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0018233
1 of 2
Copy No. 13

DOE/RL-90-24
Revision 1
Volume 1 of 2

UC-630, 721

PUREX Storage Tunnels Dangerous Waste Permit Application

Date Published
December 1991

9 1 1 2 4 3 3 3 4

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

Approved for Public Release

THE PUREX STORAGE TUNNELS DANGEROUS WASTE PERMIT APPLICATION

FOREWORD

The Hanford Site is owned by the U.S. Government and operated by the U.S. Department of Energy, DOE Richland Field Office. The Hanford Site manages and produces dangerous waste and mixed waste (containing both radioactive and dangerous components). The dangerous waste is regulated in accordance with the *Resource Conservation and Recovery Act of 1976* and the *State of Washington Hazardous Waste Management Act of 1976* (as administered through the Washington State Department of Ecology *Dangerous Waste Regulations*, Washington Administrative Code 173-303). The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act of 1954*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the *Resource Conservation and Recovery Act of 1976* and Washington Administration Code 173-303.

For purposes of the *Resource Conservation and Recovery Act* and the Washington State Department of Ecology *Dangerous Waste Regulations*, the Hanford Site is considered to be a single facility. The single dangerous waste permit identification number issued to the Hanford Site by the U.S. Environmental Protection Agency and the Washington State Department of Ecology is U.S. Environmental Protection Agency/State Identification Number WA7890008967. This identification number encompasses more than 60 treatment, storage, and/or disposal units within the Hanford Site, hereinafter referred to as the Hanford Facility when cited in the context of the *Resource Conservation and Recovery Act* and the Washington State Department of Ecology *Dangerous Waste Regulations*. All waste management activities carried out under the assigned identification number are considered to be 'onsite'.

Westinghouse Hanford Company is a major contractor to the U.S. Department of Energy, DOE Richland Field Office and serves as co-operator of the PUREX Storage Tunnels, the storage unit addressed in this permit application.

Westinghouse Hanford Company is identified in the permit application as a "co-operator" and signs in that capacity. Any identification of Westinghouse Hanford Company as an 'operator' elsewhere in this application is not meant to conflict with Westinghouse Hanford Company's designation as a co-operator but rather is based on Westinghouse Hanford Company's contractual status for the U.S. Department of Energy.

The *PUREX Storage Tunnels Dangerous Waste Permit Application* (Revision 1) consists of both a Part A and a Part B permit application. An explanation of the Part A revisions associated with this storage unit, including the Part A revision currently in effect, is provided at the beginning of the Part A Section.

The Part B consists of 15 chapters addressing the organization and content of the Part B checklist prepared by the Washington State Department of Ecology (Ecology 1987). For ease of reference, the checklist section numbers, in brackets, follow chapter headings and subheadings.

The *PUREX Storage Tunnels Dangerous Waste Permit Application* (Revision 0) was submitted to the Washington State Department of Ecology and the U.S. Environmental Protection Agency on September 28, 1990. This submittal, Revision 1, addresses Washington State Department of Ecology review comments made on Revision 0, dated February 5, 1991, and August 9, 1991.

The *PUREX Storage Tunnels Dangerous Waste Permit Application* contains information current as of September 30, 1991.

DOCUMENT CONTENT

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APPENDICES

VOLUME 1

2A HANFORD SITE MAPS

2B CONSTRUCTION PHOTOGRAPHS

VOLUME 2

2C CONSTRUCTION DRAWINGS

2D HWS-5638, SPECIFICATIONS FOR DISPOSAL FACILITY FOR FAILED EQUIPMENT, PROJECT CA-1513-A

2E HWS-8262, SPECIFICATION FOR PUREX EQUIPMENT DISPOSAL, PROJECT CGC 964

2F STORAGE TUNNEL CHECKLIST

3A CLASSIFICATION OF RESIDUAL TANK HEELS IN PUREX STORAGE TUNNELS

7A EMERGENCY PLAN FOR PUREX FACILITY

8A TRAINING COURSE DESCRIPTIONS

11A THE PUREX STORAGE TUNNELS ENGINEERING STUDY

ACRONYMS

ADC	authorized derivitive classifier
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
DOE-RL	U.S. Department of Energy, DOE Richland Field Office
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
PUREX	plutonium-uranium extraction
railcars	railroad cars
RCRA	*Resource Conservation and Recovery Act of 1976*
SARA	*Superfund Amendment and Reauthorization Act of 1986*
TSD	treatment, storage, and/or disposal
UNCI	uncontrolled nuclear information
WAC	Washington Administrative Code

ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
log	logarithmic
mrem	millirem
sch	schedule
typ	typical
~	approximately
#	number

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PART A

The Part A, Form 1, included in this permit application was submitted to the Washington State Department of Ecology in May 1988. The Part A, Form 1, consists of three pages.

The original Part A, Form 3 (Revision 0), was submitted in November 1987. A revised Part A, Form 3 (Revision 1), was submitted with the original Part B permit application in September 1990.

The Part A, Form 3 (Revision 1), included in this permit application was submitted with the original Part B permit application to redesignate the PUREX Storage Tunnels as a miscellaneous unit. Additionally, dangerous waste code D001 [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 revision included in this permit application consists of five pages of Form 3, three figures, and one photograph.

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911122.0807

FORM 1

State of Washington Department of Ecology

WASHINGTON STATE

DANGEROUS WASTE PERMIT GENERAL INFORMATION

(Read "Form 1 instructions" before starting)

I. EPA/STATE I.D. NUMBER

WA7890008967

II. NAME OF FACILITY

U.S. DEPARTMENT OF ENERGY-HANFORD SITE

III. FACILITY CONTACT

A. NAME & TITLE (last, first, & title)	B. PHONE (area code & no.)
LAWRENCE, MICHAEL J., MANAGER	509 376 7395

IV. FACILITY MAILING ADDRESS

A. STREET OR P.O. BOX: P.O. BOX 550

B. CITY OR TOWN	C. STATE	D. ZIP CODE
RICHLAND	WA	99352

V. FACILITY LOCATION

A. STREET, ROUTE NO. OR OTHER SPECIFIC IDENTIFIER: HANFORD SITE

B. COUNTY NAME: BENTON

C. CITY OR TOWN	D. STATE	E. ZIP CODE	F. COUNTY CODE (if known)
RICHLAND	WA	99352	005

VI. SIC CODES (4-digit, in order of priority)

A. FIRST		B. SECOND	
9711	NATIONAL SECURITY	8922	NUCLEAR NONCOMMERCIAL DEVELOPMENT AND EDUCATION
C. THIRD		**D. FOURTH**	
9611	ADMINISTRATION AND GENERAL ECONOMICS PROGRAM	4911	STEAM-ELECTRIC GENERATION

VII. OPERATOR INFORMATION

A. NAME

DEPARTMENT OF ENERGY-RICHLAND OPERATIONS (DOE-RL)

WESTINGHOUSE HANFORD COMPANY (WHC)

B. Is the name listed in Item VII-A also the owner? [X] YES [ ] NO **

C. STATUS OF OPERATOR (Enter the appropriate letter into the answer box; if "Other", specify.)

F = FEDERAL
S = STATE
P = PRIVATE
M = PUBLIC (other than federal or state)
O = OTHER (specify)

F (specify)

D. PHONE (area code & no.): 509 376 7395
509 376 7803

E. STREET OR P.O. BOX: PO BOX 550/PO BOX 1970

F. CITY OR TOWN	G. STATE	H. ZIP CODE
RICHLAND	WA	99352

VIII. INDIAN LAND

Is the facility located on Indian lands? [ ] YES [X] NO

**DOE-RL: OWNER/CO-OPERATOR; WHC: CO-OPERATOR FOR CERTAIN UNITS ON THE HANFORD SITE.

COMPLETE BACK PAGE

ECY 030-31

IX. MAP

Attach to this application a topographic map of the area extending to at least one mile beyond property boundaries. The map must show the outline of the facility, the location of each of its existing and proposed intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids underground. Include all springs, rivers and other surface water bodies in the map area. See instructions for precise requirements.

X. NATURE OF BUSINESS *(provide a brief description)*

- NATIONAL DEFENSE NUCLEAR MATERIAL PRODUCTION
- ENERGY RESEARCH AND TECHNOLOGY DEVELOPMENT
- DEFENSE NUCLEAR WASTE MANAGEMENT
- BYPRODUCT STEAM, SOLD FOR ELECTRIC POWER GENERATION

AND SIC 15: BUILDING CONSTRUCTION - GENERAL CONTRACTORS AND OPERATIVE BUILDERS

XI. CERTIFICATION *(see instructions)*

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that, based on my inquiry of those persons immediately responsible for obtaining the information contained in the application, I believe that the 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.

A. NAME & OFFICIAL TITLE (type or print)	B. SIGNATURE	C. DATE SIGNED
SEE ATTACHMENT		

WA7890008967

FORM 1

DANGEROUS WASTE PERMIT GENERAL INFORMATION

XI. CERTIFICATION

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments, 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.

Michael J. Lawrence 5-19-88
Michael J. Lawrence
Manager, Richland Operations
United States Department of Energy

Date

W. M. Jacobi 5/13/88
William M. Jacobi
President
Westinghouse Hanford Company
Co-operator

Date

Please print or type in the unshaded areas only

FORM 3

DANGEROUS WASTE PERMIT APPLICATION

I. 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 (yr., mo., & day)	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.)

☐ 2. NEW FACILITY (Complete item below.)

MO 0 6 DAY 1 5 YR 5 6 — FOR EXISTING FACILITIES, PROVIDE THE DATE (mo., day, & yr.) OPERATION BEGAN OR THE DATE CONSTRUCTION COMMENCED (use the boxes to the left)

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

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

☒ 1. FACILITY HAS AN INTERIM STATUS PERMIT

☐ 2. FACILITY HAS A FINAL PERMIT

III. PROCESSES — CODES AND DESIGN 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
GALLONS	G
LITERS	L
CUBIC YARDS	Y
CUBIC METERS	C
GALLONS PER DAY	U
LITERS PER DAY	V
TONS PER HOUR	D
METRIC TONS PER HOUR	W
GALLONS PER HOUR	E
LITERS PER HOUR	H
ACRE-FEET	A
HECTARE-METER	F
ACRES	B
HECTARES	Q

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. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	2. UNIT OF MEASURE (enter code)	FOR OFFICIAL USE ONLY	LINE NUMBER	A. PROCESS CODE (from list above)	B. PROCESS DESIGN CAPACITY 1. AMOUNT (specify)	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				
1	S 0 5	* 31,400**	Y		7				

* Process Code S05 is being utilized to designate the PUREX Storage Tunnels as a "miscellaneous unit" per 40 CFR 264, Subpart X.

** Total storage volume.

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 CAPACITY

The PUREX Storage Tunnels are a miscellaneous unit (S05) used for storage of mixed waste. The two tunnels are designed to store discarded equipment. Since being placed into service, various types of equipment containing mixed waste have been stored in the tunnels on railcars. Not all equipment stored in the tunnels contain mixed waste.

The construction of Tunnel 1 was completed in 1956. The maximum storage volume of the tunnel is approximately 5,400 cubic yards (19 feet wide by 22 feet high by 350 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 sealed. The combined volume of the equipment stored in Tunnel 1 is approximately 780 cubic yards.

The construction of Tunnel 2 was completed in 1964. The maximum storage volume of the tunnel is approximately 26,000 cubic yards (19 feet wide by 22 feet high by 1,680 feet long) providing storage space for 40 railcars. The first railcar was placed in Tunnel 2 in December 1967 and as of January 1990, 17 railcars have been placed in the tunnel. The combined volume of equipment stored on the 17 railcars presently in Tunnel 2 is approximately 1,780 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.

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))
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

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

I.D. NUMBER (enter from page 1)

W	A	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	D008	6,000*	P	S05	Storage/Other/Miscellaneous Unit
2	WT01				Included With Above
3	D009	100*	P	S05	Storage/Other/Miscellaneous Unit
4	WT01				Included With Above
5	D011	1,500*	P	S05	Storage/Other/Miscellaneous Unit
6	WT01		↓	↓	↓
7	D001				Included With Above
8					
9					
10					
11					
12					
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14					
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16					
17					
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26					

* Listed annual quantities represent the estimated maximum quantity of waste placed in either tunnel in a given year since the tunnels were placed in service. Listed annual waste quantities may be exceeded in future years of operation.

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 includes lead (D008) weights, counterweights, mercury (D009) in the dissolvers, and silver salts (D011) from the silver reactors. The silver salts are considered ignitible (D001) because of the presence of silver nitrate. These dangerous wastes are considered toxic extremely hazardous waste (WT01).
The estimated amount of mixed waste currently stored in the tunnels is as follows.

TUNNEL NUMBER	DANGEROUS WASTE	AMOUNT[1]	LOCATION IN TUNNELS[2]
1	Lead (elemental)	500 lbs	Positions 2 and 4
2	Silver Salts[3]	1,625 lbs[4]	Positions 5 and 15
	Mercury (elemental)	284 lbs	Positions 7, 9, and 11
	Lead (elemental)	6,084 lbs	Positions 14 and 15

1 - The amounts indicated are approximates in pounds (lbs).
2 - Railcar positions start from the south end of the tunnel (Position 1 farthest south).
3 - A mixture of silver nitrate, silver halides and silver fines.
4 - Expressed as pounds-equivalent of silver nitrate.

V. FACILITY DRAWING

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

VI. PHOTOGRAPHS

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 drawings and photos

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 VIII 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 VIII 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, Richland Operations United States Department of Energy		9-18-90

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

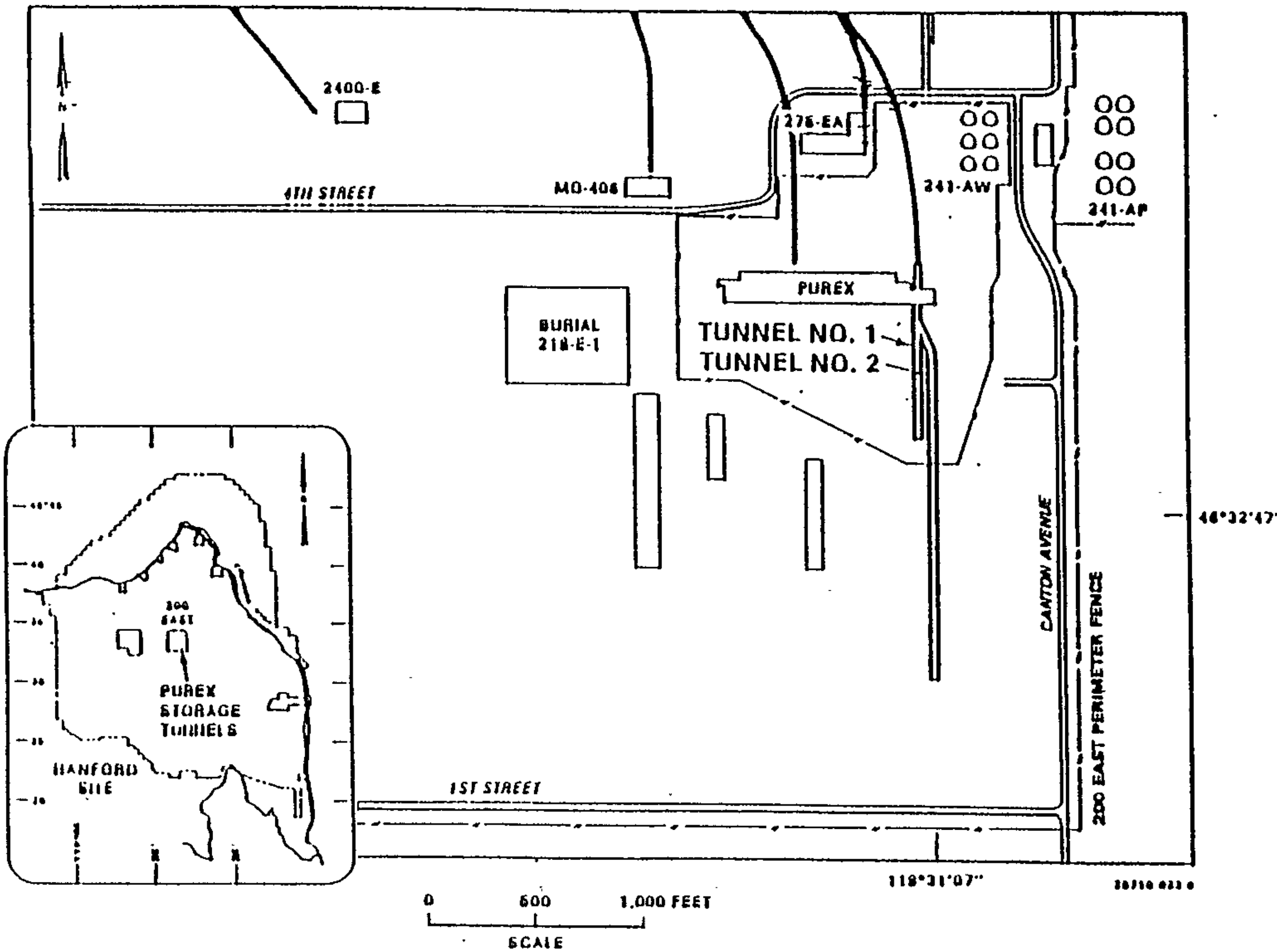
I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true,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

Edward S. Goldberg ________________ 9/18/90
Owner/Operator — Date
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

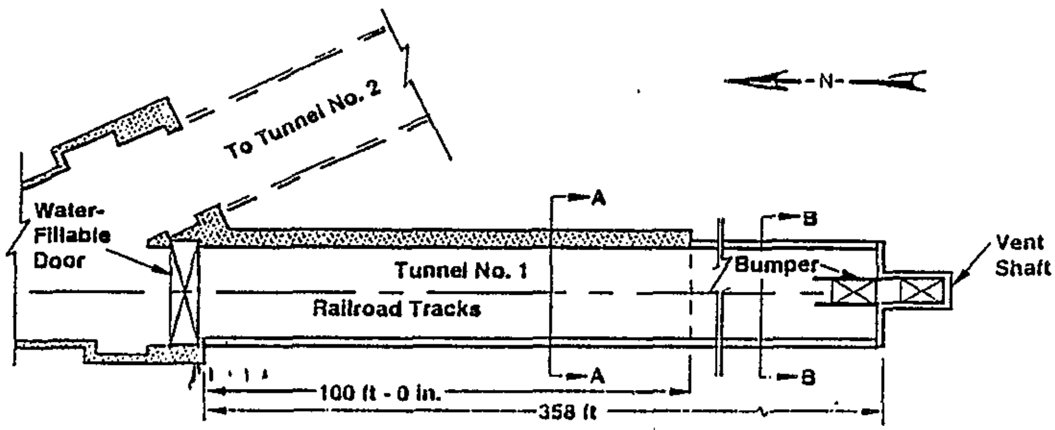
Roger Nichols ________________ 8/31/90
Co-operator — Date
Roger C. Nichols, President
Westinghouse Hanford Company

9 2 1 2 4 | 3 5 1

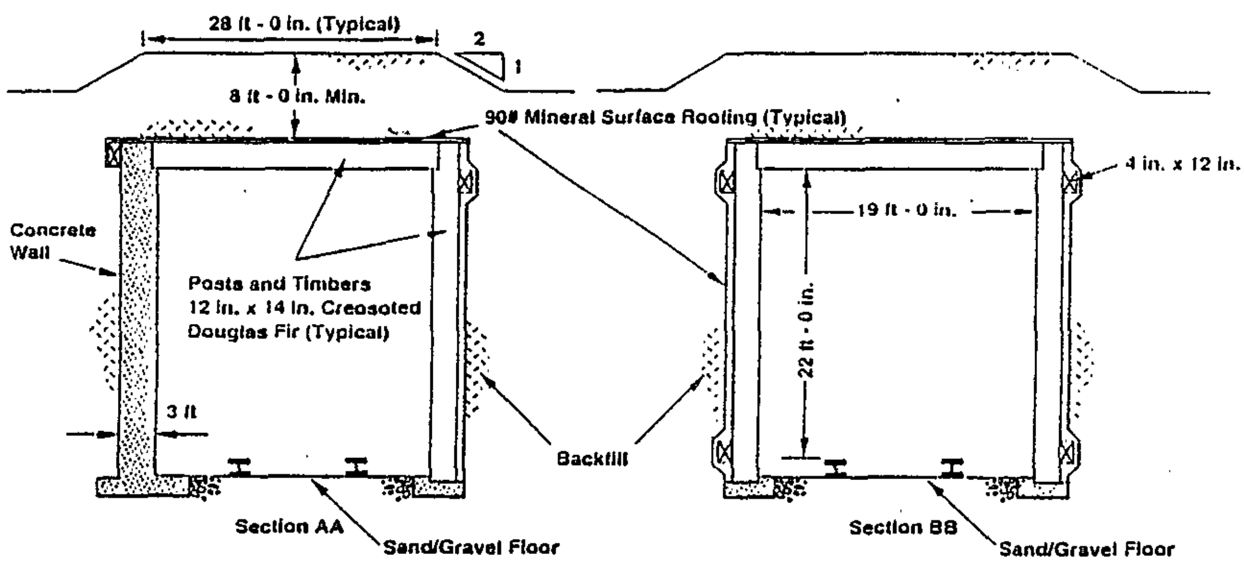
PUREX STORAGE TUNNELS
SITE PLAN



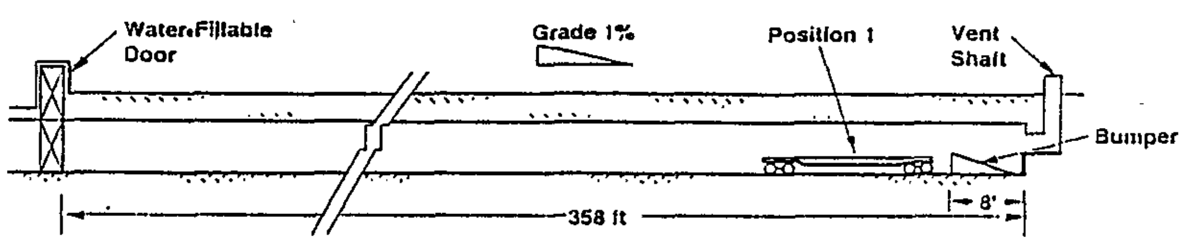
PUREX Tunnel No. 1 - Details



Tunnel No. 1 - Plan View



PUREX Tunnel No. 1 - Section Views



PUREX Tunnel No. 1 - Elevation View

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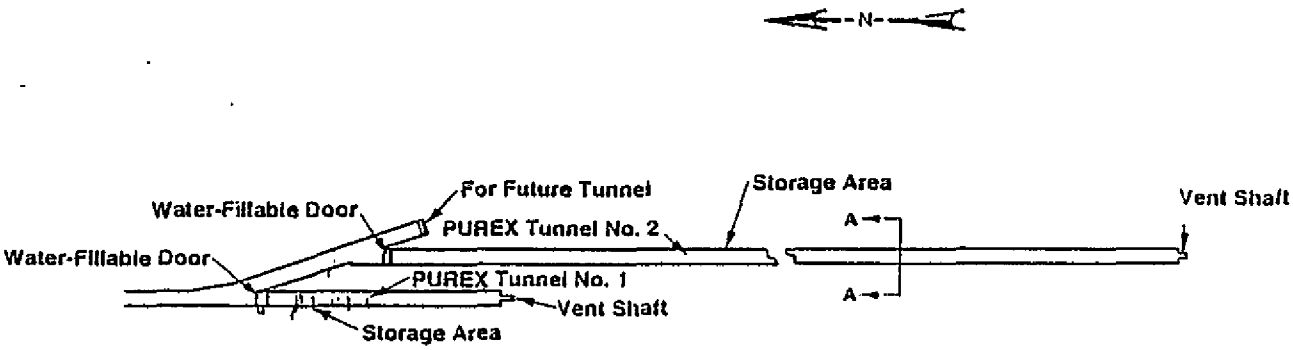
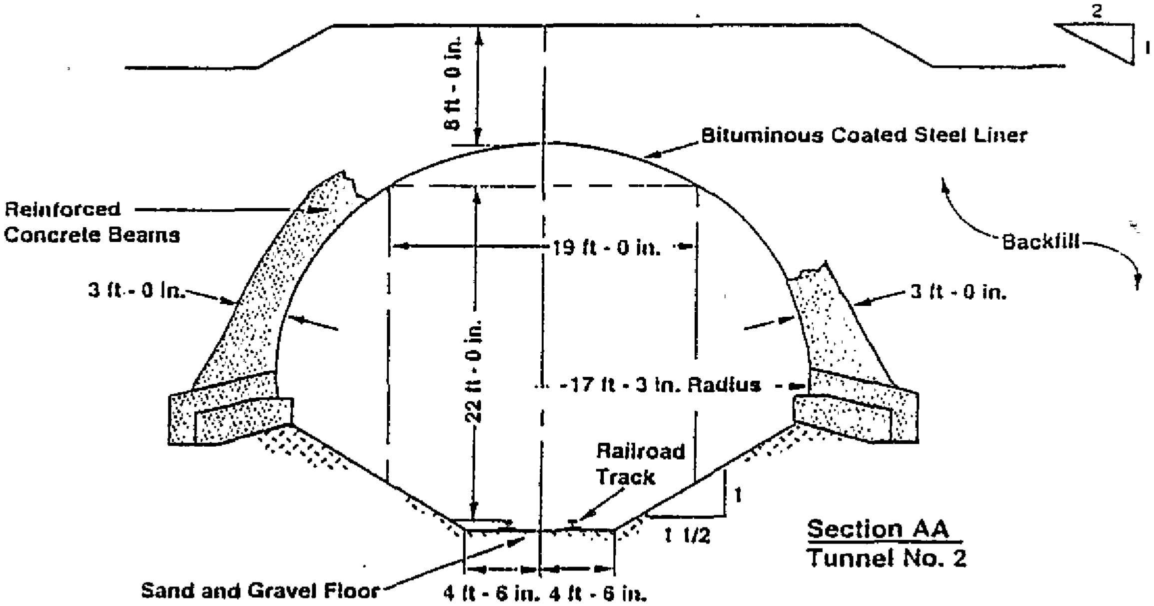
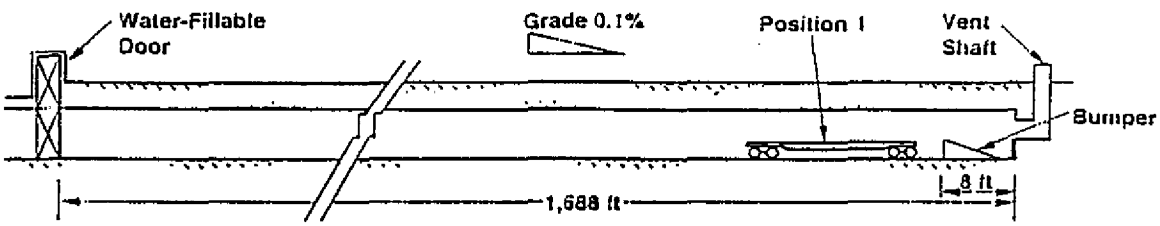
PUREX Tunnel No. 2 - Details



PUREX Tunnels - Plan View



Section AA
Tunnel No. 2



PUREX Tunnel No. 2 - Elevation View

78910032.1

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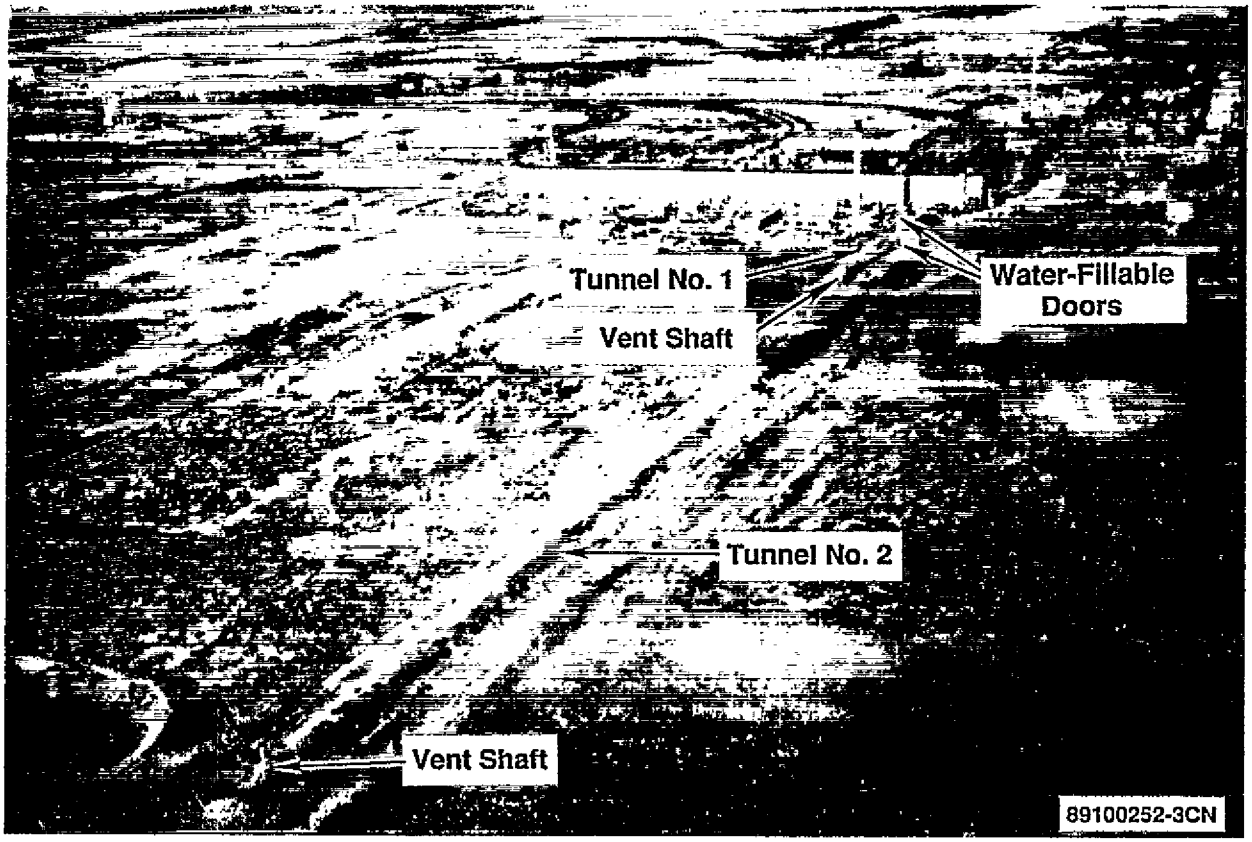
PUREX STORAGE TUNNELS



46°32'47"
119°31'07"

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(PHOTO TAKEN 1989)

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PART B

This permit application for the PURIX Storage Tunnels consists of 15 chapters and 10 appendices.

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CONTENTS

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1.0 INTRODUCTION

This chapter describes the permitting approach for the PUREX (plutonium-uranium extraction) Storage Tunnels and provides an overview of the contents of the PUREX Storage Tunnels Part B permit application.

1.1 THE PUREX STORAGE TUNNELS PERMITTING

The PUREX Storage Tunnels are a mixed waste storage unit consisting of two underground railroad tunnels: Tunnel Number 1 designated 218-E-14 and Tunnel Number 2 designated 218-E-15. The two tunnels are connected by rail to the PUREX Plant and combine to provide storage space for 48 railroad cars (railcars).

The PUREX Storage Tunnels provide a long-term storage location for equipment removed from the PUREX Plant. Transfers into the PUREX Storage Tunnels are made on an as-needed basis. Radioactively contaminated equipment is loaded on railcars and remotely transferred by rail into the PUREX Storage Tunnels. Railcars act as both a transport means and a storage platform for equipment placed into the tunnels.

The tunnels are weather-tight structures covered by 8 feet (2.4 meters) of earth. This design protects the stored equipment from exposure to natural elements, provides external radiation shielding from the radioactive equipment stored inside the tunnels, and provides for protection of the environment.

Tunnel Number 1 was completed in 1956 as part of the PUREX Facility construction project and provides storage space for eight railcars. Tunnel Number 1 was filled to capacity in 1965 and subsequently was sealed. Tunnel Number 2 was an expansion project constructed in 1964. This tunnel is different in design and is considerably longer than Tunnel Number 1, providing storage space for a total of 40 railcars. As of September 30, 1991, there were 17 railcars stored in Tunnel Number 2. The Washington State Department of Ecology (Ecology) will be notified of future increases or decreases in the number of railcars stored in the tunnels by means of the Hanford Site Annual Dangerous Waste Report (Chapter 12.0, Section 12.4.1.2).

All equipment stored in the tunnels has been involved in PUREX Plant process operations and, as a result, is radioactive. While all of the equipment is radioactive, most equipment placed in the tunnels for storage does not contain dangerous waste. The dangerous waste associated with the equipment is either attached to, or contained within, the equipment.

The PUREX Storage Tunnels are classified as a miscellaneous unit and are being permitted under the provisions of Ecology *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-680. Classification as a miscellaneous unit was determined to be appropriate because the PUREX Storage Tunnels do not conform to the description of any existing unit provided in WAC 173-303-040.

This Part B is written under the assumption that authority for the administration of "Miscellaneous Units" (WAC 173-303-680) will be extended to Ecology by the time the PUREX Storage Tunnels permit is finalized and issued.

The WAC 173-303-680 requires that miscellaneous unit permit terms and conditions address appropriate requirements provided for other treatment, storage, and/or disposal (TSD) facilities. The construction and operation of the PUREX Storage Tunnels most closely resembles that of a container storage facility; therefore, appropriate requirements for a container storage facility are addressed throughout the permit application. However, because of the high levels of radiation present inside the PUREX Storage Tunnels, certain inspection and labeling requirements prescribed for a container storage facility are not feasible and alternatives are necessary. These alternatives serve to meet the intent of the requirements prescribed by WAC 173-303 and to maintain radiation exposure to personnel as low as reasonably achievable (ALARA). The rationale for operations associated with the PUREX Storage Tunnels is addressed further in a petition for rulemaking change submitted to Ecology and the U.S. Environmental Protection Agency (EPA) (Freeberg 1989) in fulfillment of a *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) milestone (Milestone M-22-01) (Ecology et al. 1990). This proposed petition identifies areas where it is not practical to perform inspections and other activities prescribed by the *Resource Conservation and Recovery Act (RCRA) of 1976* because of radiological hazards present at certain Hanford Site TSD units.

This permit application addresses only the PUREX Storage Tunnels. Other TSD units that are part of the PUREX Facility will be addressed under separate Part A and Part B permit applications.

1.2 THE PUREX STORAGE TUNNELS PART B PERMIT APPLICATION CONTENTS

The PUREX Storage Tunnels Part B permit application consists of 15 chapters:

- Introduction (Chapter 1.0)
- Facility Description and General Provisions (Chapter 2.0)
- Waste Characteristics (Chapter 3.0)
- Process Information (Chapter 4.0)
- Groundwater Monitoring (Chapter 5.0)
- Procedures to Prevent Hazards (Chapter 6.0)
- Contingency Plan (Chapter 7.0)
- Personnel Training (Chapter 8.0)
- Exposure Information Report (Chapter 9.0)

- Waste Minimization Plan (Chapter 10.0)
- Closure and Postclosure Requirements (Chapter 11.0)
- Reporting and Recordkeeping (Chapter 12.0)
- Other Relevant Laws (Chapter 13.0)
- Certification (Chapter 14.0)
- References (Chapter 15.0).

A brief description of each chapter is provided in the following sections.

1.2.1 Facility Description and General Provisions (Chapter 2.0)

This chapter provides a general description of the PUREX Facility, the PUREX Plant, and the PUREX Storage Tunnels. A brief description of the Hanford Site and Hanford Facility also are provided.

1.2.2 Waste Characteristics (Chapter 3.0)

This chapter describes the physical, chemical, and biological characteristics of the dangerous waste stored within the PUREX Storage Tunnels. A waste analysis plan is included that provides the methodology for determining waste types.

1.2.3 Process Information (Chapter 4.0)

This chapter covers the detailed operation of the PUREX Storage Tunnels. The information describes the removal of equipment from the PUREX Plant and placement and removal of the equipment at the PUREX Storage Tunnels.

1.2.4 Groundwater Monitoring (Chapter 5.0)

This chapter explains that the PUREX Storage Tunnels are not operated as a dangerous waste surface impoundment, waste pile, land treatment unit, or landfill. Therefore, groundwater monitoring is not required.

1.2.5 Procedures to Prevent Hazards (Chapter 6.0)

This chapter discusses hazard prevention and emergency preparedness equipment, structures, and procedures.

1.2.6 Contingency Plan (Chapter 7.0)

This chapter provides information on contingency planning to ensure that the PUREX Facility has measures in place to lessen the potential impact on the public health and the environment in the event of an emergency.

1.2.7 Personnel Training (Chapter 8.0)

This chapter outlines the training program for PUREX Facility employees whose primary duties at the PUREX Storage Tunnels are identified as being associated with dangerous waste management.

1.2.8 Exposure Information Report (Chapter 9.0)

This chapter explains that the PUREX Storage Tunnels will not store, treat, or dispose of dangerous waste in a surface impoundment or a landfill. Therefore, exposure information is not required.

1.2.9 Waste Minimization Plan (Chapter 10.0)

This chapter explains that the PUREX Storage Tunnels operations do not generate regulated dangerous waste. Therefore, a waste minimization plan is not required.

1.2.10 Closure and Postclosure Requirements (Chapter 11.0)

This chapter describes how the PUREX Storage Tunnels will be decontaminated and closed. A closure schedule is provided. The PUREX Storage Tunnels are to be clean closed; therefore, no postclosure plan is included.

1.2.11 Reporting and Recordkeeping (Chapter 12.0)

This chapter summarizes commitments for reporting and recordkeeping that are applicable to the PUREX Storage Tunnels.

1.2.12 Other Relevant Laws (Chapter 13.0)

This chapter discusses federal and state laws that govern the operation of the PUREX Storage Tunnels, other than the RCRA, as amended, and the *State of Washington Hazardous Waste Management Act of 1976*, as amended.

1.2.13 Certification (Chapter 14.0)

This chapter contains the required certification signed by officials of the U.S. Department of Energy, DOE Richland Field Office (DOE-RL) and Westinghouse Hanford Company indicating that the information provided is true, accurate, and complete.

1.2.14 References (Chapter 15.0)

References used throughout this Part B permit application are listed in this chapter. All references listed here, which generally are not available from other sources, will be made available for review, upon request, to any regulatory agency or public commentor. References can be obtained by contacting the following:

Administrative Records Specialist
Public Access Room H4-22
Westinghouse Hanford Company
P. O. Box 1970
Richland, Washington 99352.

1.3 ACRONYMS AND ABBREVIATIONS

Acronyms and abbreviations used throughout this Part B permit application are located at the beginning of the document between the Foreword and the Part A permit application.

1.4 DEFINITIONS

Definitions specific to this permit application are provided in this section. These definitions supplement those provided in WAC 173-303-040.

ALARA--An acronym for as low as reasonably achievable. ALARA denotes the concept of ensuring minimization of exposure of personnel to all hazardous substances and conditions including radiation and hazardous chemicals. This concept is the policy of the U.S. Department of Energy.

Contractor--Firm under contract to the U.S. Department of Energy to provide Hanford Site services. Currently, there are the following four onsite, prime contractors:

- An Operations and Engineering Contractor
- A Research and Development Contractor
- An Engineer and Constructor Contractor
- A Medical Health Services Contractor.

Throughout the remainder of this permit application, the term contractor, except where specified, is used to refer to the operations and engineering contractor.

Dangerous or hazardous waste--In addition to the definition in WAC 173-303-040, means the nonradioactive dangerous component of waste commonly called mixed waste (i.e., waste that is both dangerous and radioactive). Dangerous waste commonly is used to refer to hazardous, dangerous, or extremely hazardous waste within this permit application.

DOE Richland Field Office--Formally referred to as 'Richland Operations Office' and 'DOE Field Office, Richland.' Usage of either term within the text should be considered as equivalent to the 'DOE Richland Field Office'.

Facility--Dependent on context, the term 'facility', as used in this permit application, could refer to:

- The Hanford Facility (refer to definition)
- A facility as defined in WAC 173-303-040
- Building nomenclature commonly used at the Hanford Facility. In this context, the term 'facility' remains as part of the title for various treatment, storage, and/or disposal (TSD) units (e.g., 616 Nonradioactive Dangerous Waste Storage Facility, Grout Treatment Facility).

Generating Unit--Term inferred to have the same meaning as 'generator' as defined in WAC 173-303-040. For purposes of RCRA and the *Dangerous Waste Regulations*, the Hanford Facility is considered to be a single generator consisting of a number of generating units.

Hanford Facility--A single RCRA facility identified by the EPA/State Identification Number WA7890008967 that consists of over 60 TSD units conducting dangerous waste management activities. These TSD units are included in the *Hanford Facility Dangerous Waste Part A Permit Application* (DOE-RL 1988). Also, the contiguous portion of the Hanford Site that contains these TSD units and, for the purposes of the RCRA, is owned and operated by the U.S. Department of Energy (excluding lands north and east of the Columbia River, river islands, state owned or leased lands, lands owned by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and the Ashe Substation). The Hanford Facility is a single site for purposes of provisions regulating 'offsite' or 'onsite' waste handling.

Hanford Site--The approximately 560 square miles (1,450 square kilometers) in southeastern Washington State owned by the United States Government and commonly known as the Hanford Reservation.

Jumper--A prefabricated, remotely installed, piping assembly used to make intra cell transfers between process equipment. The piping assembly may contain: connectors, valves, instrumentation, and counterweights.

Offsite Shipments--Shipments not considered to be onsite.

Onsite Shipments--Shipments (1) from waste generating units to TSD units operated by the DOE-RL or (2) between TSD units operated by the DOE-RL.

PUREX Facility--All buildings and structures, including the PUREX Storage Tunnels, that lie within, or adjacent to, the double fenced area. The office trailer complex located adjacent to, but outside, the double fenced area, also is considered to be a part of the PUREX Facility.

PUREX Plant--The PUREX processing building, Building 202-A.

Treatment, Storage, and/or Disposal Unit--A unit used for treatment, storage, and/or disposal of dangerous waste that is required to be permitted and/or closed pursuant to RCRA requirements as determined in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) Action Plan (Ecology et al. 1990). Also refers to a grouping of TSD units for the purpose of preparing and submitting a permit application pursuant to the requirements under RCRA, as determined in the Tri-Party Agreement Action Plan.

Tri-Party Agreement--The term Tri-Party Agreement means the *Hanford Federal Facility Agreement and Consent Order*, dated May 1989, as amended, and as it may be amended from time to time, including the Action Plan incorporated in Tri-Party Agreement.

Waste Management Unit--Term inferred to have the same meaning as 'dangerous waste management unit' as defined in WAC 173-303-040. Also inferred to have the same meaning as TSD unit.

1.5 PERMIT MODIFICATIONS

All modifications to the PUREX Storage Tunnels dangerous waste permit application will be made in accordance with the requirements identified in WAC 173-303-830, with the following exception. The notifications required by WAC 173-303-830(4)(a)(i)(A) and (B) for Class 1 changes will be submitted on an annual basis to the required regulatory agencies, appropriate units of state and local government, and individuals on the facility mailing list maintained by Ecology. These notifications will be submitted by March 1 of each year.

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CONTENTS

CONTENTS (cont)

APPENDICES

FIGURES

TABLE

2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B]

This chapter briefly describes the Hanford Site and Hanford Facility. In addition, this chapter presents an overview of the PUREX Storage Tunnels, including the following:

- General description
- Topography
- Location information
- Traffic information
- Performance standards
- Buffer monitoring zones
- Spills and discharges
- Manifest system.

2.1 GENERAL DESCRIPTION [B-1]

This section contains a discussion of the general Hanford Facility operating areas and provides an introduction to the PUREX Storage Tunnels. A brief description of the Hanford Facility waste management practices and a description of the PUREX Storage Tunnels are contained in this section. More detailed discussions of the waste types, known characteristics, and operating methods of the PUREX Storage Tunnels are provided in Chapters 3.0 and 4.0, respectively.

2.1.1 The Hanford Site

The Hanford Site covers approximately 560 square miles (1,450 square kilometers) of semiarid land that is owned by the U.S. Government and managed by the DOE-RL. The Hanford Site is located northwest of the city of Richland, Washington (Figure 2-1). The city of Richland adjoins the southeasternmost portion of the Hanford Site boundary and is the nearest population center. In early 1943, the U.S. Army Corps of Engineers selected the Hanford Site as the location for reactor, chemical separation, and related activities for the production and purification of special nuclear materials. The mission of the Hanford Site recently has focused on environmental remediation and restoration.

Activities at the Hanford Site are centralized in numerically designated areas (Drawing H-6-958 in Appendix 2A). The reactors are located along the Columbia River in the 100 Areas. The reactor fuel reprocessing units are in the 200 Areas, which are on a plateau approximately 7 miles (11.3 kilometers) from the Columbia River. The 300 Area, located adjacent to and north of Richland, contains the reactor fuel manufacturing plants and the research and development laboratories. The 400 Area, 5 miles (8 kilometers) northwest of the 300 Area, contains the Fast Flux Test Facility used for testing liquid metal reactor systems. The 600 Area is the identifier for all locations not specifically given an area designator. Adjacent to and north of Richland, the 1100 Area contains buildings associated with administration, maintenance, transportation, and materials procurement and distribution. The 3000 Area, between the 1100 and the 300 Areas, contains engineering offices and administrative offices. Administrative offices also are located in the 700 Area, which is in downtown Richland.

Drawing H-6-958 in Appendix 2A provides a general overview of the Hanford Site and contiguous area. The drawing illustrates the following:

- Legal boundary
- Contours [at 20-foot (6.1-meter) intervals] sufficient to show surface water flow
- Fire control services
- Access roads, internal roads, railroads, perimeter gates, and barricades
- Longitudes and latitudes.

2.1.2 The Hanford Facility

The Hanford Facility is defined as a single RCRA facility, identified by the EPA/State Identification Number WA7890008967, that consists of over 60 TSD units conducting dangerous waste management activities. These TSD units are included in the *Hanford Facility Dangerous Waste Part A Permit Application* (DOE-RL 1988). The Hanford Facility consists of the contiguous portion of the Hanford Site that contains these TSD units and, for the purposes of the RCRA, is owned and operated by the U.S. Department of Energy (excluding lands north and east of the Columbia River, river islands, state owned or leased lands, lands owned by the Bonneville Power Administration, lands leased to the Washington Public Power Supply System, and the Ashe Substation). The Hanford Facility is a single site for purposes of provisions regulating 'offsite' or 'onsite' waste handling.

2.1.3 The PUREX Facility

The PUREX Facility is located in the southeast corner of the 200 East Area. The 200 East Area (Figure 2-2) is located near the center of the Hanford Facility and is situated on a plateau [elevation 710 feet (216.4 meters)] approximately 7 miles (11.3 kilometers) west of the Columbia River [elevation 350 feet (106.7 meters)]. The PUREX Facility (Figure 2-3) includes all buildings and structures that lie within the double fenced area, plus the office trailer complex located adjacent to but outside the double fenced area. The trailer complex is used by engineering, training, and administrative personnel who provide direct support to the PUREX Facility. The PUREX Facility is used to recover the plutonium product and the reusable uranium content of irradiated reactor fuel. Liquid-liquid extraction processes are used to separate the plutonium and uranium from radioactive fission products and to separate the plutonium from the uranium.

Irradiated reactor fuel is processed in the PUREX Processing Building 202-A (commonly referred to as the PUREX Plant). A cutaway and section of the 202-A Building are shown in Figures 2-4 and 2-5, respectively. This building is a reinforced concrete structure 1,005 feet (306.3 meters) long, 119 feet (36.3 meters) wide (at its maximum), and 100 feet (30.5 meters) high with about 40 feet (12.2 meters) of this height below grade. The building consists of three main structural components: (1) a thick-walled, concrete canyon containing remotely operated process equipment (in cells below grade); (2) the pipe and operating, sample, and storage galleries; and (3) an annex that includes offices, process control rooms, laboratories, and the building services. The portion of the canyon below grade is subdivided into a row of process cells paralleled by an exhaust air tunnel and pipe trench through which intercell solution transfers are made. The air tunnel exhausts the ventilation air from the cells to the main ventilation filters and stack.

A craneway is located above the cells and pipe trench and extends almost the full length of the canyon building. In the craneway are three gantry-type maintenance cranes that are used to handle cell cover blocks, remotely remove and replace process cell equipment, and charge irradiated reactor fuel into the dissolvers. The galleries contain service piping to the cells, samplers for obtaining process samples, and electrical switchgear.

A railroad spur enters the PUREX Facility from the north and extends into the east end of Building 202-A (Figures 2-2 and 2-3). The railroad spur enters Building 202-A through a vertical door that leads into an area known as the railroad tunnel. It is through this railroad tunnel that irradiated reactor fuel is received at the PUREX Plant. The railroad tunnel also is used to receive replacement equipment to be installed in the canyon processing area. Access from the railroad tunnel to the canyon processing area is through a horizontal door located in the ceiling of the railroad tunnel. The horizontal door lies beneath the canyon craneway and to the west of the crane maintenance area. Figure 2-4 shows this door open (slid northward) to allow crane access to the reactor fuel cask car positioned beneath the upper canyon floor. Access to the PUREX Storage Tunnels (Section 2.1.5) 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 2-4 to show the cask car and the extended railroad track.

2.1.4 The PUREX Storage Tunnels

The PUREX Storage Tunnels branch off from the railroad tunnel and extend southward from the east end of the PUREX Plant (Figure 2-3). The tunnels are used for storage of failed and/or obsolete process equipment that is removed from the PUREX Plant. 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 and suppression, radiation monitoring, or communication systems provided inside the storage area of the PUREX Storage Tunnels.

Equipment selected for storage in the PUREX Storage Tunnels is loaded on railcars that have been modified to serve as both transport and storage platforms. Normally, a remote-controlled, battery-powered locomotive is 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 equipment 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 spur inside each storage tunnel, the railcars can be removed only in reverse order to that used to place them into storage (i.e., last in, first out).

Equipment transfers into or out of the PUREX Storage Tunnels are infrequent and are not manpower-intensive operations. Personnel with responsibilities for management, operation, and maintenance of the PUREX Storage Tunnels are PUREX Facility employees that have other responsibilities associated with the operation of the PUREX Plant. A more detailed description of the operation of the PUREX Storage Tunnels is provided in Chapter 4.0.

Designated dangerous waste TSD units within 1,000 feet (305 meters) of the PUREX Storage Tunnels are listed in Table 2-1. In accordance with WAC 173-303-806(4)(a)(xviii)(L), the locations of these TSD units are shown on Drawing H-2-79998 in Appendix 2A.

2.1.4.1 Tunnel Number 1 (218-E-14). Construction of Tunnel Number 1 was completed in 1956 as part of the PUREX Facility construction project. Tunnel Number 1 consists of three areas: the water-fillable door, the storage area, and the vent shaft (Figure 2-6).

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 24.5 feet (7.5 meters) high, 21.5 feet (6.6 meters) wide, and 7 feet (2.1 meters) thick, and is constructed of 1/2-inch (1.3 centimeter) steel plate. The door is hollow so that it may be filled with water to act as a radiation shield when it 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. The water pumped from the door will discharge to B Pond by means of a 6-inch (15.2-centimeter) line that connects to the PUREX Plant cooling water line.

Above the door is a reinforced concrete structure that encloses the door when the door is raised to the open position. 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 operation gallery. Water used for filling the door is supplied by a 3-inch (7.6-centimeter) raw water line (Drawing H-2-55587 in Appendix 2C).

Beneath the water-fillable door is a sump with a 6-inch (15.2-centimeter) drain that connects to a railroad tunnel sump that can be pumped out to tanks U3/U4 located in the PUREX Plant.

The storage area is that portion of the tunnel that extends southward from the water-fillable door. The inside dimensions of Tunnel Number 1 are 358 feet (109.1 meters) long, 22 feet (6.7 meters) high, and 19 feet (5.9 meters) wide. The ceiling and walls are 14 inches (35.6 centimeters) thick and constructed of 12- by 14-inch (30.5- by 35.6-centimeter) creosote pressure-treated Douglas fir timbers arranged side by side. The first 100 feet (30.5 meters) of the east wall is constructed of 3-foot-thick (0.9-meter-thick) reinforced concrete (Section AA of Figure 2-6). A 90-pound (40.8-kilogram) mineral-surface roofing material was used to cover the exterior surface of the timbers before placement of 8 feet (2.4 meters) of earth fill. The earth cover serves as radiation shielding. The timbers that form the walls rest on reinforced concrete footings 3 feet (0.9 meters) wide by 1 foot (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 8 feet (2.4 meters) from the south end of the tracks to act as a stop. Top-of-track elevation is 693 feet (211.2 meters) at the water-fillable door and the track slopes to an elevation of 689 feet 5 inches (210.1 meters) at the end of the tunnel. The capacity of the storage area is eight, 42-foot-long (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 of these risers are capped. For more detail on these pipe risers, refer to Drawing H-2-55587 in Appendix 2C and Figure 2 in Appendix 11A.

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

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to be at about 21 percent with carbon dioxide at about 0.3 percent. The reported temperature in Tunnel Number 1 holds consistently at 60 °F (15.6 °C) (Rambosek and Foster 1972).

An independent evaluation of the data collected by Silvan in 1980 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 should be structurally 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 because of the exposure of the timbers to the high gamma radiation field emitted by the material stored within the tunnel were conservative.

A vent shaft is located at the south end of Tunnel Number 1. The shaft is approximately 5 feet by 5 feet (1.5 meters by 1.5 meters) in cross section and is constructed of reinforced concrete. The vent stack extends approximately 1 foot (0.3 meter) above grade and is capped with a single-stage, high-efficiency particulate air filter, a 10,000 cubic foot (283 cubic meter) per minute exhaust fan, and a 20-foot (6.1 meters) tall exhaust stack. After filling Tunnel Number 1 to capacity, the tunnel was sealed. Sealing activities included blanking the exhaust system upstream of the air filters to prevent interaction of the tunnel air with external air. A further discussion of the tunnel ventilation system is provided in Chapter 4.0, Section 4.1.6.

In June 1960, the first two railcars were loaded with a single, approximately 41-foot- (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, as was the exhaust system. Table 3-1 in Chapter 3.0 lists the dangerous materials stored in Tunnel Number 1.

2.1.4.2 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 2-7) 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 6 feet (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 PUREX railroad tunnel approach to Tunnel Number 2 angles eastward then angles southward to parallel Tunnel Number 1 (Figure 2-7). 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 60 feet (18.3 meters).

The physical structure of the water-fillable door at the north end of Tunnel Number 2 is essentially identical to the water-fillable door for Tunnel Number 1. The water-fillable door for Tunnel Number 2 is approximately 190 feet (57.9 meters) south and 60 feet (18.3 meters) east of the water-fillable door for Tunnel Number 1 and is inside the PUREX Facility double fenced area (Figure 2-3).

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). Water used to fill the door is provided by means of a hydrant that is supplied from the PUREX Plant raw water line (Drawing H-2-63180 in Appendix 2C). Drawing H-2-63180 also shows the sump beneath the door to drain to the 216-A-30 Crib by way of the PUREX Plant steam condensate discharge line. Chapter 4.0, Section 4.1.1.2, provides additional operational information on the Tunnel Number 2 water-fillable door. The door currently is empty. Procedures for filling and draining the door are presented in Chapter 4.0, Section 4.1.4.

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 34-foot-diameter (10.4-meter-diameter), steel [3/16-inch (0.5 centimeter) plate], semicircular-shaped roof, supported by internal I-beam wales attached to external, reinforced concrete arches. The concrete arches are 1 foot 3 inches (0.4 meter) thick and vary in width from 2 1/2 to 6 feet (0.4 to 1.8 meters). The arches are spaced on 15 feet 8 3/4-inch (4.8-meters) centers. This semicircular structure is supported on reinforced concrete grade beams approximately 6 feet (1.8 meters) wide by 4 feet (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 8 feet (2.4 meters) of earth fill to serve as radiation shielding.

The nominal inside dimensions of Tunnel Number 2 are 1,688 feet (514.5 meters) long, 26 feet (7.9 meters) high, and 34 feet (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 22 feet (6.7 meters) high and 19 feet (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

8-foot-long (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 8 feet (2.4 meters) from the south end of the tracks to act as a stop. Top-of-track elevation is 693 feet (211.2 meters) at the water-fillable door and slopes downward to an elevation of 691 feet 4 inches (210.7 meters) at the end of the tunnel. The capacity of the storage area is 40, 42-foot- (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 2C). The ports are on 96-foot (29.3-meter) centers. A 3-inch (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. The PUREX Plant operations administers access control of these tunnel ports.

The vent shaft is located at the south end of Tunnel Number 2. The shaft is approximately 5 feet by 5 feet (1.5 meters by 1.5 meters) in cross section and is constructed of reinforced concrete. The vent shaft extends approximately 1 foot (0.3 meter) above grade and is capped with an exhaust system consisting of a single-stage, high-efficiency particulate air filter, a 10,000 cubic foot (283 cubic meter) per minute exhaust fan, and a 20-foot- (6.1-meter-) tall exhaust stack. The exhaust system currently is active; however, the exhaust fan has been dampered to provide only about 4,000 cubic feet (113 cubic meters) per minute of exhaust flow. A further discussion of the tunnel ventilation system is provided in Chapter 4.0, Section 4.1.6.

The first railcar was placed in storage in December 1967. As of September 30, 1991, 17 railcars have been placed in Tunnel Number 2. Table 3-1 in Chapter 3.0 lists the dangerous materials stored in Tunnel Number 2.

2.1.4.3 Construction Photographs. Photographs taken during construction of the PUREX Storage Tunnels are provided in Appendix 2B.

2.1.4.4 Construction Drawings and Specifications. The PUREX Storage Tunnels construction specifications and design drawings are included in Appendices 2C, 2D, and 2E.

2.2 TOPOGRAPHIC MAP [B-2]

A topographic map, showing a distance of at least 1,000 feet (305 meters) around the PUREX Storage Tunnels, is located in Drawing H-2-79998 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
- Access road location
- Access control
- Monitoring and sampling well locations
- Building locations
- TSD unit locations
- Location of the PUREX Storage Tunnels.

A legal description of the PUREX Storage Tunnels is provided in Appendix 2A.

2.3 LOCATION INFORMATION [B-3]

This section describes the location of the PUREX Storage Tunnels in relation to seismic, floodplain, and shoreline considerations.

2.3.1 Seismic Consideration [B-3a]

The PUREX Storage Tunnels is an existing waste management unit located on the Hanford Facility. Therefore, a discussion of seismic standards related to siting considerations as required by WAC 173-303-282(6)(a)(i) and WAC 173-303-806(4)(a)(xi) is not required.

2.3.2 Floodplain Standard [B-3b]

Three sources of potential flooding of the unit were considered: (1) the Columbia River, (2) the Yakima River, and (3) storm-induced run-off in ephemeral streams draining the Hanford Site. No perennial streams occur in the central part of the Hanford Site.

The Federal Emergency Management Agency has not prepared floodplain maps for the Columbia River through the Hanford Site. The flow of the Columbia River is largely controlled by several upstream dams that are designed to reduce major flood flows. Based on a U.S. Army Corps of Engineers study of the flooding potential of the Columbia River that considered historic data and water storage capacity of the dams on the Columbia River (COE 1969), the U.S. Department of Energy (ERDA 1976) has estimated the probable maximum flood (Figure 2-8). The estimated probable maximum flood would have a larger floodplain than either the 100- or 500-year floods. The PUREX Storage Tunnels are well above the elevation of the Columbia River probable maximum flood and therefore are not within the 100- or 500-year floodplain.

The 100-year floodplain for the Yakima River, as determined by the Federal Emergency Management Agency (FEMA 1980), is shown in Figure 2-9. The PUREX Storage Tunnels are not within the floodplain.

The only other potential source of flooding of the PUREX Storage Tunnels is run-off from a large precipitation event in the Cold Creek watershed. This could result in flooding of the ephemeral Cold Creek. Skaggs and Walters (1981) have given an estimate of the probable maximum flood using conservative values of precipitation, infiltration, surface roughness, and topographic features. The resulting flood area (Figure 2-10) would not affect the PUREX Storage Tunnels. The 100-year flood would be less than the probable maximum flood.

2.3.2.1 Demonstration of Compliance [B-3b(1)]. The PUREX Storage Tunnels are not located within a 100-year floodplain. Therefore, no demonstration of compliance is required.

2.3.2.1.1 Flood Proofing and Flood Protection Measures [B-3b(1)(a)]. The PUREX Storage Tunnels are not located within a 100-year floodplain. Therefore, no demonstration of compliance is required.

2.3.2.1.2 Flood Plan [B-3b(1)(b)]. The PUREX Storage Tunnels are not located within a 100-year floodplain. Therefore, no demonstration of compliance is required.

2.3.2.2 Plan for Future Compliance with Floodplain Standard [B-3b(2)]. The PUREX Storage Tunnels are not located within a 100-year floodplain. Therefore, no demonstration of compliance is required.

2.3.3 Shoreline Standard [B-3c]

The PUREX Storage Tunnels are not located within regulated 'shorelines of the state' or 'wetlands' as defined in the *Shoreline Management Act of 1971*. The PUREX Storage Tunnels are located on the Hanford Site, which is owned by the U.S. Government and operated by the DOE-RL. The Hanford Site is not classified as natural, conservancy, rural, or residential.

2.3.4 Sole Source Aquifer Criteria [B-3d]

The PUREX Storage Tunnels are not located over a 'sole source aquifer' as defined in Section 1424(e) of the *Safe Drinking Water Act of 1974*.

2.4 TRAFFIC INFORMATION [B-4]

The regional highway network traversing the Hanford Site (Washington State Highways 24 and 240 and Route 10, and that portion of Route 4S south of the Wye Barricade) and the restricted access roadways are shown in Figure 2-1.

Roadways on the Hanford Site north of the Wye Barricade and within the 300 and 400 Areas are restricted to authorized personnel. The PUREX Storage Tunnels are located approximately 5 miles (8 kilometers) from the nearest roadway (Washington State Highway 240) that has unrestricted public access. Estimated traffic volumes, in vehicles per day, are shown in Figure 2-11. The majority of traffic is passenger vehicles used for commuting and conducting company business. Approximately 10 percent of the traffic volume is trucks, and these trucks are mainly delivery, construction, and maintenance vehicles.

2.4.1 Hanford Site Roadways

Drawing H-6-958 in Appendix 2A and Figure 2-11 show the major roads throughout the Hanford Site. These roads are classified as either primary or secondary routes. The primary routes include Routes 4N, 4S, 10, 2N, 2S, 3, 6, and 11A, as well as various avenues within each area. The primary routes are constructed of bituminous asphalt [usually 2 inches (5.1 centimeters) thick, but the thickness of the asphalt layer will vary with each road] with an underlying aggregate base in accordance with U.S. Department of Transportation requirements. The secondary routes are constructed of layers of an oil and rock mixture with an underlying aggregate base. The aggregate base consists of various types and sizes of rock found onsite. Currently, no load-bearing capacities for these roads are available; however, loads as large as 140 pounds per square inch (9.8 kilograms per square centimeter) have been transported without observable damage to road surfaces. All roads meet the requirements for the American Association of State Highway and Transportation Officials HS-20-44 load rating (AASHTO 1983). An HS-20-44 loading represents a two-axle tractor [front axle loading of 8,000 pounds (3,629 kilograms) and rear axle loading of 32,000 pounds (14,515 kilograms)] plus a single-axle trailer with a 32,000-pound (14,515 kilogram) axle loading.

2.4.2 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 features of the PUREX Storage Tunnels (Figure 2-2). A paved parking area is provided outside of the double fence security isolation area northwest of the main gate.

2.4.3 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 (Figures 2-2 and 2-3).

2.4.4 Traffic Control Signs, Signals, and Procedures

Standard traffic control signs are used throughout the Hanford Site (i.e., hexagonal stop signs, triangular yield signs). Speed limits are posted throughout the Hanford Site, and the maximum posted speed is 55 miles (88.5 kilometers) per hour on major thoroughfares. Inside the 200 East Area, posted speeds are reduced to a maximum of 35 miles (56.3 kilometers) per hour, with caution postings in select areas as low as 10 miles (16.1 kilometers) per hour.

2.5 PERFORMANCE STANDARDS [B-5]

The PUREX Storage Tunnels serve to minimize the exposure of personnel to mixed and radioactive waste and to prevent such waste from reaching the environment.

In addition, measures are taken to ensure that the PUREX Storage Tunnels are maintained and operated in a manner that prevents:

- Degradation of groundwater quality
- Degradation of air quality by open burning or other activities
- Degradation of surface water quality
- Destruction or impairment of flora or fauna outside of the PUREX Storage Tunnels
- Excessive noise
- Negative aesthetic impacts
- Unstable hillsides or soils
- Use of processes that do not treat, detoxify, recycle, reclaim, and recover waste material to the extent economically feasible
- Endangerment of the health of employees or the public near the PUREX Storage Tunnels.

The measures taken to prevent each of the above negative effects from occurring are described in the following sections.

2.5.1 Measures to Prevent Degradation of Groundwater Quality

The storage area of each tunnel has a roof and wall system designed to prevent infiltration of surface water into the PUREX Storage Tunnels. The external surfaces of the roof and the wall timbers of Tunnel Number 1 are covered with 90-pound (40.8-kilogram) mineral surface roofing material.

For Tunnel Number 2, the semicircular shaped, bituminous-coated steel roof construction provides infiltration protection. In addition, the 8-foot (2.4-meter) soil overburden and surrounding surface area have been contoured to alleviate ponding and to divert surface water away from the PUREX Storage Tunnels.

Other potential sources of leachate include the water contained in the water-fillable door (Tunnel Number 1 door is presently filled; Tunnel Number 2 door is presently empty) and nonregulated liquid heels remaining in some of the equipment stored in the tunnels. To mitigate spills of the equipment heels during transport, catch pans are on the railcars under the equipment where such leakage could occur. A sump with a drain also is present beneath each water-fillable door to prevent water from over filling and/or leakage from entering the tunnel storage area.

The potential for leakage from the equipment heels or from the water-fillable doors coming into contact with dangerous waste is not considered to be a credible occurrence. However, should any liquid from either the equipment or the water-fillable door leak, the generation of a mixed waste leachate is not considered likely because all mixed waste is stored above the floor level on railcars and is either encased or stored in a storage container.

The only liquid dangerous waste stored in either tunnel is the elemental mercury stored in Tunnel Number 2. The mercury is sealed in a stainless steel thermowell within a stainless steel vessel that is stored above the floor level on a railcar. A spill or leak of mercury is not considered to be a probable occurrence.

Periodic inspection of the stored waste is precluded by ALARA considerations (Chapter 6.0, Section 6.2). Therefore, should a leak occur, this unlikely event would go undetected until closure. Cleanup of the spill will be performed during closure activities in accordance with the criteria outlined in Chapter 11.0, Section 11.1.4.7.

2.5.2 Measures to Prevent Degradation of Air Quality by Open Burning or Other Activities

The Tunnel Number 1 exhaust system was deactivated in January 1965 when the storage tunnel was filled to capacity. Presently, no ventilation is provided to Tunnel Number 1 as the exhaust vent has been blanked off ahead of the filter housing.

Tunnel Number 2 has an operating stack (296-A-10) registered and permitted for radionuclide emissions with the Washington State Department of Health. The exhaust air from the tunnel stack is sampled continuously in accordance with established controls for radioactive airborne emissions. Collected particulates are analyzed for total alpha and total beta activity periodically. Air samples are obtained from a continuous air sampler via a 3/4-inch (1.9 centimeter) sample tap, located downstream of the high-efficiency particulate air filters on the exhaust stack. The continuous air sampler is of a design that meets the criteria specified in *American National Standards Institute* (ANSI) N13.1 (ANSI 1969) and ANSI N42.18 (ANSI 1980), and is inspected daily and source checked monthly.

Monitoring for nonradioactive airborne emissions is not performed as the dangerous waste stored in the tunnels is not considered to have a credible potential (based on applicable analysis of safety analysis reports, environmental plan documentation, and operational history) for release to the environment. Emissions are not expected to exceed quantifiable release standards based on federal, state, and local criteria contained in the *Code of Federal Regulations* (CFR) 40 CFR 52, 40 CFR 372, WAC 173-400, and Benton-Franklin-Walla Walla Counties Air Pollution Control Authority 80-7.

A further discussion of the tunnel ventilation system is provided in Chapter 4.0; Section 4.1.6.

2.5.3 Measures to Prevent Degradation of Surface Water Quality

The measures taken to prevent surface water from entering the PUREX Storage Tunnels are discussed in Section 2.5.1.

2.5.4 Measures to Prevent Destruction or Impairment of Flora or Fauna Outside of the Unit

The activities associated with the PUREX Storage Tunnels do not appear to have altered the flora and fauna outside the unit for the over 30 years the unit has been in operation. The PUREX Storage Tunnels are covered with 8 feet (2.4 meters) of soil to isolate the contents from local flora or fauna.

2.5.5 Measures to Prevent Excessive Noise

Operation of the PUREX Storage Tunnels requires infrequent use of a battery-powered locomotive, or other power source, to move railcars into, or out of, their storage position. This operation does not generate excessive noise.

2.5.6 Measures to Prevent Negative Aesthetic Impacts

The above grade portions of the PUREX Storage Tunnels consist of a reinforced concrete structure 11 feet (3.6 meters) by 28 feet (8.5 meters) by 18 feet (5.5 meters) that encloses the water-fillable door on the north end of each storage tunnel. A filter housing, exhaust fan, and 20-foot- (6.1-meter-) tall exhaust stack are present on the south end of each storage tunnel. Between these extremity structures, the soil overburden is gently sloped and uniformly contoured to provide a positive aesthetic effect. The soil covering and natural vegetation that have been allowed to grow blend with the surrounding terrain and do not present a negative impact to the aesthetics of the area.

2.5.7 Measures to Prevent Unstable Hillsides or Soils

During construction, the soil overburden covering the PUREX Storage Tunnels was contoured to provide a side slope of 2 (horizontal) to 1 (vertical) for stability. In addition, natural vegetation has been permitted to cover the tunnel mounds to minimize water and wind erosion.

2.5.8 Measures to Prevent the Use of Processes That Do Not Treat, Detoxify, Recycle, Reclaim, and Recover Waste Material to the Extent Economically Feasible

The PUREX Storage Tunnels are a storage unit only. No waste is treated, detoxified, recycled, reclaimed, or recovered in any manner at this unit. Therefore, this requirement is not applicable to the PUREX Storage Tunnels.

2.5.9 Measures to Prevent Endangerment of the Health of Employees or the Public Near the Unit

The PUREX Storage Tunnels are located approximately 23 miles (37 kilometers) from the nearest population center, Richland, Washington. This isolation, coupled with multiple security barriers, prevents access to the PUREX Facility by the general public. Access to the PUREX Storage Tunnels by employees is restricted to only those employees who have a security clearance and management approval. Approval for each entry is evaluated on a case-by-case basis.

In addition to possessing a security clearance and having management approval, employees involved in storage operations at the PUREX Storage Tunnels are required to be trained as specified in Chapter 8.0. This training ensures employees are knowledgeable of applicable safety requirements and are adequately skilled to prevent endangerment of themselves, co-workers, and the public during the operation of the tunnels.

The DOE-RL policy is to limit radiation and chemical exposure of all employees to ALARA levels. To ensure ALARA goals are met, the following protective measures are employed.

- Radiation shielding is used.
- The distance from radiation sources is maximized.
- The time of occupancy in radiation zones is minimized.
- Protective clothing is worn.
- Personnel are accompanied by a health physics technician equipped with proper radiation detection instrumentation.
- All exhaust from the Tunnel Number 2 stack is filtered through a single-stage, high-efficiency particulate air filter before release.

The remote location of the PUREX Storage Tunnels coupled with stringent access controls are considered adequate protection to employees and the public, given the operation of the tunnels and the very low probability of a dangerous waste release.

2.6 BUFFER MONITORING ZONES [B-6]

Requirements for buffer monitoring zones have been deleted from WAC 173-303-440. Therefore, no discussion of the checklist items under buffer monitoring zones [B-6] will be included in this permit application.

2.7 SPILLS AND DISCHARGES INTO THE ENVIRONMENT [B-7]

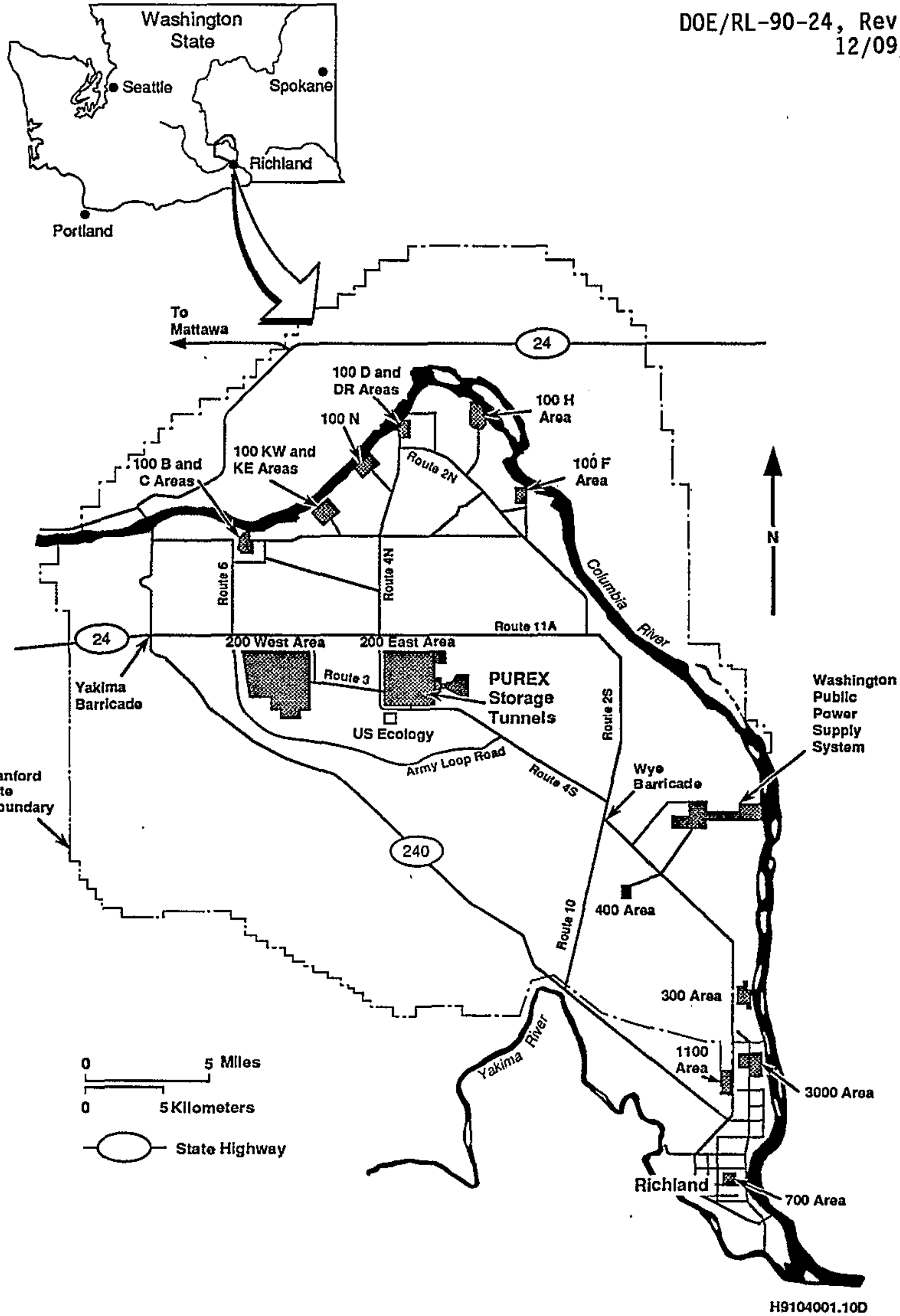
Because of the design and operation of the PUREX Storage Tunnels (Section 2.1.4) and the nature and limited volume of the dangerous waste stored within the tunnels (Chapter 3.0), spills and leaks of dangerous waste into the environment are not considered to be probable.

2.8 MANIFEST SYSTEM [B-8]

The PUREX Storage Tunnels are used solely for storage of process equipment from the PUREX Plant. Because none of the dangerous waste stored is from offsite sources, the requirements of WAC 173-303-370 do not apply to the PUREX Storage Tunnels. In lieu of a manifest system, the storage tunnel checklist (Appendix 2F) serves to document the source, quantity, dangerous characteristics, and storage location of each waste stored in the PUREX Storage Tunnels.

Storage activities conducted before January 1, 1990 have not been documented using the storage tunnel checklist. Equipment stored before January 1, 1990 has been characterized using historical operating logs, records, and process documentation. An inventory of equipment stored in the PUREX Storage Tunnels as of September 30, 1991 is included in Appendix 11A. A summary of the dangerous waste stored in Tunnel Number 1 and Tunnel Number 2 is included in Chapter 3.0, Table 3-1.

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



1 Figure 2-1. Hanford Site Location.

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200 East Area

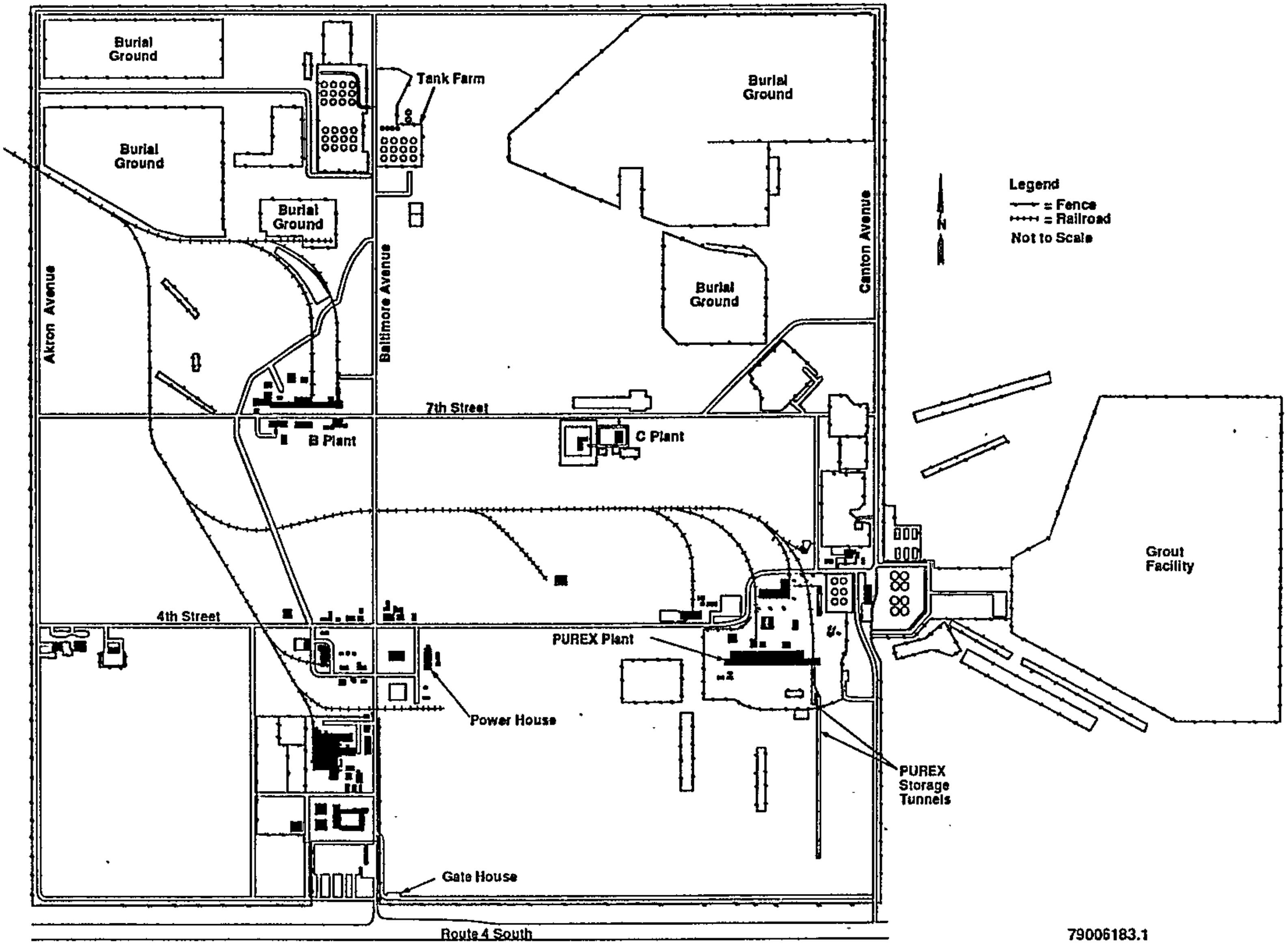

Figure 2-2. The 200 East Area.

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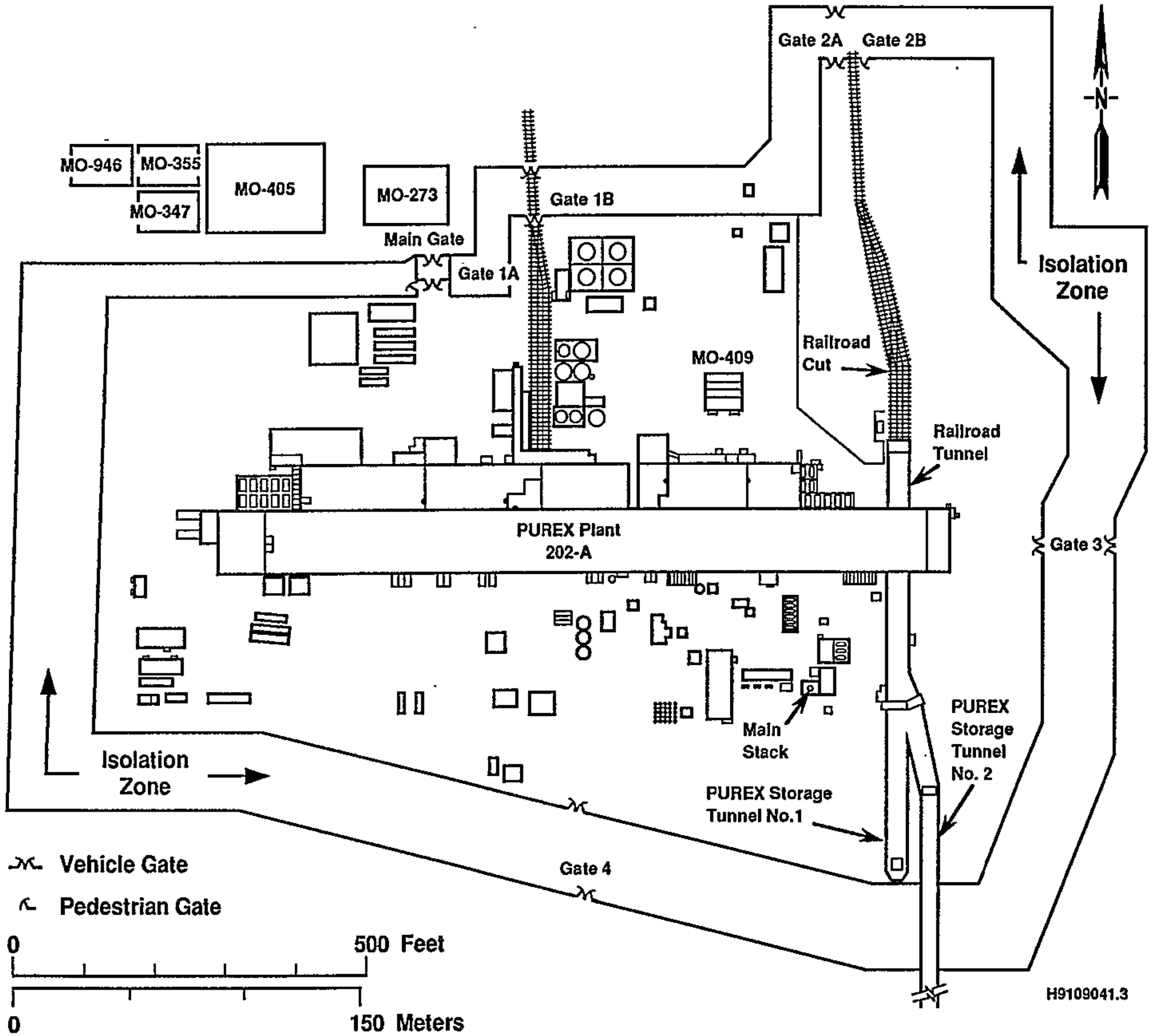

Figure 2-3. The PUREX Facility.

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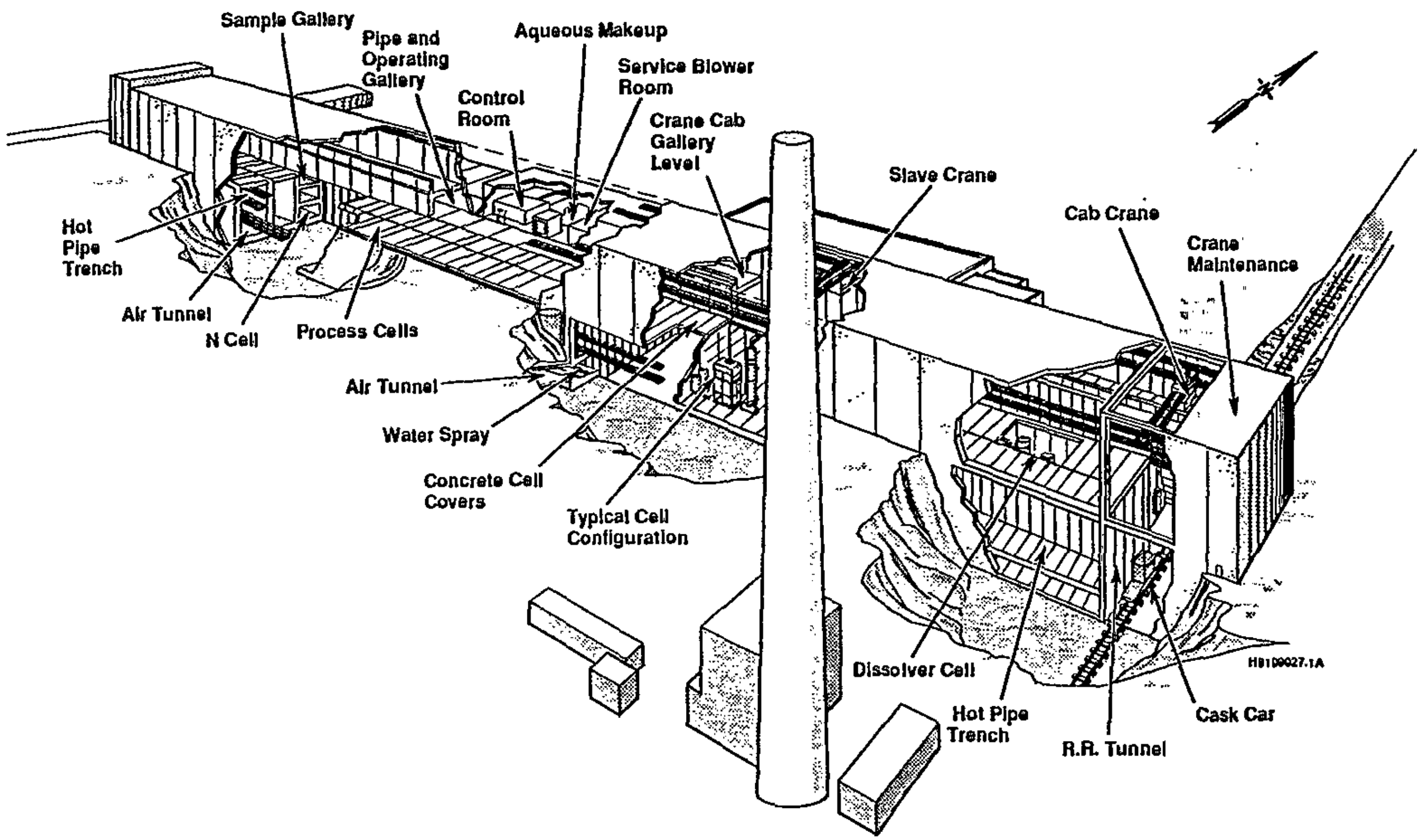

Figure 2-4. The PUREX Plant (Building 202-A).

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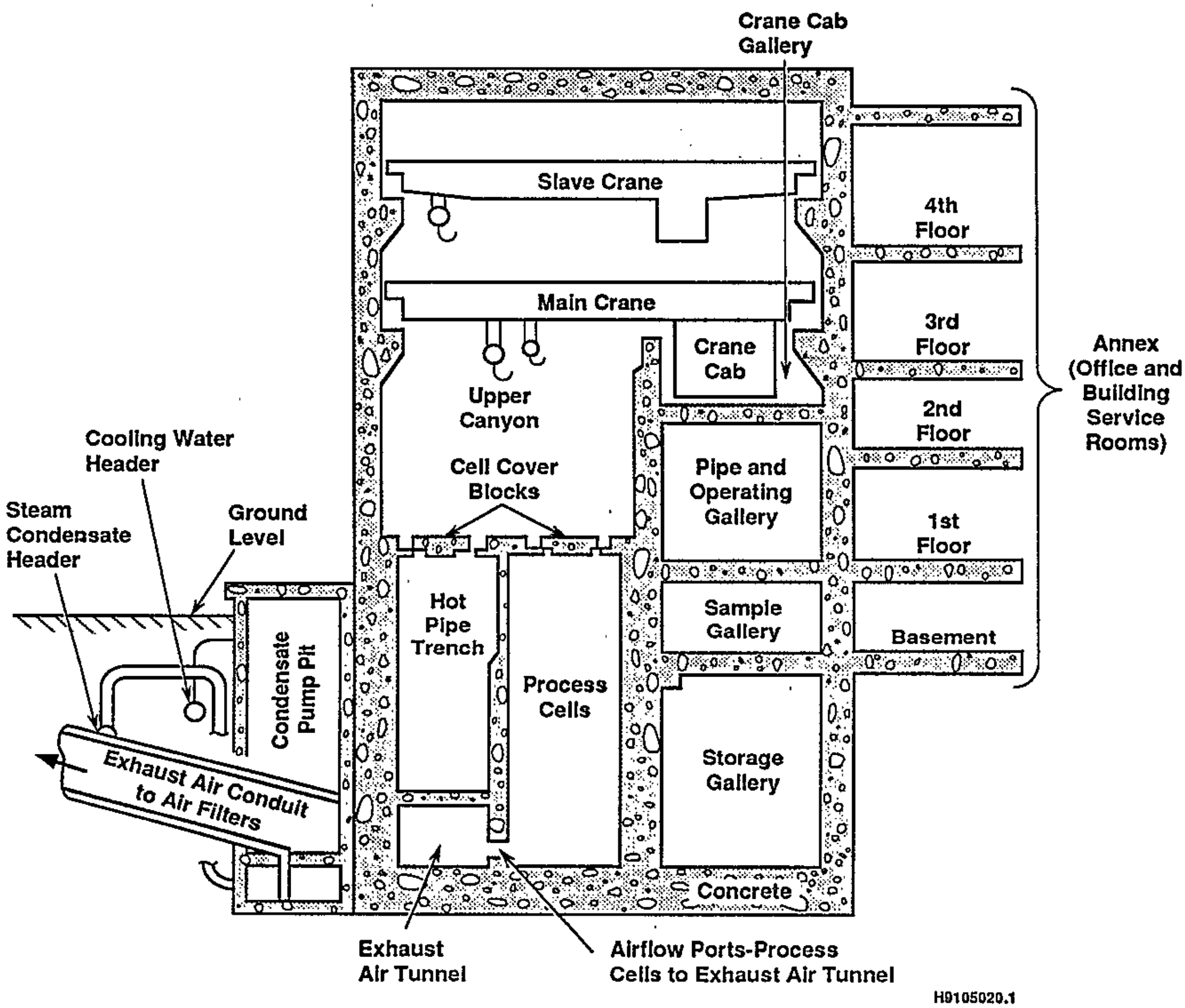

Figure 2-5. The PUREX Plant Cross Section (looking west).

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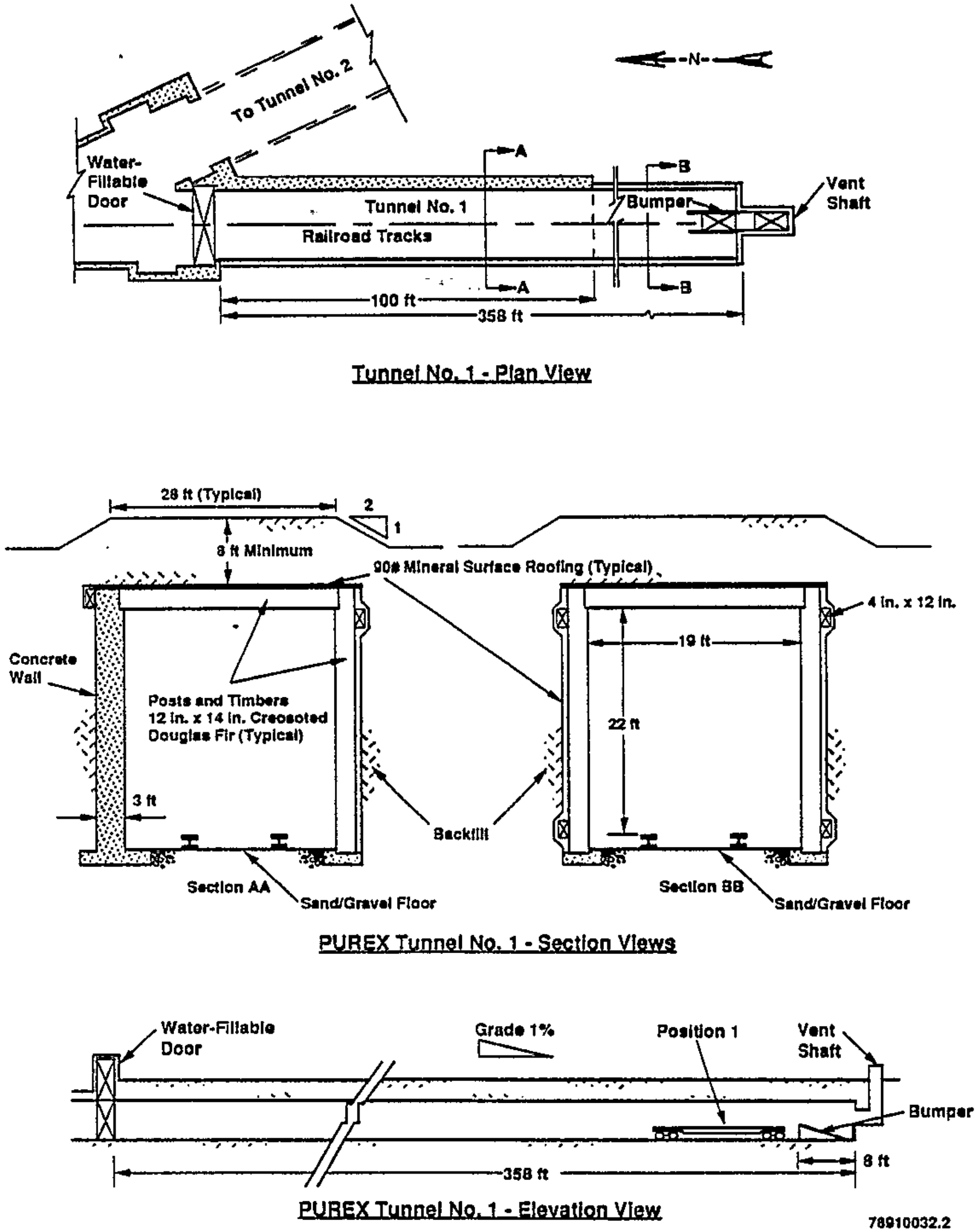

Figure 2-6. The PUREX Storage Tunnel Number 1.

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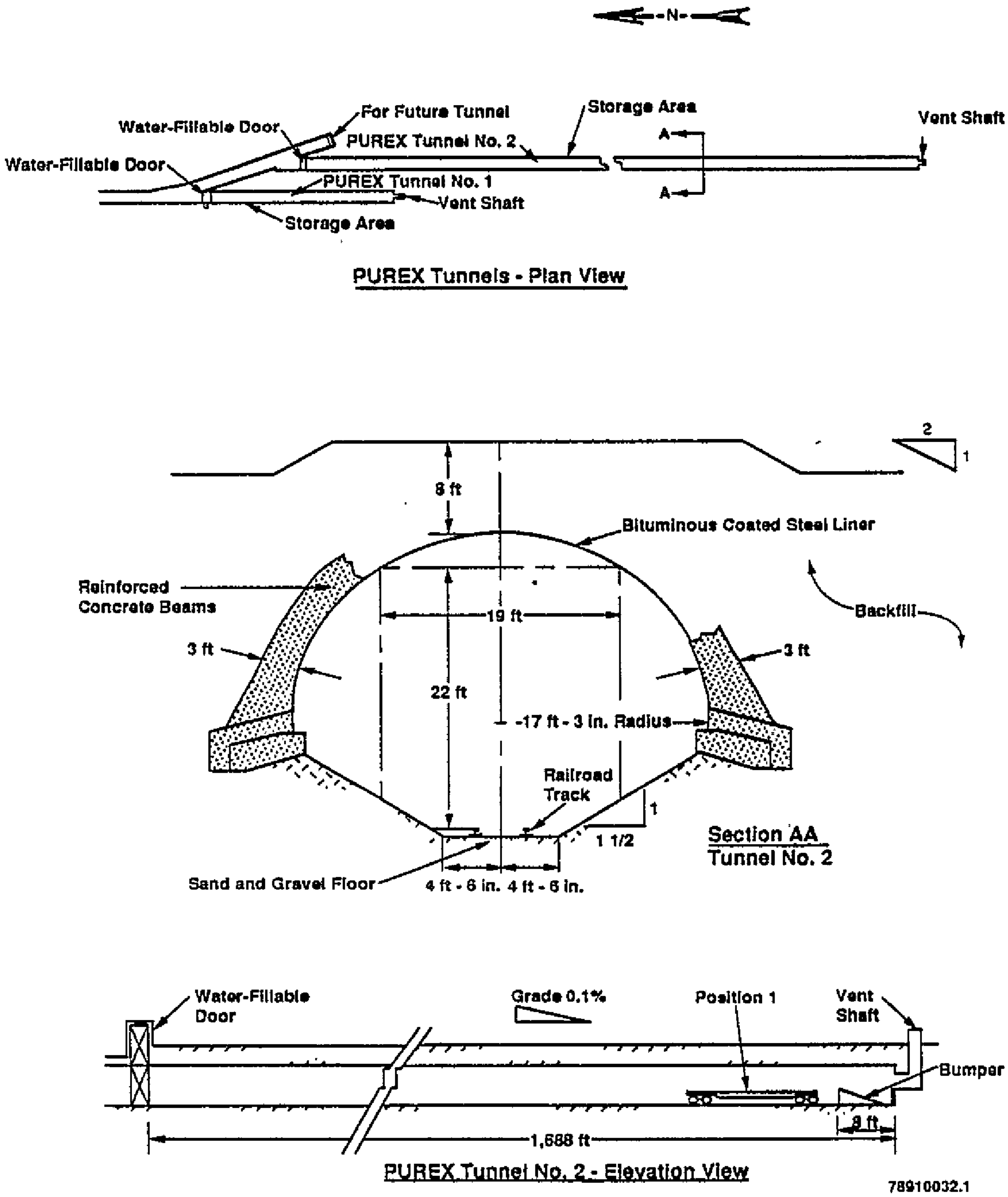

1 Figure 2-7. The PUREX Storage Tunnel Number 2.

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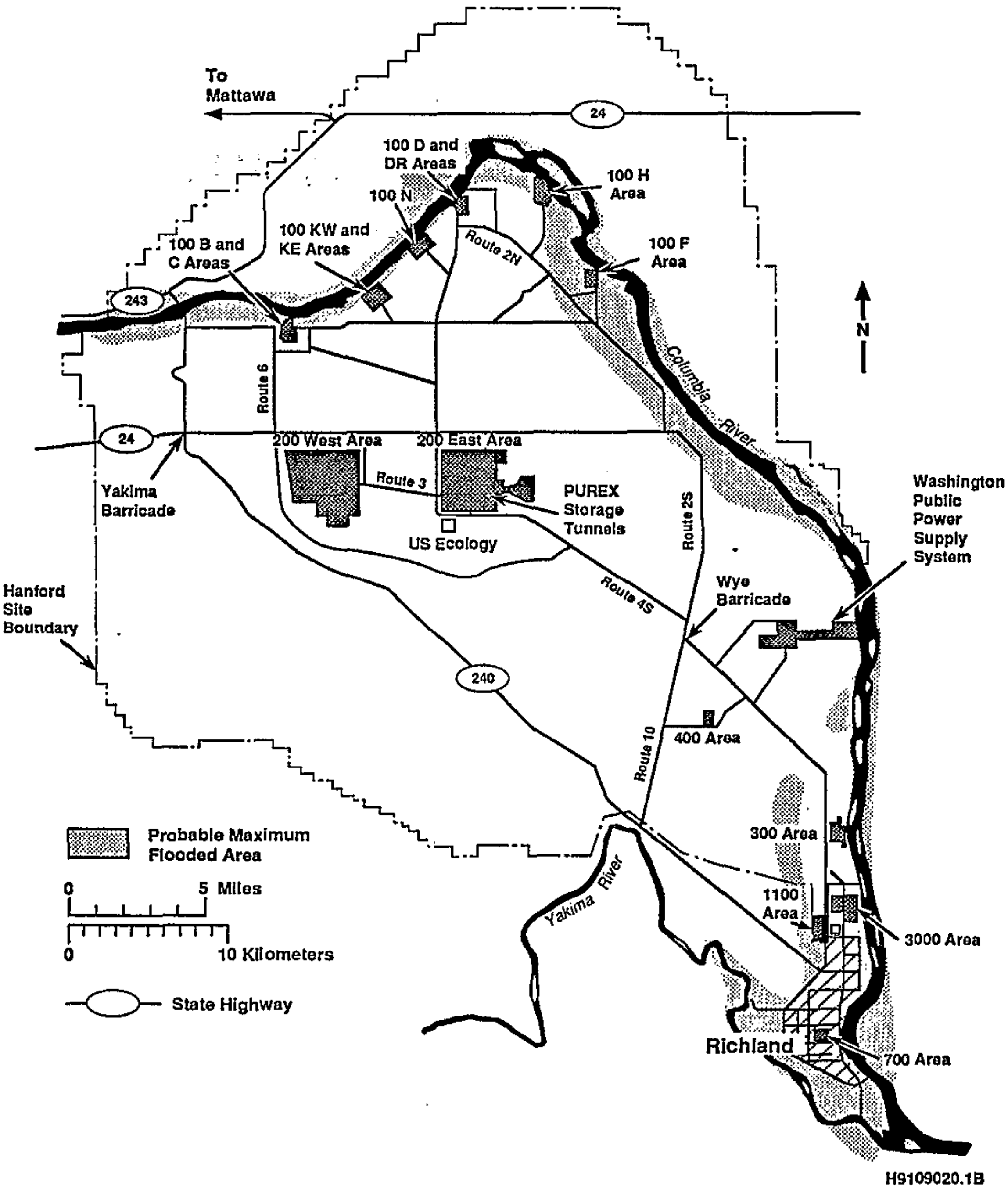

1 | Figure 2-8. Columbia River Floodplain (probable maximum flood).

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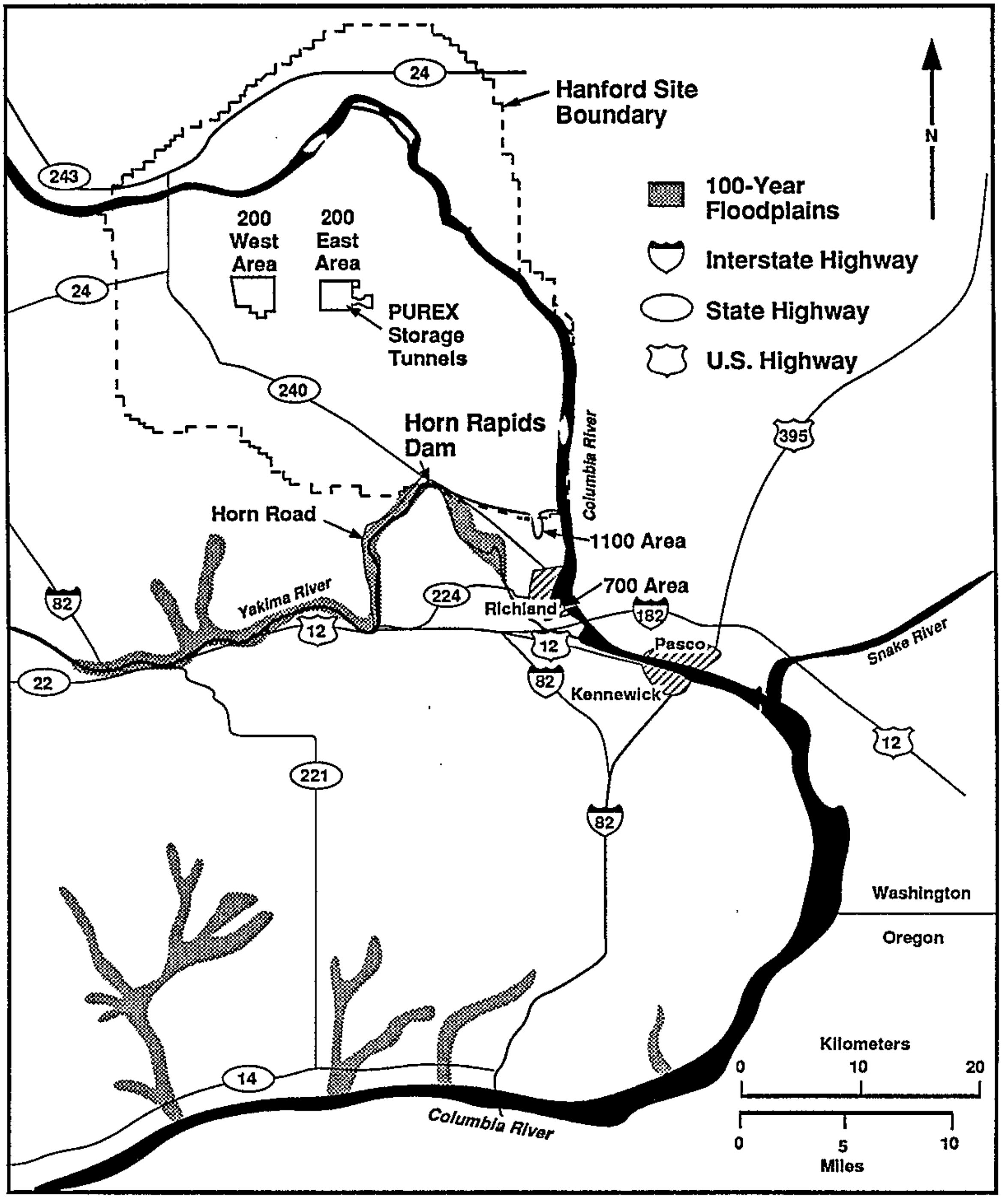

1 Figure 2-9. Yakima River Floodplain.

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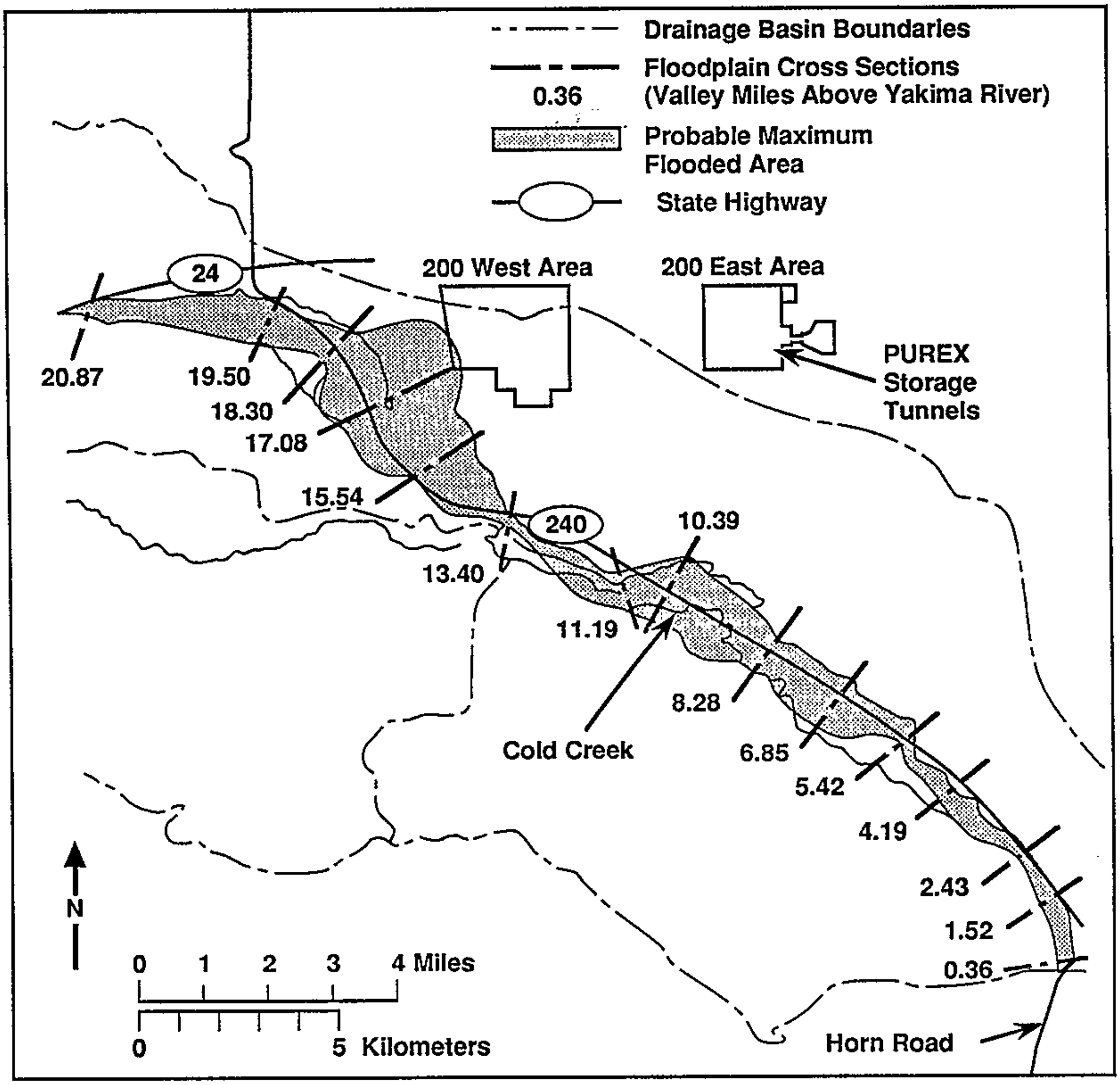

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1 Figure 2-10. Cold Creek Watershed Floodplain (probable maximum flood).

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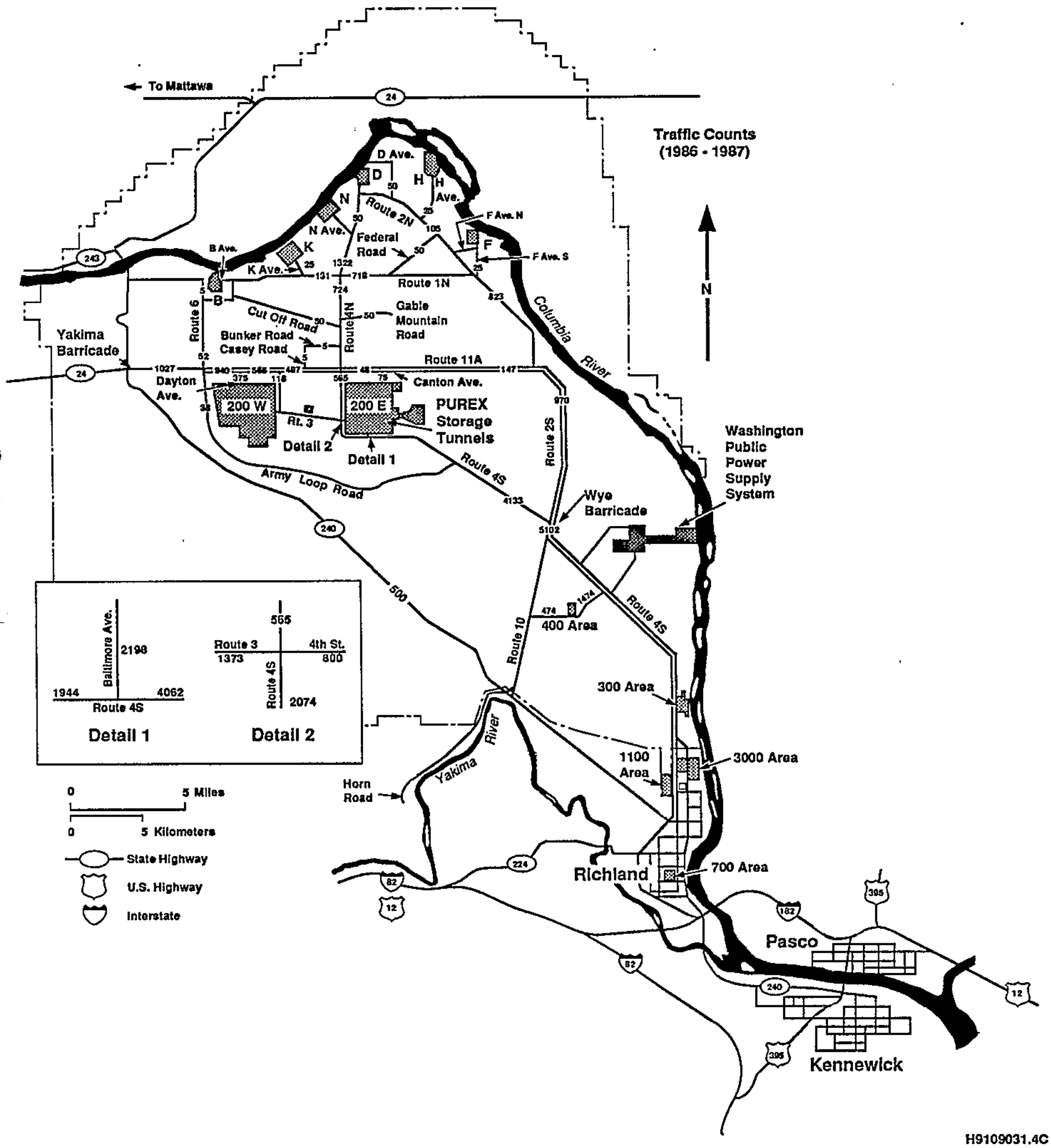

Figure 2-11. Estimated Traffic Volumes (vehicles per day).

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Table 2-1. Dangerous Waste Treatment, Storage, and/or Disposal Units Within 1,000 Feet (305 Meters) of the PUREX Storage Tunnels.

Unit	Permit	Type	Class
PUREX Plant	A/B	T/S	M
Double-Shell Tank System: • 241-AP • 241-AW	A/B	T/S	M
216-A-10 Crib	A/C	D	M
216-A-36B Crib	A/C	D	M

Unit = Name of unit that is designated for permitting as part of the Hanford Facility (EPA/State Identification Number WA7890008967).

Permit = Type of permit application that is required for the unit:

A - Part A
B - Part B
C - Closure and Postclosure Plan

Type = Waste unit operational classification:

T - Treatment
S - Storage
D - Disposal

Class = M - Unit contains radioactive and dangerous waste (mixed waste).

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CONTENTS

APPENDIX

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FIGURES

TABLE

3.0 WASTE CHARACTERISTICS [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 is included to describe 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.

The waste stored in the PUREX Storage Tunnels is generated at the PUREX Plant. All waste stored in the tunnels is radioactive as a result of contamination induced during processing of irradiated reactor fuel at the PUREX Plant. Because of this radioactivity and the large size of the discarded equipment, the waste is stored in the PUREX Storage Tunnels, which provide the necessary shielding for the protection of employees and the environment. As of September 30, 1991, only about one-third of the railcars in the PUREX Storage Tunnels (Appendix 11A, Appendix A) store discarded equipment that contains dangerous waste components (mixed waste).

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

Certain equipment stored in the PUREX Storage Tunnels contains the following dangerous waste:

- Elemental lead
- Elemental mercury
- Silver salts.

Dangerous waste is either attached to or contained within some equipment removed from the PUREX Plant. Because the dangerous waste is an integral part of radioactively contaminated equipment, this equipment is managed as a mixed waste. Table 3-1 provides an approximation of the total amount of dangerous waste contained in the equipment stored in the PUREX Storage Tunnels as of September 30, 1991. Changes in the amount of dangerous waste stored will be updated annually in the "Treatment, Storage, and/or Disposal Facility Annual Dangerous Waste Report," Forms 4 and 5, submitted to Ecology (Chapter 12.0, Section 12.4.1.2).

3.1.1 Elemental Lead

Historically, elemental lead was used as weight, counterweight, and radiation shielding in the fabrication of process equipment used at the PUREX Plant. Elemental lead was selected for use because of its high density [710 pounds per cubic foot (11,373 kilograms per cubic meter) as compared to 489 pounds per cubic foot (7,833 kilograms per cubic meter) for steel] and because it was readily available in various physical shapes (shot, sheet, bars, or poured shapes). Generally the lead was encased in steel (carbon or stainless) to facilitate its attachment to the process equipment. Since early 1987, the use of lead in the design and fabrication of new or replacement equipment for the PUREX Plant has been discontinued wherever feasible.

A typical process pipe jumper design using lead-filled carbon steel pipe counterweights is shown in Figure 3-1. Counterweighted jumper assemblies are used to facilitate remote installation of in-cell process and service piping. To minimize the use of lead, pipe jumpers currently are being designed wherever possible to replace the lead-filled counterweights with steel bars having the same equivalent weight.

A typical lead counterweight used with equipment dunnage (carbon steel support structure) is shown in Figure 3-2. It is imperative that the equipment assembly be balanced vertically to facilitate remote handling with the overhead crane during installation and removal. New or replacement equipment assemblies currently are fabricated using carbon steel counterweight as required.

A jumper alignment tool (Figure 3-3) might contain as much as 1,500 pounds (680.4 kilograms) of lead. This tool is used as a weight to pull down the free end of a jumper so that the connecting parts are aligned vertically and the connection can be made. Restricted work space between equipment in the process cells makes the use of a high-density material, such as lead, a necessity. Similarly, the space restrictions around certain diaphragm- operated valves limit the selection of radiation-shielding materials to those of high-density materials, such as lead. Operating experience has shown that the useful life of the diaphragm material can be extended by shielding it from external radiation sources. Figure 3-4 shows a typical shielding arrangement for a diaphragm-operated valve.

Elemental lead exhibits the characteristic of toxicity as determined by the toxicity characteristic leaching procedure and is designated D008 [WAC 173-303-090(8)]. The quantity of lead present could produce an extract greater than 0.066 ounce per gallon (500 milligrams per liter) should it be exposed to a leachate; therefore, the mixed waste is managed as extremely hazardous waste and is further designated as WT01 [WAC 173-303-104(3)]. 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 within the tunnel, the potential for exposure of bare lead to a leachate is considered to be negligible.

Sampling and chemical analysis is not performed on lead associated with the radioactive discarded equipment placed in the PUREX Storage Tunnels. The quantity of lead is determined from a review of the fabrication drawings for each piece of equipment placed in storage. This approach is effective for equipment where the lead weight, counterweight, or shielding is specifically detailed. However, where only 'typical' details are shown, as in Figure 3-2, the addition of counterweights was a field fit operation and the size and location of each counterweight (if attached) was not recorded on the final 'as-built' assembly drawings. Therefore, the accuracy of the estimate of the amount of lead stored in each tunnel is limited to the data available from existing fabrication drawings. The estimated quantity of lead listed in

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Table 3-1 accounts only for the lead in alignment tools and jumper counterweights. 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. However, following removal, the equipment will be thoroughly examined visually and any suspect attachments will be removed, evaluated, and disposed of in accordance with established procedures of the treatment unit.

3.1.2 Elemental Mercury

Elemental mercury stored in the PUREX Storage Tunnels is sealed inside 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 (Figure 3-5), which are approximately 9 feet (2.7 meters) in diameter, 24 feet (7.3 meters) tall, and weigh approximately 58,000 pounds (26,309 kilograms). The outer shell is constructed of a 3/8-inch-thick (1-centimeter-thick) plate. Dissolvers are used in decladding and dissolution of irradiated reactor fuel in the PUREX Plant.

There are two thermowells per dissolver located diametrically opposite each other (Figure 3-5). Each thermowell consists of a 9-foot-5-inch length (2.9 meters) of 3-inch (7.6 centimeter) Schedule 80, 304L stainless steel pipe with a 7 1/2-inch (19.1 centimeter) right angle lateral extension welded to the downside end. The lower end butts up against the outer surface of the internal slotted bar screen that separates the undissolved nuclear fuel elements from the outer solution chamber of the annular dissolver. Depending on the specific dissolver in question, 42 or 50 pounds (19.1 or 45.4 kilograms) of mercury [3/8 or 7/16 gallons (1.4 or 1.77 liters)] are poured into each thermowell [84 or 100 pounds (38.1 or 45.4 kilograms) total per dissolver]. The mercury is added after the new dissolver is positioned vertically inside the PUREX canyon and before it is installed in a process cell. The mercury serves 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 are removed and the upper end of each thermowell is sealed 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.

Elemental mercury exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D009 [WAC 173-303-090(8)(c)]. If exposed to a leachate, the quantity of mercury present could produce an extract greater than 0.0026 ounce per gallon (20 milligrams per liter); therefore, the mixed waste is managed as extremely hazardous waste and is further designated as WT01 [WAC 173-303-104(3)].

The potential for the mercury stored in the PUREX Storage Tunnels to become exposed to leachate is considered to be 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 to be 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 the fabrication drawings. Because the thermowells are sealed, the quantity of mercury present will not decrease with time due to evaporation.

3.1.3 Silver Salts

Silver 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 (Figure 3-6) were used to remove radioactive iodine from the offgas streams of the irradiated reactor fuel dissolvers. The reactor vessel is approximately 4 1/2 feet (1.4 meters) in diameter by 13 1/2 feet (4.1 meters) tall and is constructed of 3/8-inch (1-centimeter) 304L stainless steel. The vessel contains two 46-inch-deep (1.2-meter-deep) beds of packing. Each bed consists of a 12-inch (30.5 centimeter) depth of 1-inch (2.5 centimeter) unglazed ceramic saddles topped with a 34-inch (0.6 meter) depth of 1/2-inch (1.3 centimeter) unglazed ceramic saddles. The two beds are separated vertically by a distance of about 2 feet (0.6 meter), and each bed rests on a support made of stainless steel angles and coarse screen. The packing is coated initially with 250 pounds (113.4 kilograms) of silver nitrate used for iodine retention. Nozzles on the top of the reactor are provided to allow flushing and/or regeneration of the packing with silver nitrate solution as the need arises.

Experience has shown that, after extended use, the silver reactors lose efficiency. This loss in efficiency normally occurs when about one-half of the silver on the packing has been converted to silver iodide. Other competing reactions such as reduction of silver nitrate to metallic silver and formation of silver chloride also occur and affect silver reactor efficiency. The chloride is introduced as an impurity in process chemicals. Therefore, regeneration of the silver reactor with fresh silver nitrate is performed periodically. The packing of a discarded silver reactor will therefore contain 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)(c)]. The quantity of silver present could produce an extract having greater than 0.0066 ounce of silver per gallon (500 milligrams per liter) should the salts be exposed to a leachate; therefore, the mixed waste is managed as extremely hazardous waste and is further designated as WT01 in accordance with WAC 173-303-104(3). In addition, nitrates (per 49 CFR 173.151) exhibit the characteristic of ignitability and must also be designated as D001 [WAC 173-303-090(5)].

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Silver salts are contained within a stainless steel vessel, stored inside a weather-tight structure, and elevated above floor level on a railcar. The potential for exposure of the silver salts to a leachate is considered to be negligible. Also, the contained salts are 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 is not performed for silver salts before placing a silver reactor in storage. However, for accountability purposes, the total silver content 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 salts regeneration history. Operating records (process knowledge) of regenerations and flushes are used to estimate the total accumulation of silver within each reactor.

3.1.4 Containerized Waste [C-1a]

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 facility. That is, the bulk of the discarded equipment stored in the tunnels is not placed in a container; rather, this equipment is placed on a portable device (railcar) that is used as a storage platform. Refer to the container definition in WAC 173-303-040. In general, the dangerous waste stored in the PUREX Storage Tunnels is encased or contained within carbon or stainless steel plate, pipe, or vessels. Therefore, the dangerous 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 [0.300-inch (0.8 centimeter)] thermowells constructed from 3-inch (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 1/2 gallon (1.7 liter).

Other liquid containers, such as large discarded process tanks, are stored in the PUREX Storage Tunnels. These containers are either 'empty' [per WAC 173-303-160(2)(a)] or have been flushed and the final rinsate sampled and analyzed to verify that the residual heel is not a dangerous waste (Appendix 3A).

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 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 and ignition source.

3.1.5 Waste in Tank Systems [C-1b]

Operation of the PUREX Storage Tunnels does not involve storage of dangerous waste in tank systems. Therefore, the requirements of WAC 173-303-640 are not applicable to the PUREX Storage Tunnels.

3.1.6 Waste in Piles [C-1c]

Operation of the PUREX Storage Tunnels does not involve storage of dangerous waste in waste piles. Therefore, the requirements of WAC 173-303-660 are not applicable to the PUREX Storage Tunnels.

3.1.7 Landfilled Wastes [C-1d]

Operation of the PUREX Storage Tunnels does not involve placement of dangerous waste in landfills. Therefore, the requirements of WAC 173-303-665 are not applicable to the PUREX Storage Tunnels.

3.1.8 Wastes Incinerated and Wastes Used in Performance Tests [C-1e]

Operation of the PUREX Storage Tunnels does not involve burning of dangerous waste. Therefore, the requirements of WAC 173-303-670 are not applicable to the PUREX Storage Tunnels.

3.1.9 Wastes to be Land Treated [C-1f]

Operation of the PUREX Storage Tunnels does not involve land treatment of dangerous waste. Therefore, the requirements of WAC 173-303-655 are not applicable to the PUREX Storage Tunnels.

3.2 WASTE ANALYSIS PLAN [C-2]

The waste analysis plan describes the procedures used to operate the PUREX Storage Tunnels and to ensure that the dangerous waste components of the discarded equipment to be stored in the tunnels are properly characterized and designated. Proper characterization and designation are necessary to ensure that the dangerous waste is managed properly. Characterization analysis relies on a knowledge of the fabrication, process, and operating history to identify the existence and quantity of dangerous waste in the discarded radioactive equipment. Process knowledge has established that the only dangerous waste stored in the tunnels is elemental lead, elemental mercury, and silver salts. Whereas the mercury and silver are associated with specific types of equipment (the dissolver and silver reactors, respectively), lead counterweights could be associated with any piece of equipment that is handled as a balanced assembly in the PUREX Plant. Analysis of the equipment fabrication drawings is used to identify the presence of lead associated with the specific piece of equipment to be stored. Results of the waste analysis are documented on the storage tunnel checklist (Appendix 2F).

3.2.1 Parameters and Rationale [C-2a]

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

3.2.1.1 Discarded Chemical Products. The first category of dangerous waste designation is "Discarded Chemical Products," WAC 173-303-081. Of the three dangerous wastes listed in Section 3.1, only elemental mercury is listed in the WAC 173-303-9903, "Discarded Chemical Products List." The mercury present in the dissolver thermowells does not fit any of the definitions in WAC 173-303-081 for a discarded chemical product. Consequently, mercury is regulated under the characteristics of toxicity rather than as a discarded chemical product. Therefore, the dangerous waste stored in the PUREX Storage Tunnels is not designated as a discarded chemical product.

3.2.1.2 Dangerous Waste Sources. The second category of dangerous waste designation is "Dangerous Waste Sources," WAC 173-303-082. Elemental lead, elemental mercury, and silver salts are not listed in WAC 173-303-9904, "Dangerous Waste Sources List." Therefore, the dangerous waste stored in the PUREX Storage Tunnels is not designated as a dangerous waste source.

3.2.1.3 Infectious Dangerous Waste. The third category of dangerous waste designation is "Infectious Dangerous Waste," WAC 173-303-083. None of the three dangerous wastes (elemental lead, elemental mercury, and silver salts) contain infectious materials as the wastes are not a result of the use of biological processes or their wastes. Therefore, the dangerous waste stored in the PUREX Storage Tunnels is not designated as an infectious dangerous waste.

3.2.1.4 Dangerous Waste Mixtures. The fourth category of dangerous waste designation is "Dangerous Waste Mixtures," WAC 173-303-084. Only silver salts constitute a mixture because the lead and mercury are not actually mixed together with another constituent. Although silver nitrate is listed in the EPA spill tables (40 CFR 302.4), the percentage of nitrate in relation with other silver compounds is unknown. Consequently, the silver is designated under the characteristics of toxicity rather than as a dangerous waste mixture. Therefore, the dangerous waste stored in the PUREX Storage Tunnels is not designated as a dangerous waste mixture.

3.2.1.5 Dangerous Waste Characteristics. The fifth category of dangerous waste designation is "Dangerous Waste Characteristics," WAC 173-303-090; the characteristics are as follows.

- Characteristic of Ignitability--The nitrate ion in the silver nitrate is an oxidizer as specified in 49 CFR 173.151. Therefore, the silver

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nitrate waste exhibits the characteristic of ignitability under WAC 173-303-090(5) and is designated as D001.

- Characteristic of Corrosivity--Most of the discarded equipment removed from the PUREX canyon either has contained or has been in contact with corrosive liquids. The standard operating procedure has been to flush equipment with water to recover as much special nuclear material as practical. Also, flushing removes much of the radioactive material from the equipment, minimizing the spread of radioactive 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. Past practices associated with equipment flushing are addressed in Appendix 3A.

- Characteristic of Reactivity--Elemental lead, elemental mercury, and silver salts do not meet any of the definitions of reactivity as defined in WAC 173-303-090(7). These dangerous waste materials are not unstable, do not react violently with water or form explosive mixtures, or generate toxic gases. Therefore, the dangerous waste stored in the PUREX Storage Tunnels is not designated as a reactive waste.

- Characteristic of Toxicity--Lead, mercury, and silver are toxic substances. The quantity of lead, mercury, and silver salts 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 expected to be in the extremely hazardous waste range of greater than 0.066 ounce per gallon (500 milligrams per liter) for either lead or silver or greater than 0.0026 ounce per gallon (20 milligrams per liter) for mercury. Therefore, these dangerous wastes are designated in WAC 173-303-104(3) as extremely hazardous toxic waste, WT01, as well as toxic lead, D008; mercury, D009; and silver, D011.

3.2.1.6 Waste Designation Summary. The mixed waste stored in the PUREX Storage Tunnels is designated as extremely hazardous toxic waste. This designation is based on the potential extract concentration of either lead, mercury, or silver as shown in 'characteristic of toxicity'. In addition, silver salts are reported as a weight equivalent of silver nitrate and are designated as 'characteristic of ignitability'. The 'characteristic of toxicity' designation also is applied to elemental lead, elemental mercury, and silver salts.

3.2.2 Test Methods [C-2b]

The only test method presently used in support of the PUREX Storage Tunnels operation is a corrosivity check on the final aqueous rinse of discarded vessels before the vessels are released for storage. The pH is determined by a pH meter using EPA Test Method 5.2 in *Test Methods for the Evaluation of Solid Waste: Physical/Chemical Methods* (EPA 1986).

3.2.3 Sampling Methods [C-2c]

The only dangerous waste stored in the tunnels is elemental lead, elemental mercury, and silver salts. Sampling and chemical analysis of either the lead or the mercury to confirm that it is elemental lead or elemental mercury would not provide additional data beneficial to proper management of the waste and the radiation exposure to personnel performing sampling would not be in compliance with ALARA principles; therefore, such sampling is not performed. The silver salts are nonuniformly distributed on ceramic packing contained within a large stainless steel reactor vessel. Representative sampling of the packing in place is not considered to be practical and therefore is not performed.

Representative sampling methods listed in WAC 173-303-110 are not considered appropriate for the operation of the PUREX Storage Tunnels. 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 dangerous waste stored therein.

3.2.4 Frequency of Analyses [C-2d]

The discarded process equipment stored in the PUREX Storage Tunnels is unique in that the fabrication and operating history of each piece of equipment is different even among similar equipment. The fabrication records (i.e., as-built drawings and specifications) of each item to be stored are analyzed to determine if a dangerous waste component (e.g., lead counterweights) is present and in what amount. Where applicable, an analysis of operating history is used to establish the quantity of dangerous waste present. For example, the regeneration and flushing history of a specific silver reactor is analyzed because the total quantity of silver salts present is a function of its operating history.

Because the dangerous waste components of mixed waste stored in the PUREX Storage Tunnels are stable, 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.

3.2.5 Additional Requirements for Wastes Generated Offsite [C-2e]

All waste placed in the PUREX Storage Tunnels is generated at the PUREX Plant. Therefore, the requirements of this section are not applicable to the PUREX Storage Tunnels.

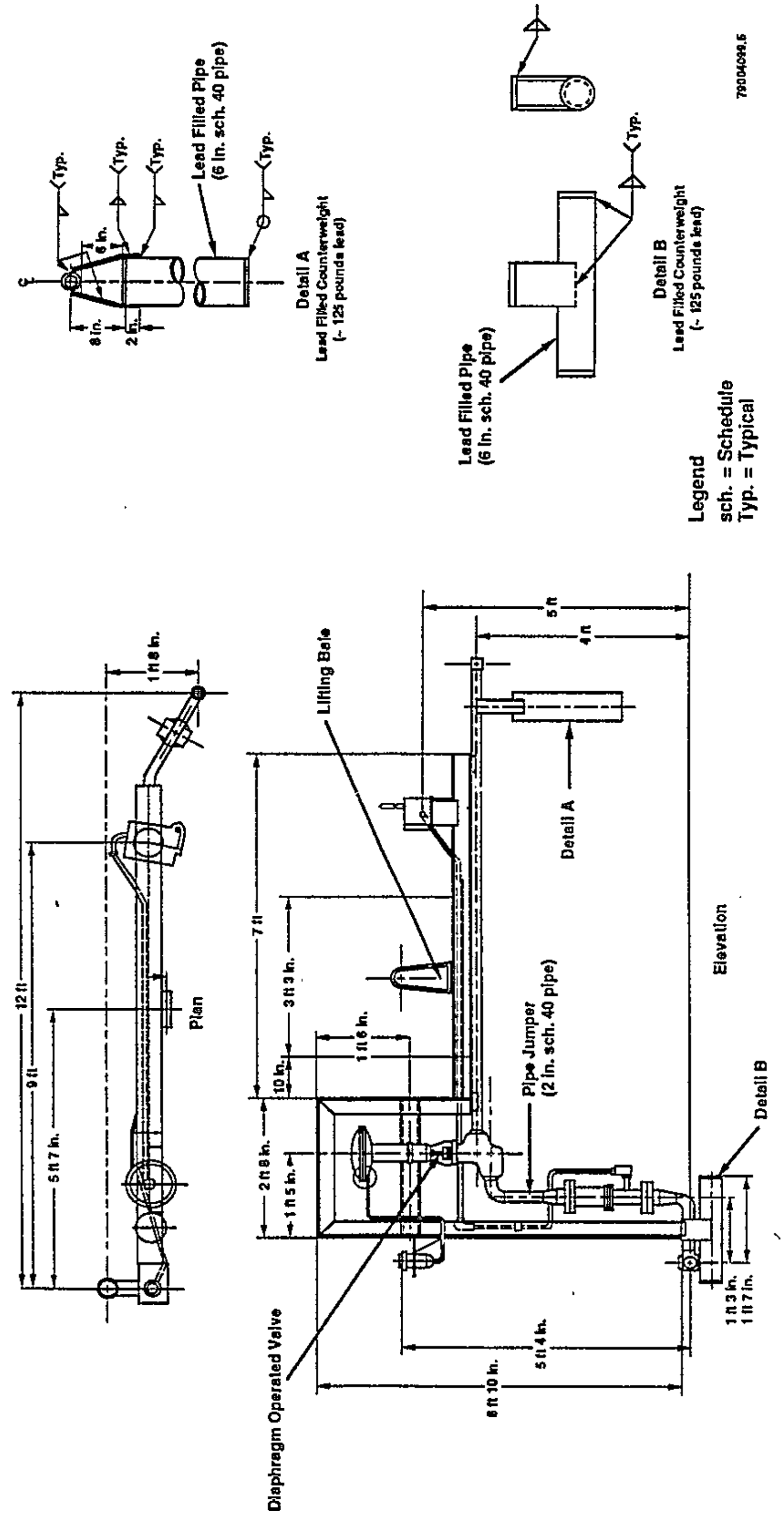
3.2.6 Additional Requirements for Ignitable, Reactive, or Incompatible Wastes [C-2f]

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 3.1.3) that separates this material from all other waste material stored in the tunnel. The WAC 173-303-395(1)(a) requires 'No Smoking' signs be conspicuously placed wherever there is a hazard present from ignitable or dangerous waste. 'No Smoking' signs are not considered to be 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. Since 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. The rationale for operations associated with the PUREX Storage Tunnels are addressed further in a petition for rulemaking submitted to Ecology (Freeberg 1989), in fulfillment of a Tri-Party Agreement milestone (Milestone M-22-01) (Ecology et al. 1990).

3.2.7 Land Disposal Restrictions

Operation of the PUREX Storage Tunnels does not involve land disposal of dangerous waste. Therefore, related requirements of RCRA Section 3004 are not applicable to the PUREX Storage Tunnels.



1 Figure 3-1. Jumper Assembly with Counterweight (typical).

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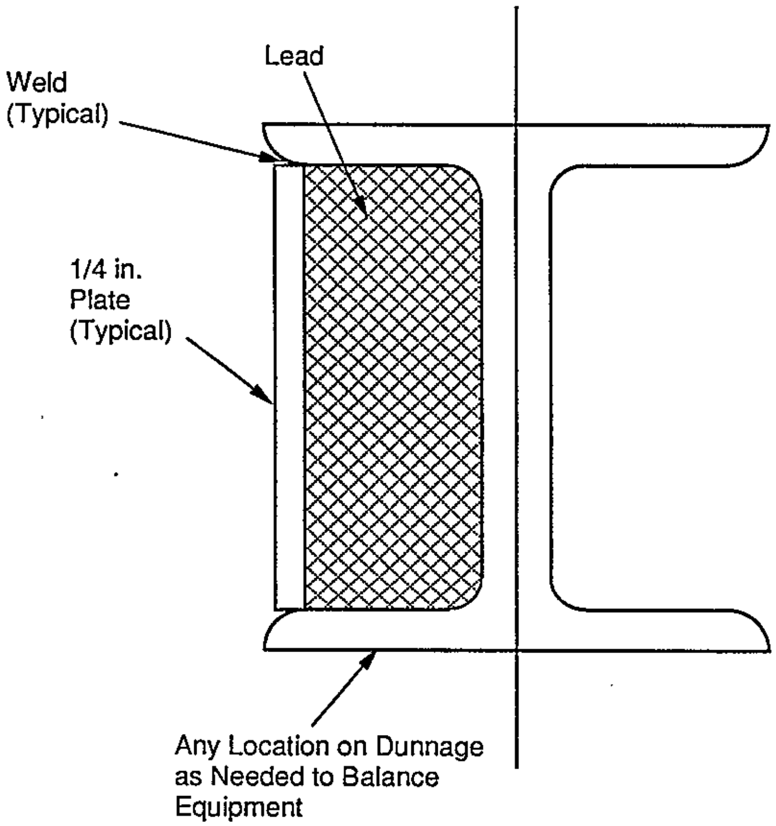

Figure 3-2. Equipment Dunnage Lead Counterweight (typical).

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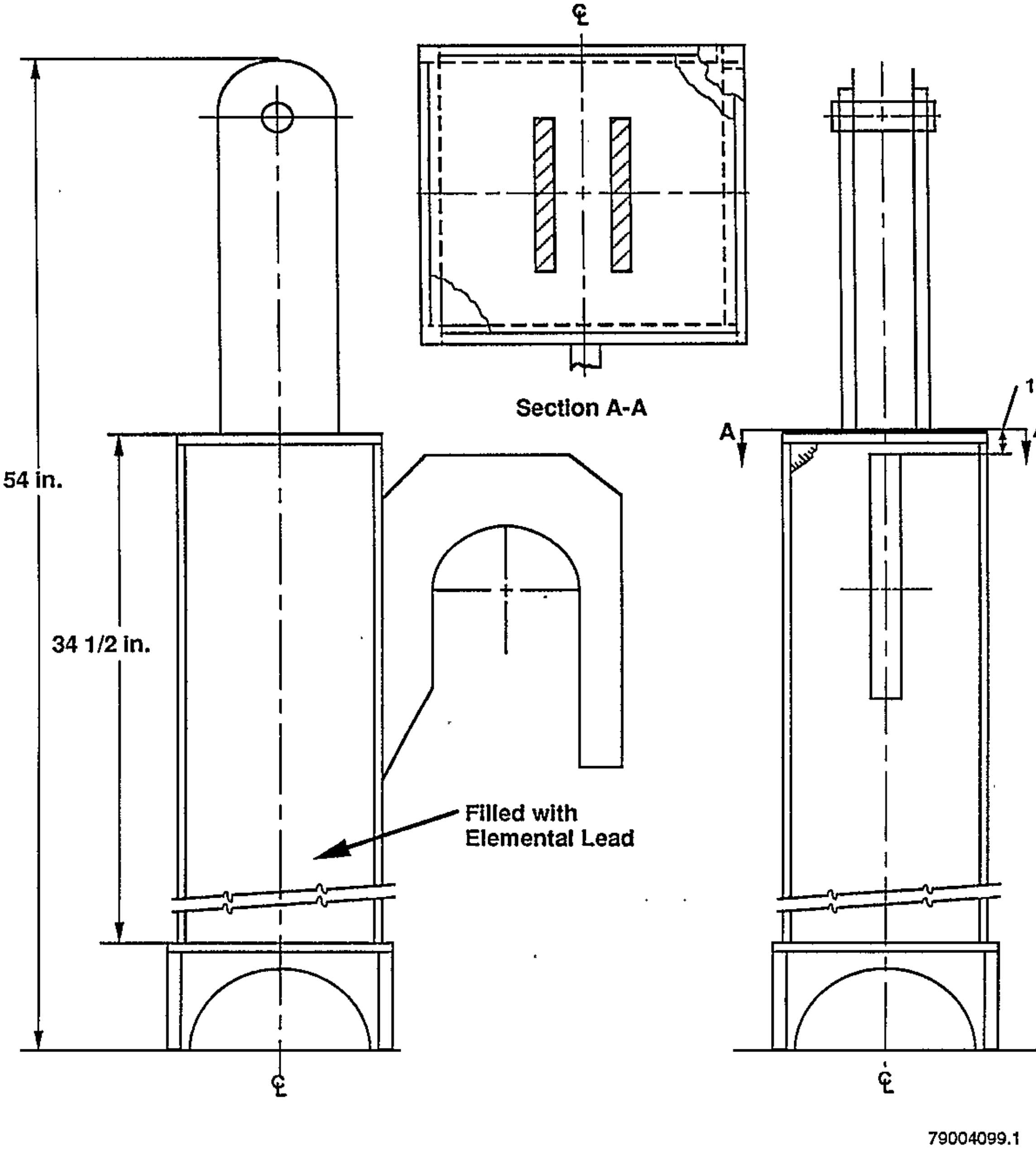

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Figure 3-3. Jumper Alignment Tool.

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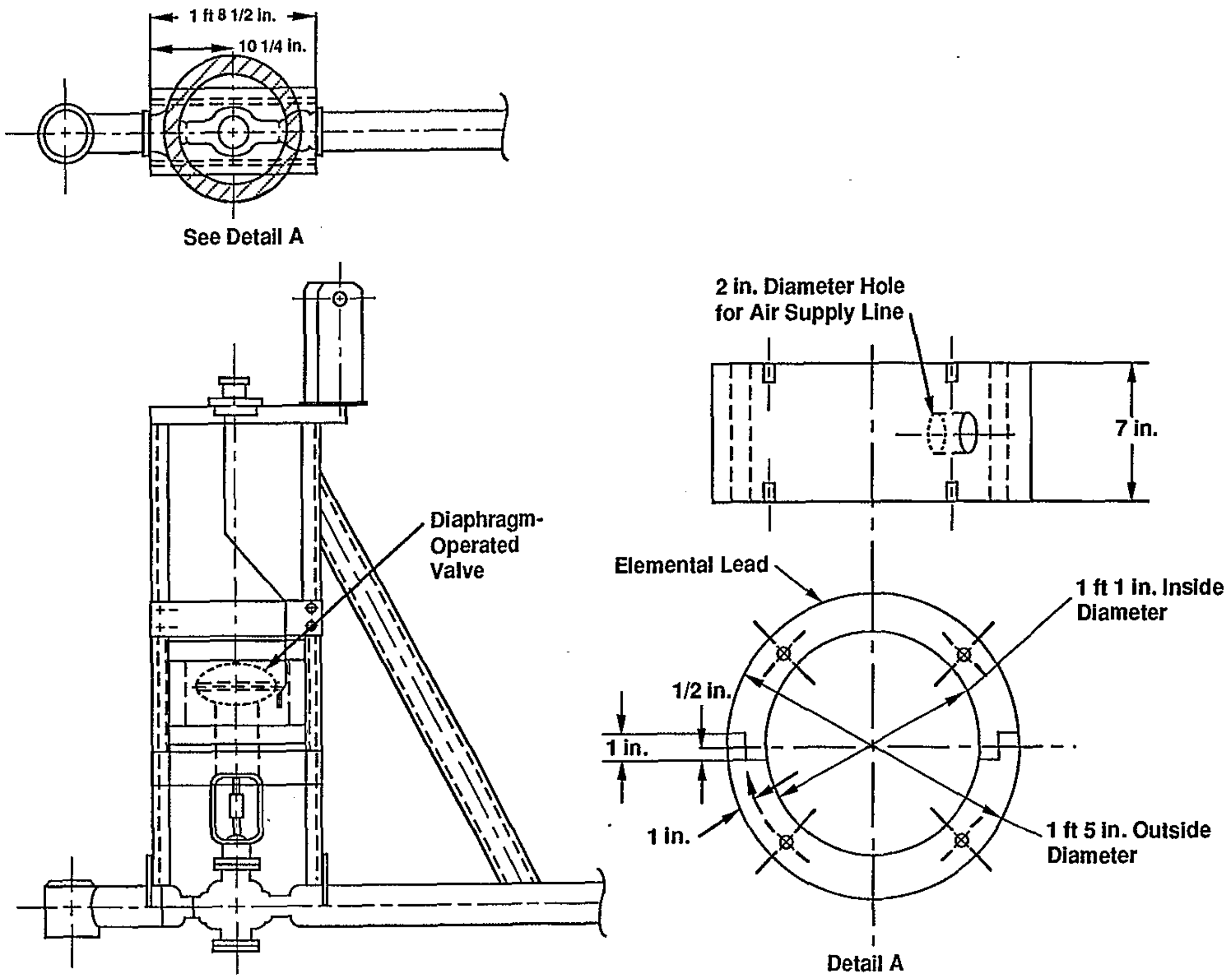

Figure 3-4. Diaphragm-Operated Valve Shielding.

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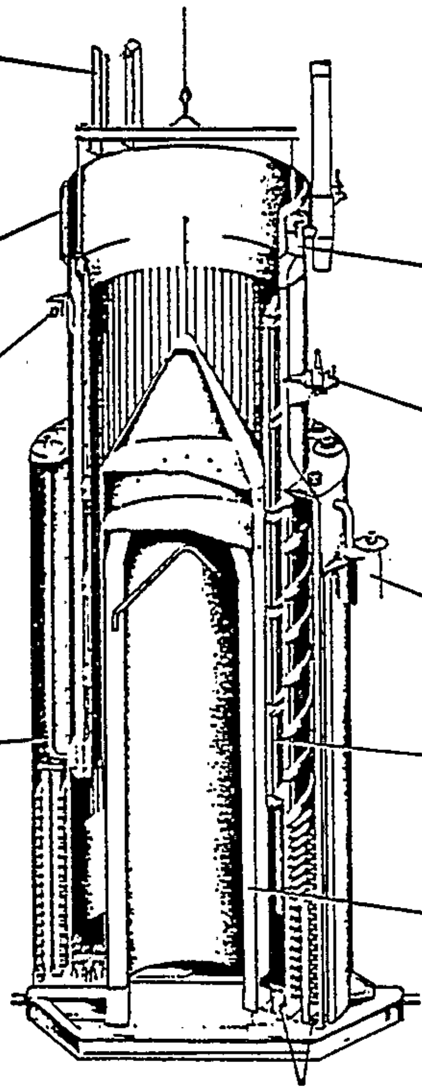

Approximately 9 ft diameter, 24 ft tall, and 58,000 lbs.

Figure 3-5. A PUREX Plant Annular Dissolver.

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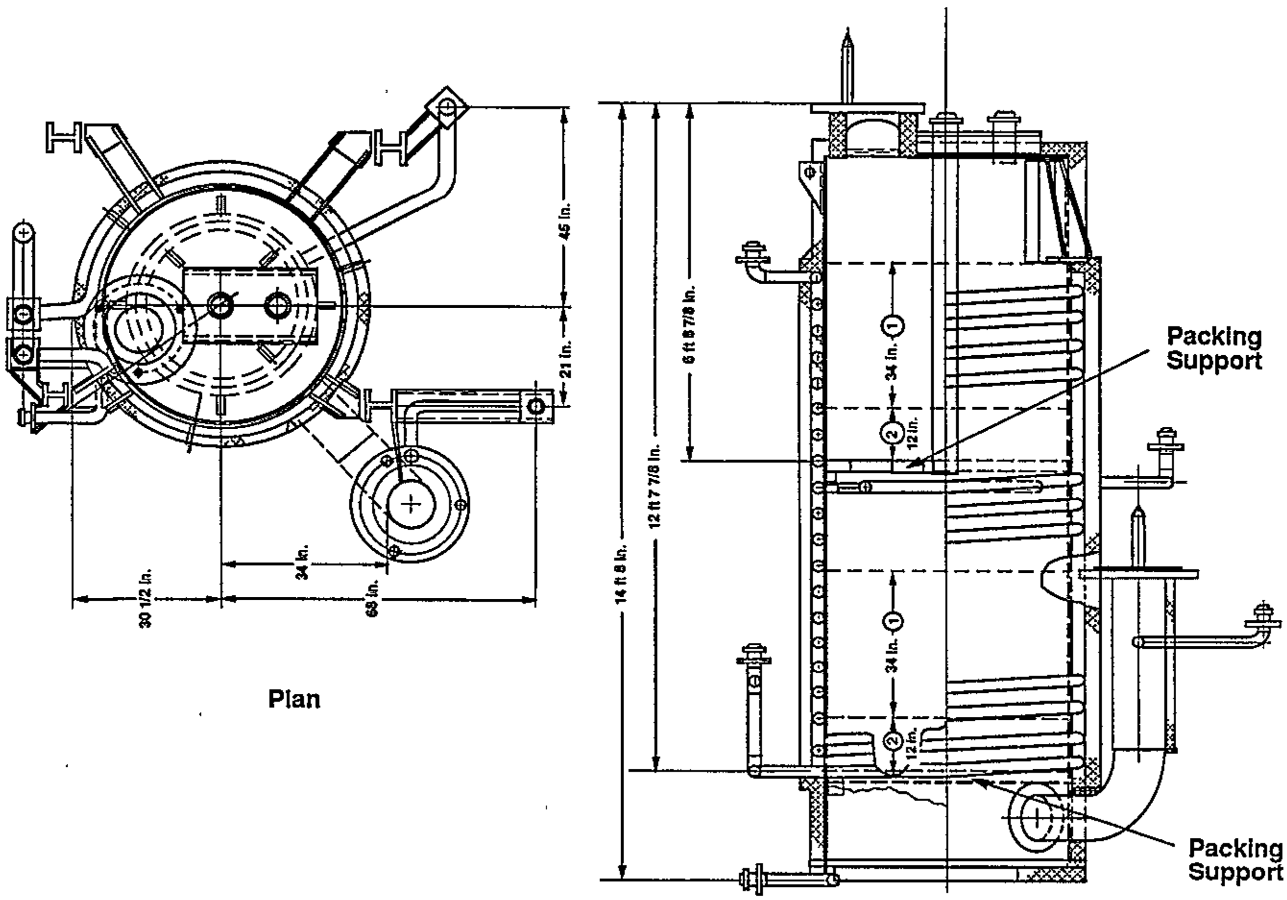

① 1/2 in. unglazed ceramic berl saddle packing*

② 1 in. unglazed ceramic berl saddle packing*

* Initially Coated with Silver Nitrate

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1 Figure 3-6. Silver Reactor.

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Table 3-1. Dangerous Waste Material in the PUREX Storage Tunnels.

Dangerous waste	Approximate amount[a] pounds (kilograms)	Tunnel location[b]
Tunnel 1		
Lead	500[d] (230)	2 and 4
Tunnel 2		
Silver[c]	1,600[e] (740)	5 and 15
Mercury	300[f] (130)	7, 9, and 11
Lead	6,100[f] (2,760)	14 and 15

[a]Total quantity per tunnel rounded to nearest 100 pounds (10 kilograms).

[b]Position of railcar. Numbering is in consecutive order with position 1 against the railcar bumper at the south end of each tunnel; position 2 is against railcar in position 1, and so forth.

[c]Expressed as silver nitrate weight equivalent.

[d]There is one box of pipe jumpers at each of two locations. It is estimated each box contain approximately 50 jumpers of which about 5 percent have lead counterweights that average 100 pounds (45 kilograms) lead per jumper. Therefore, estimated total weight of lead per box is approximately 250 pounds (113 kilograms).

[e]The amount of silver remaining on the packing of a discarded silver reactor is a function of its regeneration/flushing history. The quantity of silver is based on the following assumptions:

- A new silver reactor has 250 pounds (113 kilograms) of silver nitrate on its packing
- Periodic regeneration adds 125 pounds (56.7 kilograms) of silver nitrate per charge
- Chemical flushing removes all silver from packing.

The silver reactor in location 5 had 11 regeneration charges since its last chemical flush. The silver reactor in location 15 had only its initial charge of silver nitrate.

[f]Based on take-offs from fabrication drawings of the actual equipment in storage.

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CONTENTS

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 solely for the storage of discarded process equipment removed from the PUREX Plant. The discarded equipment stored in the tunnels either has failed in service or has become obsolete.

The PUREX Storage Tunnels are designed and constructed to provide a means of protecting personnel and the environment from radiation associated with the discarded equipment. The isolation provided by the PUREX Storage Tunnels also serves to protect personnel and the environment from the dangerous waste materials associated with the process equipment stored inside the tunnels. A physical description of the PUREX Storage Tunnels is provided in Chapter 2.0, Section 2.1.4.

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 facilities. Because the operation and construction of the PUREX Storage Tunnels most closely resemble that of a container storage facility, requirements prescribed for a container storage facility, and considered appropriate, 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

The PUREX Plant operations management, with the concurrence of the appropriate cognizant engineer from PUREX Plant engineering, determines when a specific piece of process equipment is to be replaced at the PUREX Plant or removed from the PUREX Storage Tunnels. Plant engineering prepares a job specific work plan describing the overall transfer activities. Plant operations prepares a canyon change order for the removal and replacement of the equipment (as required) and the applicable sections of the storage tunnel checklist (Appendix 2F). The work plan and storage tunnel checklist are routed for review and concurrence by key personnel in PUREX Plant operations, engineering, health physics, nuclear safety, industrial safety, and quality control or quality assurance. After the concurrence signatures are obtained, the storage tunnel checklist is forwarded to the PUREX Plant Manager for approval.

4.1.1.1 Locomotive Preparation. A remotely controlled, battery-powered locomotive normally is 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. Procedures for use of the remote locomotive are described in this chapter because this method 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, a specific procedure for that application will be developed.

Preparatory activities associated with the remote-controlled locomotive include 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, Section 2.1.4.1 provides a description of the door.) Tunnel Number 1 was filled to capacity in 1965 and subsequently was sealed. As part of sealing the tunnel, the area surrounding the tunnel door (at the door frame interface) was sealed to prevent airflow from the storage tunnel to the railroad tunnel. At that time, the controls for operation of the tunnel door were deactivated electrically and currently are disabled. The Tunnel Number 1 water-fillable door is filled with water because of the close proximity of the stored radioactive equipment to the railroad tunnel. The water serves as radiation shielding, effectively reducing the dose rate at the door by a factor of 10.

Because the operation of Tunnel Number 1 is static and the tunnel is not entered routinely, information associated with the operation of the water-fillable doors is addressed only for Tunnel Number 2. It should be noted that operation of the Tunnel Number 1 water-fillable door is essentially the same as the operation of the Tunnel Number 2 water-fillable door.

Currently, the water-fillable door to Tunnel Number 2 is empty and is not expected to be filled in the near future. In the event the door is filled, the water must be pumped from the door before the door can be raised. The door is emptied by installing a throttle valve to the wall stub located on the exterior of the door housing (Figure 4-1). A length of fire hose is attached to the throttle valve and extended eastward from the tunnel to an area where the surface discharge will not migrate to the tunnel storage area. The inline pump is activated, the water is pumped from the door through the fire hose, and the water is discharged to the soil column. Operational checks are performed on the door hoists. Before performing operational checks on the water-fillable door, the operator verifies with the PUREX dispatcher that the railroad tunnel area is clear of personnel.

4.1.1.3 Other Preparation Tasks. Before equipment storage or removal, the following preparatory tasks are completed.

- The PUREX railroad tunnel floor drains are verified to be unobstructed and free-flowing.

- The area under the horizontal overhead door and a section of the track approximately 20 feet (6.1 meters) on each end of the overhead door is washed down.

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

- A predetermined length of cord is attached to the north end of the railcar to provide storage location indication (optional, if needed).

- Placards are attached to the railcar in accordance with WAC 173-303-395(6) and 173-303-630(3) if the equipment contains dangerous waste components (storage only).

4.1.2 Tunnel Storage Activities

This section describes the procedures followed to place equipment in storage within the PUREX Storage Tunnels. All equipment and material placed into storage within the PUREX Storage Tunnels has been removed from the PUREX Plant. Equipment and material from other sources are not stored within the tunnels.

4.1.2.1 Selection of Equipment to be Stored. Most of the major pieces of process equipment removed from the PUREX Plant are radioactive and too large to be considered for shipment from the PUREX Facility. Therefore, the equipment must be placed in the PUREX Storage Tunnels until a means of separating the dangerous waste, decontaminating the waste, and reducing the equipment size is available.

4.1.2.2 Physical Characterization of Equipment to be Stored. Physical characterization of equipment to be stored in the PUREX Storage Tunnels occurs after it is determined that the piece of equipment has failed or has become obsolete and must be removed from the PUREX Plant. Physical characterization of each piece of equipment takes place within the PUREX Plant and 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.

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 materials. Such information also is used to design and fabricate, if required, supports on the railcar and to determine the methods to be used in the removal of the equipment from its position in the process cells.

Specific equipment at the PUREX Plant is known to contain dangerous waste. The equipment includes dissolvers that contain elemental mercury, silver reactors that contain silver salts, and jumpers and other equipment that have elemental lead counterweights. Characteristics of these materials when stored as dangerous waste are described in Chapter 3.0.

4.1.2.3 Equipment Flushing. Before removal from service, the equipment is 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. Currently, analysis of the rinsate is used to determine when these goals have been achieved. Where practical, the rinsate is returned to the process to minimize both product and chemical losses. The analysis of the final flush is retained as part of the PUREX Plant records.

The exteral surface of the equipment normally is flushed to remove radioactive contamination using a portable, high-pressure, water-spray wand. This flush generally occurs while the equipment is being hoisted from the process cell. Past practices associated with equipment flushing are addressed further in Appendix 3A.

4.1.2.4 Railcar Preparation. Railcars (either flatbed or gondola-style cars) are modified to serve as dedicated storage platforms and transporters for process equipment 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.

4.1.2.5 Placement of Discarded Equipment into Storage Position. With all preparations complete and with the approval of the PUREX shift operations manager, transferring the discarded equipment to the PUREX Storage Tunnels proceeds as follows.

- The railcar is positioned beneath the horizontal overhead door to the PUREX canyon and the water-fillable door to the storage tunnel is opened.

- The overhead door is opened and 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.

- After loading the railcar, the overhead door is closed.

- A health physics technician obtains a radiation level survey of the loaded railcar at a distance commensurate with ALARA practices.

- The railcar is pushed by the locomotive into the storage tunnel to its storage position.

- Once the railcar is in position, the locomotive is backed out of the PUREX Storage Tunnel and the water-fillable door is closed.

4.1.3 Removal of Stored Equipment

The removal of equipment stored within the PUREX Storage Tunnels is not conducted on a routine basis. It is planned that the equipment will remain in storage within the PUREX Storage Tunnels until modifications are made at the PUREX Plant or a new TSD unit is constructed on the Hanford Facility to accommodate processing and repackaging of the equipment for disposal or further storage. Removal of equipment from storage within the PUREX Storage Tunnels proceeds after the preparation activities identified in Section 4.1.1.

With all preparations complete and with the approval of the shift operations manager, removal of equipment from the storage area of the PUREX Storage Tunnels will proceed as follows.

- The locomotive is positioned in the PUREX Plant railroad tunnel.

- Verification is made that the PUREX Plant 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 locomotive is moved into the storage tunnel and connected to the railcar.

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

- The water-fillable door is closed.

The loaded railcar retrieved from the tunnel will be placed beneath the horizontal door of the railroad tunnel at the east end of the PUREX Plant (Chapter 2.0, Figure 2-4). Detailed remote viewing and radiation measurements will be obtained at this time to determine the possibility of dangerous 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) will be documented and attached to the storage tunnel checklist. This information will be maintained in the files and will be used to establish sampling locations within the tunnels at closure. After remote viewing and radiation surveys, the railcar and associated equipment will 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. This is 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 is in place, the hydrant is opened slowly and the door is filled with water. The hydrant is closed when a high-level indicator light illuminates. 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 6-inch (15.2-centimeter) drain is provided in each door sump that connects to the PUREX Plant steam condensate discharge line. Water accumulated in the door sump flows via the 16-inch (40.6-centimeter) condensate line to the 216-A-30 Crib.

4.1.5 Poststorage Activities

The following poststorage activities will conclude the tunnel storage task.

- The locomotive is placed beneath the horizontal door in the railroad tunnel.
- A health physics technician performs a radiation survey of the locomotive, the plastic shroud is removed, and the locomotive is decontaminated, as required.
- After decontamination, the locomotive is returned to its railroad spur in the railroad cut north of the PUREX Plant.
- A health physics technician performs a radiation survey of the railroad tunnel between the overhead door and the water-fillable door, and the area is decontaminated as required.

- The PUREX Plant operations management is notified of any unusual conditions observed during the storage/retrieval activities and/or of any suggestions for improving future transfer operations.

- The storage tunnel checklist is finalized by PUREX Plant operations and plant engineering and verified by quality assurance/quality control and placed in PUREX Facility files.

4.1.6 Operation of the Tunnel Ventilation System

The design of both Tunnel Number 1 and Tunnel Number 2 included provisions for a filtered ventilation system (Chapter 2.0, Section 2.1.5). The ventilation systems were designed to ventilate air from within the tunnels and prevent the release of airborne contamination.

4.1.6.1 Tunnel Number 1 Ventilation. Active ventilation of Tunnel Number 1 presently is not provided. After the placement of the last railcar into Tunnel Number 1, the tunnel was sealed. As part of the sealing activities, the ventilation fan was electrically deactivated and the exhaust stack and filter were isolated from the system by installing a blank in the tunnel exhaust duct upstream of the filters. Once railcar removal activities are initiated, it is planned that the ventilation system will be reactivated. Operation of the ventilation system will be similar to that for Tunnel Number 2.

4.1.6.2 Tunnel Number 2 Ventilation. The Tunnel Number 2 ventilation system presently is active and is maintained in an operational condition. When the water-fillable door is closed, the exhaust system, which discharges approximately 4,000 cubic feet (113 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 contamination away from both the railroad tunnel and the personnel following railcars (if allowed) into the storage tunnel. A high-efficiency particulate air filter provides filtration of all exhaust air before release to the atmosphere. The high-efficiency particulate air filter is tested in place at least annually to ensure particulate removal efficiency. Exhausted air is sampled continuously and analyzed periodically for airborne radionuclides.

4.2 CONTAINERS [D-1]

This section describes the various types of containment used to isolate the dangerous waste components of the discarded process equipment 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 facility. The dangerous waste stored in the PUREX Storage Tunnels is contained and is not considered to pose a risk to Hanford Facility personnel, the public, or to the environment.

4.2.1 Containers with Free Liquids [D-1a]

The only dangerous waste stored as a free liquid in the PUREX Storage Tunnels is elemental mercury. A small quantity, less than 1/2 gallon (1.7 liters), of mercury is contained in each of the two thermowells attached to and contained within each dissolver (Chapter 3.0, Figure 3-5). Primary containment of the mercury is provided by the all-welded construction of the thermowell itself, which is fabricated from 3-inch, Schedule 80, 304L stainless steel pipe. The open upper end of the thermowell was sealed with a 304L stainless steel nozzle plug in preparation for storage. The discarded 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 3/8-inch (1-centimeter) thick plate and is approximately 9 feet (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 unit 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 the last railcar containing a discarded dissolver was placed into storage on January 18, 1986. Personnel access into the storage area for purposes such as labeling is not feasible because of the radiation levels and cannot be justified under the ALARA guidelines. Based on ALARA, dangerous waste presently within the PUREX Storage Tunnels will remain unlabeled. However, future transfers of dangerous waste into the PUREX Storage Tunnels will be placarded 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 [D-1b]

Three discarded jumper alignment tools stored in Tunnel Number 2 (position 14) contain a total of approximately 2,500 pounds (1134 kilograms) of elemental lead. Some of the process pipe jumpers stored in Tunnel Number 1 (positions 2 and 4) and in Tunnel Number 2 (positions 14 and 15) have attached counterweights that also contain elemental lead. The total amount of lead in Tunnel Number 1 is approximately 500 pounds (230 kilograms). The total amount of lead in Tunnel 2, through position 17, is approximately 6,100 pounds (2,760 kilograms). Most lead is fully contained in all-welded encasements of either carbon steel or 304L stainless steel. The encasement is of nominally

1/4-inch (6.4-millimeter) thick material. The encasement serves as support, protection against mechanical damage, and protection of the lead from exposure to the process environment.

Cut-up pipe jumper assemblies with attached, encased counterweights intact are placed in steel burial box liners nominally 9 feet (2.7 meters) by 18 feet (5.5 meters) by 8 feet (2.4 meters). This steel box provides secondary containment for the lead in the unlikely event the primary encasement should fail. Although this steel box is 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 facility closure is not considered to be credible.

The process equipment that contains lead weights or that has encased lead weights attached, is not labeled as containing characteristic toxic lead (D008) [WAC 173-303-090(8)(c)]. This labeling had not been identified as applicable as of May 13, 1988, when the last lead was placed in Tunnel Number 2. As stated in Section 4.2.1, personnel entry into the radiation zones of the tunnel storage area for purpose of labeling would be inconsistent with ALARA guidelines. However, future storage of equipment containing lead will be on railcars that are properly placarded.

4.2.3 Protection of Extremely Hazardous Waste in Containers [D-1c]

The amount of elemental lead, elemental mercury, and silver salts 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 will remain undisturbed for long periods of time.

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

- The physical characteristics and limited volume of the extremely hazardous waste are such that, in the unlikely event the material is released from its primary container, no significant impact to the environment would occur.

4.2.4 Prevention of Reaction of Ignitable, Reactive, and Incompatible Waste in Containers [D-1d]

There is no reactive or incompatible waste known to be stored in the PUREX Storage Tunnels. The only dangerous waste stored in the PUREX Storage Tunnels considered an ignitable waste is the silver nitrate in Tunnel 2. The silver nitrate fraction of the silver salts, within the silver reactors, exhibits the characteristic of ignitability as defined in 49 CFR 173.151. 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 will remain undisturbed for long periods of time.
- 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).

Although ignitable waste storage facilities 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 and the means of storage. The rationale for operations associated with the PUREX Storage Tunnels are addressed further in a petition for rulemaking submitted to Ecology and the EPA (Freeberg 1989) in fulfillment of a Tri-Party Agreement milestone (Milestone M-22-01) (Ecology et al. 1990).

4.3 TANK SYSTEM [D-2]

Operation of the PUREX Storage Tunnels does not involve the storage of dangerous waste in tank systems. Therefore, the requirements of WAC 173-303-640 are not applicable to the PUREX Storage Tunnels.

4.4 WASTE PILES [D-3]

Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in piles. Therefore, the requirements of WAC 173-303-660 are not applicable to the PUREX Storage Tunnels.

4.5 SURFACE IMPOUNDMENTS [D-4]

Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in surface impoundments. Therefore, the requirements of WAC 173-303-650 are not applicable to the PUREX Storage Tunnels.

4.6 INCINERATORS [D-5]

Operation of the PUREX Storage Tunnels does not involve the incineration of dangerous waste. Therefore, the requirements of WAC 173-303-670 are not applicable to the PUREX Storage Tunnels.

4.7 LANDFILLS [D-6]

Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in landfills. Therefore, the requirements of WAC 173-303-665 are not applicable to the PUREX Storage Tunnels.

4.8 LAND TREATMENT [D-7]

Operation of the PUREX Storage Tunnels does not involve the land treatment of dangerous waste. Therefore, the requirements of WAC 173-303-655 are not applicable to the PUREX Storage Tunnels.

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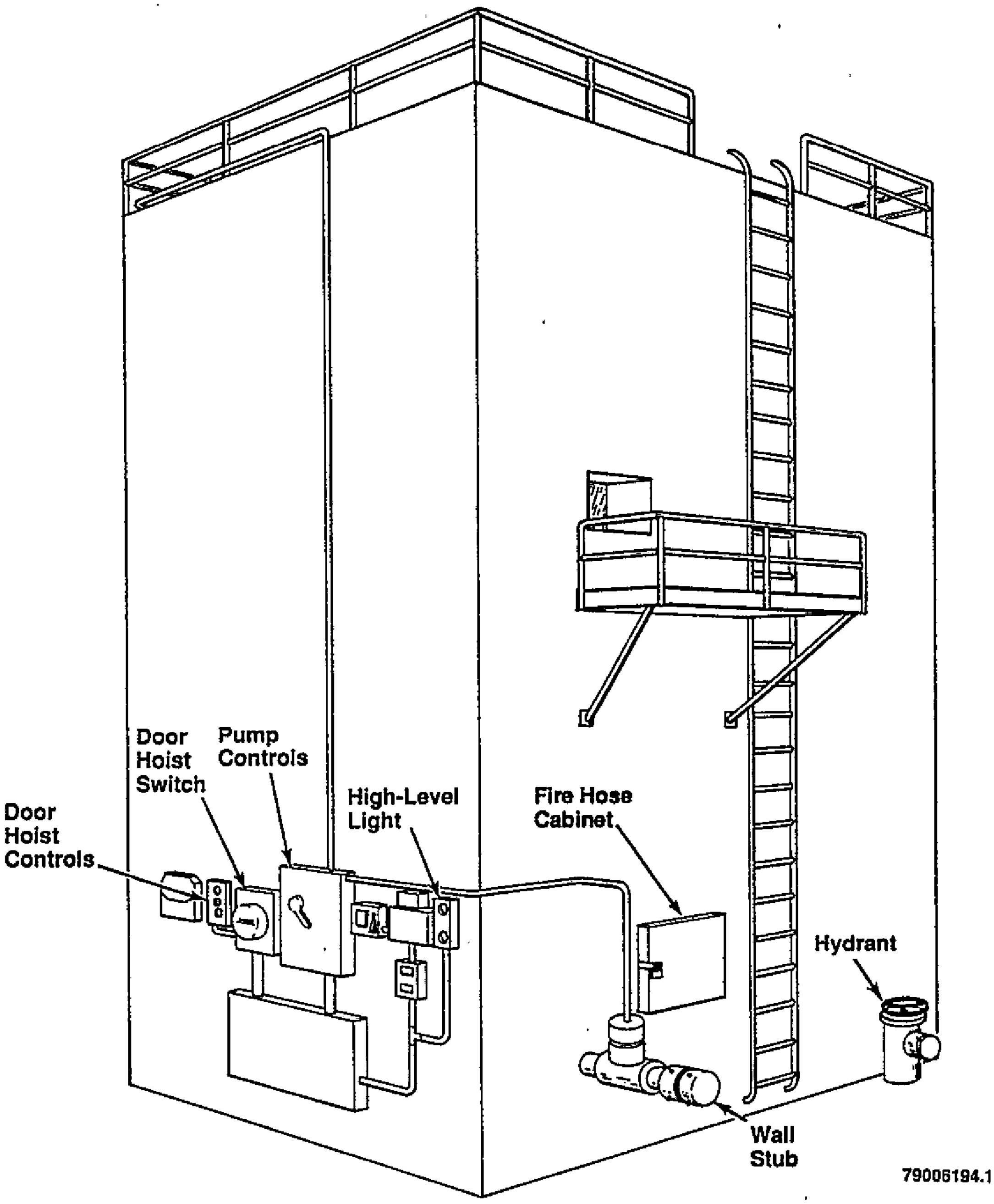

Figure 4-1. Water-Fillable Door Exterior (Tunnel Number 2).

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5.0 GROUNDWATER MONITORING [E]

The PUREX Storage Tunnels are being permitted as a miscellaneous unit under the provisions of WAC 173-303-680. These regulations require that miscellaneous unit permit terms and provisions address appropriate requirements provided for other TSD facilities.

Appropriate requirements for a container storage facility are addressed for the PUREX Storage Tunnels because the construction and operation of the PUREX Storage Tunnels most closely resemble this type of facility. The PUREX Storage Tunnels are not operated as a dangerous waste surface impoundment, waste pile, land treatment unit, or landfill as defined in WAC 173-303-645(1)(a). Therefore, groundwater monitoring is not required.

The Part B permit application is written under the assumption that authority for administration of miscellaneous units under WAC 173-303-680 will be extended to Ecology by the time the permit is finalized and issued for the PUREX Storage Tunnels.

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter discusses hazard prevention, emergency preparedness, structures, run-off controls, security barriers, inspection requirements, and emergency equipment in place at the PUREX Storage Tunnels.

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 facilities. The operation and construction of the PUREX Storage Tunnels most closely resemble that of a container storage facility. Therefore, requirements prescribed for a container storage facility that are considered appropriate for the safe management of dangerous waste are addressed in this chapter.

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.

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 [F-1a(1)]. The entire Hanford Facility, including the PUREX Storage Tunnels, is a controlled access area and is expected to remain so for the foreseeable future. The Hanford Facility maintains around-the-clock surveillance for protection of government property, classified information, and special nuclear materials. The Hanford Patrol maintains a continuous presence of armed guards to provide additional security.

6.1.1.2 Barrier and Means to Control Entry [F-1a(2),(2a),(2b)]. Manned barricades are maintained around the clock at checkpoints on vehicular access roads leading to the operational areas of the Hanford Facility. All personnel accessing these areas must have a U.S. Department of Energy-issued security identification badge indicating the appropriate authorization. Personnel also might be subject to a search of items carried into or out of these areas.

Within the Hanford Facility are operational areas to which access is further restricted. The PUREX Storage Tunnels are located in one such operational area, the 200 East Area. Access to the 200 East Area is gained through one of two manned barricades. All personnel entering or leaving the 200 East Area must display a U.S. Department of Energy-issued security

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identification badge indicating authorization to enter the area and must submit to a search of vehicles and personal items carried into and out of the area.

The PUREX Plant and the entries to the PUREX Storage Tunnels currently are surrounded by a double, 7-foot (2.1 meter) high, chain link fence system. Entry into the PUREX Storage Tunnels is made from within the PUREX Plant by means of the PUREX railroad tunnel. Personnel wishing to enter either storage tunnel must be qualified radiation zone workers and must obtain PUREX management approval made on a need-to-enter basis. Actual access into the active portion, the storage area, of the storage tunnel can be made only through the north entry after the massive, water-fillable door is raised. The water-fillable door normally is closed and requires PUREX Plant operations approval, as well as mechanical assistance, to open. Although a portion of Tunnel Number 2 lies outside the double fenced area, access to the tunnel interior can be made only through the PUREX Plant.

6.1.1.3 Warning Signs [F-1a(3)]. Warning signs are posted on the outer fence around the perimeter of the PUREX Facility. The signs are printed in English, legible from a distance of 25 feet (7.6 meters), and visible from all angles of approach. Three types of signs are posted around the PUREX Facility and contain the following legends:

- "NO TRESPASSING. BY ORDER OF THE UNITED STATES DEPARTMENT OF ENERGY"
- "WARNING. THIS AREA PATROLLED BY POLICE DOGS"
- "NOTICE. ALL PERSONS-VEHICLES SUBJECT TO SEARCH FOR PROHIBITED ARTICLES."

Additionally, points of access to the PUREX Storage Tunnels are posted with the following warning signs: "DANGER Unauthorized Personnel Keep Out!" in accordance with requirements of WAC 173-303-310(2)(a). The word DANGER is in large, white, block letters on a bright red background. The remaining lettering is black on a white background.

6.1.2 Waiver [F-1b,b(1),b(2)]

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

6.2 INSPECTION SCHEDULE [F-2]

This section describes the method and schedule for inspection of the PUREX Storage Tunnels. The purpose of inspections at the PUREX Storage Tunnels is to prevent malfunctions, deteriorations, and discharges that may cause or lead to the release of radioactive or dangerous waste to the environment or pose a threat to human health. Abnormal conditions identified by inspections must be corrected on a schedule that prevents hazards to workers, the public, and the environment.

Because of the levels of radiation present within the PUREX Storage Tunnels, only external inspections are performed. The material stored within the tunnels consists of discarded process equipment removed from the PUREX Plant. This equipment is radioactive, resulting in radiation levels that exceed 5 roentgen per hour within certain areas of the tunnels. Additionally, the PUREX Storage Tunnels are physically inaccessible to personnel as the design does not provide for manned entry. There are no shielded corridors nor does the tunnel width in either tunnel provide adequate space for personnel to safely pass by railcars in storage. Internal inspections required by RCRA have been considered and determined to be incompatible with the requirements of the *Atomic Energy Act*, which seeks to maintain personnel exposures ALARA. Internal inspections will be performed only at closure following the removal of the equipment stored within the tunnels. Inspection results will be documented and corrective action initiated in accordance with established closure procedures.

6.2.1 General Inspection Requirements [F-2a]

The content and frequency of inspections are described in this section. The inspection schedule and inspection reports will be maintained with the tunnel storage records in the PUREX Facility. Inspection records will be retained for a minimum of 5 years.

6.2.1.1 Types of Problems [F-2a(1)]. Information from inspections will be recorded on inspection reports. The report forms will be used to initiate corrective action, if necessary. The following identifies types of inspections to occur at the PUREX Storage Tunnels.

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

- The point of access to the PUREX Storage Tunnels will be inspected to ensure that signs warning of dangerous waste are in place, visible, and legible. Abnormal conditions will be recorded, evaluated, and corrective action will be initiated if necessary.

- The exhaust fan for Tunnel Number 2 is checked to denote operating status (Tunnel Number 1 fan is not in operation). This verification is conducted by observing an indicator light and a pressure differential gage located in the PUREX Plant Power Control Room. Inspection results are recorded in the power control room logbooks. Abnormal conditions are evaluated and corrective action is initiated if necessary.

6.2.1.2 Frequency of Inspection [F-2a(2)]. Inspection of the PUREX Storage Tunnels exterior is planned to be conducted on a 6-month frequency and after any significant seismic event or severe weather condition (i.e., exceptionally high winds, heavy rainfall, or rapid run-off) that could potentially affect the structural integrity of the PUREX Storage Tunnels. Tunnel access points also are planned to be inspected every 6 months.

6.2.2 Specific Process Inspection Requirements [F-2b]

The following sections describe specific process inspection requirements.

6.2.2.1 Container Inspection [F-2b(1)]. Within the PUREX Storage Tunnels, solid dangerous waste (jumpers, tools, valves, etc., that contain elemental lead) is stored in boxes loaded on railcars. Other dangerous waste (silver salts and elemental mercury) is contained within equipment stored directly on the railcars.

As described in Section 6.2, access to the interior of the PUREX Storage Tunnels for inspection purposes is not possible because of the radiation levels present within the tunnels. Although inspection requirements specified in WAC 173-303-395 and WAC 173-303-630 are applicable to container storage facilities, these inspections are not considered appropriate for the safe operation of the PUREX Storage Tunnels and will be performed only at closure.

6.2.2.2 Tank Inspection [F-2b(2),(2)a-(2)f]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in tanks. Therefore, the inspection requirements of WAC 173-303-640 are not applicable to the PUREX Storage Tunnels.

6.2.2.3 Waste Pile Inspection [F-2b(3),(3)a-(3)d]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in piles. Therefore, the inspection requirements of WAC 173-303-660 are not applicable to the PUREX Storage Tunnels.

6.2.2.4 Surface Impoundment Inspection [F-2b(4),(4)a-(4)b]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in surface impoundments. Therefore, the inspection requirements of WAC 173-303-650 are not applicable to the PUREX Storage Tunnels.

6.2.2.5 Incinerator Inspection [F-2b(5),(5)a,(5)b]. Operation of the PUREX Storage Tunnels does not involve the incineration of dangerous waste. Therefore, the inspection requirements of WAC 173-303-670 are not applicable to the PUREX Storage Tunnels.

6.2.2.6 Landfill Inspection [F-2b(6),(6)a-(6)d]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in landfills. Therefore, the inspection requirements of WAC 173-303-665 are not applicable to the PUREX Storage Tunnels.

6.2.2.7 Land Treatment Facility Inspection [F2b(7),(7)a-(7)b]. Operation of the PUREX Storage Tunnels does not involve the land treatment of dangerous waste. Therefore, the inspection requirements of WAC 173-303-655 are not applicable to the PUREX Storage Tunnels.

6.3 WAIVER OR DOCUMENTATION OF 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 [F-3a(1)]. 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 and is maintained at the PUREX Plant.

6.3.1.2 External Communications [F-3a(2)]. External communications equipment for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or local emergency response teams is maintained and available for use at the PUREX Plant. External communication is by a telephone communication system, a two-way radio base station, and two-way portable radios. In addition, the following external communications equipment is available for notifying persons assigned to emergency response organizations.

- Fire alarm pull boxes (located at the PUREX Plant)--connected to a system monitored around the clock by the Hanford Fire Department.
- Telephone number 811--contact point for the Hanford Site; on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders.
- Telephone number 3-3800--single point of contact for non-emergency notification of the Hanford Patrol Operation Center duty officer; this number can be dialed from any Hanford Site telephone.
- Crash alarm telephone system--consists of selected telephones automatically connected to control stations.
- Two-way radio system (located at the PUREX Plant)--the system accesses the Hanford Site emergency network and can summon the Hanford Fire Department, Hanford Patrol, and/or any other assistance requested to handle emergencies.

6.3.1.3 Emergency Equipment [F-3a(3)]. A detailed list of equipment included in the emergency plan for the PUREX Facility is provided in Appendix 7A.

6.3.1.4 Water for Fire Control [F-3a(4)]. 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 of a fire in the storage area of the tunnels, the contingency plan will be activated. Because of the leachable characteristic of the dangerous waste stored within the tunnels, water will not be used for fire control. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system 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 at 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 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.

The WAC 173-303-340(3) requires that aisle space be maintained to allow the unobstructed movement of personnel, fire protection equipment, and decontamination equipment to any area of facility operation in an emergency unless it can be demonstrated that aisle space is not needed for any of these purposes. Radiation levels within the PUREX Storage Tunnels considerably exceed the level that is safe for personnel access. The high levels of radiation were anticipated in the design of the tunnels and provisions for aisle space were not included.

Probabilities for emergencies occurring within the PUREX Storage Tunnels such as a fire or a spill of a dangerous waste are considered extremely remote. However, should such an event occur, personnel access to mitigate the event would be limited to the external surfaces of the tunnels and that portion of the interior of the tunnels that is not occupied by the railcars and is determined to be a safe radiological working environment.

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

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

6.4.1 Unloading Operations [F-4a]

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 Plant. Therefore, the requirements of this section are not applicable to the PUREX Storage Tunnels.

6.4.2 Run-Off [F-4b]

The design of the PUREX Storage Tunnels included consideration and provisions for the control of run-on. Construction of both tunnels included the application of a moisture barrier before placement of the soil overburden. On Tunnel Number 1, 90-pound (40.8 kilograms) 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 4 inches (10.2 centimeters) at all joints and seams. All interior and exterior steel surfaces of Tunnel Number 2 were coated with a 35-mil (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 18 mils (0.45 millimeter), ensuring a total dry film thickness of not less than 35 mils (0.9 millimeter).

The soil overburden covering the PUREX Storage Tunnels also is contoured to provide a side slope 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. Periodic inspections of the tunnel side slopes are conducted to ensure the contours remain in a condition that will preclude ponding and continue 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, Section 2.1.5.

Run-off at the PUREX Storage Tunnels is controlled by the design features of the exterior of the tunnels which 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 [F-4c]

Water is supplied to the PUREX Storage Tunnels from the PUREX Plant. This water is used for the sole purpose of filling the water-fillable doors should it be determined necessary. There are no other sources or uses of water at the PUREX Storage Tunnels.

6.4.4 Equipment and Power Failures [F-4d]

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. Safe operation of the PUREX Storage Tunnels is not contingent on continued operation of equipment. The equipment normally associated with the operation of PUREX Storage Tunnels are the remote-powered locomotive, the railcars, the water-fillable doors, and the ventilation system. Backup or redundant systems are not provided, as failure of the equipment, except for the high-efficiency particulate air filters, would not have the potential to result in a release of dangerous waste or radioactive material to the environment. Periodic monitoring of the stack exhaust sampling system coupled with the annual filter efficiency test provides a check of the integrity of the air filtering system. Mitigation of equipment failure is provided through routine and as-needed maintenance.

6.4.4.2 Mitigation of the Effects of Power Failure. Electrical power is required to operate the water-fillable doors and the ventilation fan in Tunnel Number 2. Backup or redundant systems are not provided, as failure of the equipment would not have the potential to result in a release of dangerous waste or radioactive material to the environment.

There are no hazards associated with the shutdown of the tunnel ventilation system due to loss of electrical power or as a result of a mechanical failure. Back-up or redundant systems are not provided as the system is operated only to maintain air balance and provide secondary control of radioactive airborne particulate. In the event the Tunnel Number 2 ventilation system fails or is mechanically shut down, a reversal of airflow will occur redirecting the airflow to the PUREX canyon ventilation system. The PUREX canyon ventilation system is filtered and is equipped with a steam-driven emergency exhaust fan for back-up in the event of an electrical power failure.

6.4.5 Personnel Protection Equipment [F-4e]

Personnel protection equipment for personnel working in the PUREX Storage Tunnels is available and maintained at the PUREX Plant. Personnel are trained and qualified in using the protective equipment and are checked routinely for mask fit.

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 consists of two pairs of radiation protection coveralls, one pair of canvas shoe covers, rubber boots or rubber shoe covers, two pairs of gloves, a cloth cap and hood, and a full face air respirator equipped with a high-efficiency particulate air filter. Such equipment also is considered to be sufficient protection from the dangerous waste stored within the PUREX Storage Tunnels.

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

There is no reactive or incompatible waste stored in the PUREX Storage Tunnels. The only ignitable dangerous 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 (Chapter 3.0, Table 3-1).

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 DOE-RL emergency plan and procedures manual, the *Emergency Plan* (WHC 1989), and the *Emergency Plan for PUREX Facility* (WHC 1991a). The DOE-RL emergency plan and procedures manual and the *Emergency Plan* are available for review upon request. The *Emergency Plan for PUREX Facility* is provided as Appendix 7A. The *Emergency Plan for PUREX Facility* and the referenced response procedures are maintained in the office of the shift operations manager located in the 202-A Building, Room 9.

The cited contingency plan documents also serve to satisfy a broad range of other requirements (e.g., Occupational Safety and Health Administration and U.S. Department of Energy orders). Therefore, revisions made to portions of the contingency plan documents that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology.

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FIGURE

TABLES

8.0 PERSONNEL TRAINING [H]

This chapter outlines the training program developed and implemented for the PUREX Facility employees whose duties have been identified as being associated with dangerous waste management.

The PUREX Facility training program uses existing general courses, augmented by courses developed specifically for the PUREX Facility. The program was designed to ensure that the PUREX Facility, including the PUREX Storage Tunnels, is operated and maintained in accordance with requirements of the EPA, Ecology, Occupational Safety and Health Administration, and the U.S. Department of Energy.

8.1 OUTLINE OF THE TRAINING PROGRAM [H-1]

The PUREX Storage Tunnels are used for long-term storage of equipment removed from the PUREX Plant. Equipment transfers from the PUREX Plant to the PUREX Storage Tunnels are conducted on an as-needed basis and are not manpower-intensive operations. Personnel involved with the transfer of equipment and in the operation and maintenance of the PUREX Storage Tunnels are PUREX Facility employees, trained and qualified through the PUREX Facility training program.

The PUREX Facility training program prepares employees to transfer equipment removed from the PUREX Plant to the designated PUREX Storage Tunnel in a safe, efficient, and environmentally sound manner. In addition to preparing employees to transfer equipment to the designated PUREX Storage Tunnel under normal conditions, the program ensures that employees are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with emergency responses outlined in the contingency plan (Appendix 7A).

The PUREX Facility training program includes a solid waste training course that covers training requirements for shift surveillance managers and nuclear operators associated with PUREX Storage Tunnels activities. PUREX Facility Management, in cooperation with Technical Training, Occupational Health and Safety Protection, and other applicable organizations, is responsible for the development and administration of the comprehensive training program for personnel involved with the PUREX Facility (Figure 8-1). The PUREX Facility management is responsible for identifying training requirements for PUREX Facility personnel and for ensuring that personnel complete appropriate training. The responsibilities of the various organizations are outlined in Section 8.1.3.

An initial job analysis process was completed on the PUREX Facility, which resulted in identifying the required training to transfer equipment from the PUREX Plant to the designated PUREX Storage Tunnel in a safe and efficient manner.

A job analysis process will be used to guide reevaluations of the PUREX Facility training program to ensure that operational and dangerous waste training requirements continue to be met. These reevaluations could result in modifying or adding new material to the current training program.

8.1.1 Job Positions and Descriptions [H-1a]

Each employee is assigned a job title (from the salaried nonexempt or bargaining unit classifications) or position (from the exempt classifications). Job titles and positions for employees who are associated with managing dangerous waste at the units managed by the PUREX Facility are listed in the following sections with brief descriptions of associated responsibilities.

8.1.1.1 PUREX/UO_3 Plant Manager and Deputy Manager. Responsibilities of the PUREX/UO_3 Plant manager and deputy manager include the following:

- Operating and maintaining the PUREX Facility in compliance with U.S. Department of Energy directives, policies and procedures, and approved safety documentation
- Complying with all hazardous and dangerous waste policies, procedures, and regulations
- Recruiting and developing a trained group of managers, professionals, nonexempt, and bargaining unit employees
- Ensuring safe and disciplined operations by trained personnel who implement policies and procedures
- Ensuring that documents related to the safe operations and maintenance of the PUREX Facility are accurate and up-to-date
- Ensuring the proper allocation of resources required to support the operation, maintenance and plant modification, and the installation of new equipment required for safety and to meet applicable schedules
- Providing operational requirements to support organizations to plan and provide services and resources when needed
- Approving the PUREX Storage Tunnel checklist
- Promoting safe operations of the PUREX Facility
- Responding to abnormal and/or emergency conditions according to established procedures
- Performing the duties of the building emergency director during emergencies.

8.1.1.2 PUREX Operations Manager. Responsibilities of the PUREX Operations manager include the following:

- Supervising, coordinating, and directing the activities of PUREX Shift Surveillance managers
- Planning, organizing, and coordinating the operation activities for PUREX Storage Tunnels
- Promoting safe operations of the PUREX Facility, including the PUREX Storage Tunnels
- Enforcing safety, housekeeping, and general plant rules
- Conducting operations according to established procedures
- Meeting quality assurance requirements
- Determining the status of and resolving action items arising from audits, inspections, and unusual occurrences
- Supervising emergency response and recovery actions
- Maintaining administrative controls
- Supervising procedure compliance
- Minimizing injuries and/or equipment damage
- Ensuring compliance to operating limits and specifications
- Ensuring that staff levels and training are adequate for safe and effective operations
- Coordinating the recovery from and reestablishing control of unplanned releases to the environment and other emergency conditions
- Responding to and providing remedial guidance and decisions for operations anomalies, offnormal conditions, and equipment malfunctions
- Notifying Solid Waste Management of any unplanned releases to the environment
- Ensuring that radiation exposure and dangerous waste exposure are maintained ALARA
- Responding to abnormal and/or emergency conditions according to established procedures
- Assuming charge during emergencies until properly relieved by upper management or the building emergency director.

8.1.1.3 PUREX Shift Surveillance Manager. Responsibilities of the PUREX shift surveillance managers include the following:

- Supervising, coordinating, and directing the activities of nuclear operators
- Maintaining control over the PUREX Facility (including the PUREX Storage Tunnels) in accordance with established operating procedures and policies, U.S. Department of Energy Orders, and federal and state regulations
- Recognizing nonstandard conditions and taking appropriate action
- Training and/or arranging training for personnel
- Maintaining essential records
- Supervising emergency response and recovery actions
- Maintaining administrative controls
- Supervising procedure compliance
- Conducting pre-job safety and planning meetings with personnel involved with the PUREX Facility, including the PUREX Storage Tunnels
- Ensuring that nuclear operators are trained
- Notifying PUREX Facility management of any unplanned releases to the environment
- Minimizing injuries and/or equipment damage
- Ensuring compliance to operating limits and specifications
- Ensuring radiation exposure and dangerous waste exposure are maintained ALARA
- Responding to abnormal and/or emergency conditions according to established procedures
- Serving as designated alternates to the building emergency director and the staging area manager
- Assuming charge during emergencies until properly relieved by upper management or the building emergency director.

8.1.1.4 Nuclear Operator. Responsibilities of nuclear operators include the following:

- Performing PUREX Storage Tunnels work activities in accordance with current operating procedures and approved work plans

- Attending PUREX Storage Tunnels work plan and pre-job safety meetings
- Conducting routine inspections
- Preparing the PUREX railroad tunnels for transfer operations
- Providing surveillance for abnormal conditions
- Operating the doors of the PUREX railroad tunnels
- Operating the remotely controlled locomotive during transfer activities
- Operating the water-fillable doors of the PUREX Storage Tunnels
- Inspecting railcar(s) before loading
- Staging railcar(s) for loading equipment
- Responding to abnormal and/or emergency conditions according to established procedures
- Responding to leaks or spills of radioactive and/or dangerous waste
- Responding to alarms at the PUREX Facility.

8.1.1.5 **PUREX Dispatcher.** Responsibilities of the PUREX dispatchers include the following:

- Controlling personnel entrance and time spent in the PUREX tunnel areas
- Controlling the operation of the PUREX railroad tunnel doors
- Controlling the operation of the PUREX Storage Tunnel doors
- Contacting the operators when PUREX railroad tunnel doors are to be opened/closed for ventilation balance control
- Contacting PUREX operators when PUREX Storage Tunnel doors are to be opened/closed for ventilation balance control
- Responding to all PUREX Plant panel alarms.

8.1.1.6 **Planner.** Responsibilities of the planners include the following:

- Reviewing all work packages for proper documentation
- Preparing storage tunnel checklist for the transfer of equipment into or out of the PUREX Storage Tunnels
- Assembling necessary work and job permits and documentation

- Arranging for railcars

- Participating in work plan and pre-job safety meetings.

8.1.1.7 Health Physics Supervisor. Responsibilities of the health physics supervisors include the following:

- Providing health physics support for PUREX Storage Tunnels operations

- Providing current radiation work permits for all personnel working in the PUREX Facility

- Overseeing on-the-job training for health physics technicians

- Providing direction and guidance to PUREX Facility management concerning radiological conditions

- Providing immediate health physics support in an emergency

- Responding to abnormal and/or emergency conditions according to established procedures.

8.1.1.8 Health Physics Technician. Health physics technicians include health physics technician-trainees, health physics technicians, and senior health physics technicians. Responsibilities of the health physics technicians include the following:

- Operating radiation and contamination sampling systems

- Issuing supplemental dosimeters

- Providing dose rate monitoring support

- Surveying personnel out of radiation areas

- Maintaining all radiation equipment records

- Prescribing protective clothing necessary to perform work in radiation and contamination areas

- Collecting air samples

- Locating radiation and contamination boundary perimeters for nuclear operators when fences and barriers are erected

- Responding to all radiation alarms

- Performing routine surveillance

- Documenting all support provided for personnel at the PUREX Facility, including the PUREX Storage Tunnels

- Overseeing work activities to ensure exposure of personnel to radiation is maintained ALARA
- Responding to abnormal and/or emergency conditions according to established procedures.

8.1.1.9 PUREX Engineering Manager and Cognizant Engineer. Responsibilities of the PUREX engineering manager and cognizant engineers include the following:

- Preparing non-routine, one time work plan for transfer of equipment into or out of the PUREX Storage Tunnels.
- Preparing and approving engineering design documents and drawings that are in compliance with applicable policies, procedures, and instructions and are in accordance with recognized national standards and codes
- Preparing all engineering change notices
- Maintaining and updating design engineering drawing files
- Preparing and approving equipment and material specifications for new design and equipment purchase requisitions, including quality statements and impact levels
- Performing bid reviews on new designs, equipment, and materials and approving vendor bids and/or qualifications
- Acting as the 'point of contact' for resolution and disposition of nonconformance material and equipment
- Preparing design criteria, performing and approving design analysis, and assigning impact levels on designs
- Preparing and/or approving excavation permits and tie-in permits
- Analyzing and/or approving, with concurrence of cognizant, maintenance, and process engineers, the spare capital equipment requirements based on anticipated failures for PUREX Plant canyon jumpers, pumps, agitators, and major pieces of PUREX Plant equipment
- Acting as the 'point of contact' for design review and review comment record disposition
- Assisting in resolving plant equipment problems, when required
- Providing technical direction for spill responses

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- Providing input for environmental dangerous waste permits

- Responding to abnormal and/or emergency conditions according to established procedures.

8.1.1.10 PUREX Regulatory Compliance Manager. Responsibilities of the PUREX regulatory compliance manager include the following:

- Reviewing and approving dangerous waste handling procedures

- Assessing dangerous waste handling problem areas and implementing timely actions

- Ensuring that the PUREX Facility is in compliance with hazardous material control requirements

- Ensuring adherence to the EPA and Ecology reporting requirements

- Reviewing and approving new or revised Part A and B permit applications or permit modifications

- Serving as the single point of contact for hazardous material control related matters

- Coordinating the review and submittal of environmental data for the following:
  - Annual dangerous waste report
  - Waste minimization report
  - Waste volume projections (solid)
  - The *Superfund Amendments and Reauthorization Act* (SARA) *of 1986* 312 Inventory
  - The SARA 313 releases

- Preparing and providing input to reporting of the following:
  - Interim compliance status
  - Ecology and EPA reporting requirements

- Coordinating the development and review of new or revised permit applications or modifications including the following:
  - Part A permit applications
  - Part B permit applications or permit modifications
  - Closure plans

- Ensuring implementation of permitting requirements and conducting periodic surveillances of compliance assessment with Part A and B permits. Maintaining active Part A and B permits in an up-to-date condition

- Preparing, issuing, and approving environmental waste handling procedures

- Assessing dangerous waste handling problem areas and implementing corrective action

- Maintaining tracking system for 90-day dangerous waste accumulation.

8.1.1.11 Quality Assurance Manager and Quality Assurance Engineer. Responsibilities of the Quality Assurance managers and Quality Assurance engineers include the following:

- Providing quality planning to ensure that requisite quality is attained and ensuring compliance with technical requirements, including all U.S. Department of Energy-approved requirements and applicable codes and standards

- Reviewing supplier, contractor, and other applicable status reports, audit reports, inspection reports, nonconformance reports, and unusual occurrence reports to determine existing or potential problems

- Establishing inspection procedures and controls that provide the data necessary to resolve disposition of nonconformance or other quality problems. Obtaining commitments from supplier and contractor management to take corrective action to solve root cases of problems and following up to ensure the effectiveness of actions taken

- Reviewing and approving engineering drawings, specifications, and other technical documents specifying design and fabrication requirements, and changes thereto, to ensure adequacy of definition of quality provisions

- Investigating, analyzing, and evaluating, in concert with applicable environmental and engineering organizations, all reported nonconformances from approved technical requirements and approving disposition actions defined by nonconformance reports for all nonconforming items

- Planning and performing quality assurance surveillance of contractors and individual organizations to assess compliance with quality requirements, issuing reports of finding, and following up as required to effect timely implementation of necessary corrective actions

- Performing quality engineering tasks and activities as related to design, procurement, program and project planning, procedures, occurrence reporting, readiness reviews, surveillance and assessments, audits, trend analysis, corrective actions, and documentation

- Assisting in studies, development, testing, and analysis of designs, processes, and procedures

- Collecting and compiling technical information for review and assisting in the preparation of technical specifications, reports, procedures, and other quality related documents

- Performing cognizant quality engineering duties within the scope of the incumbents' abilities and the technical complexity of the system.

8.1.1.12 Quality Control Manager and Quality Control Inspector. Responsibilities of the Quality Control managers and Quality Control inspectors include the following:

- Managing and directing the conduct of compliance and conformance verification activities by quality control personnel

- Selecting and assigning qualified personnel to implement the quality assurance and quality control procedures, management of information, and quality plans

- Establishing standards and goals for Quality Control personnel and implementing procedures and instructions for their accomplishment

- Implementing a quality control surveillance program to monitor and ensure that all critical characteristics are reviewed for strict compliance with policies and procedures

- Developing and implementing systems to identify, control, and monitor nonconforming conditions and activities and providing investigative and verification support to include sound recommendations leading to prompt corrective actions

- Performing scheduled and unscheduled surveillances and inspections and documenting results for follow-up actions

- Participating in the planning and performance of complex surveillances and inspections of maintenance, fabrication, and operation activities and verifying compliance with engineering and quality assurance parameters

- Performing source inspection and acceptance of procured equipment, materials, or assemblies

- Assisting quality engineers in tabulating, charting, and analyzing quality assurance data

- Researching and compiling information to evaluate quality performance trends.

8.1.1.13 Occupational Health and Safety Manager and Engineer. Responsibilities of the Occupational Health and Safety manager and engineers include the following:

- Supporting operations and activities through the provision of industrial hygiene, industrial safety, fire protection, and radiation safety expertise, assistance, and services

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- Providing guidance for consistent, effective implementation of occupational health and safety requirements

- Assisting the line organizations in developing cost-effective occupational health and safety plans, systems, controls, procedures and training

- Assisting the line organizations in preparing designs, specifications, work packages, incident and occurrence reports, corrective action plans, procurement documents and specifications; in conducting hazard evaluations, risk analyses and self-assessments; and in the determination and resolution of unreviewed safety questions

- Supplying or assisting in the procurement of services for health and safety engineering, dosimetry, radiological and chemical monitoring, respiratory protection, safety training resources, and medical scheduling

- Administering programs to control and minimize radiological, chemical, and industrial hazard exposures, and promoting improved occupational health and safety performance throughout operations

- Administering work permitting systems and approving hazardous and radiation work permits; excavation permits; coredrill permits; and welding, cutting, and braising permits

- Directing, advising, and assisting in the investigation and resolution of health and safety related complaints, employee concerns, accidents, occurrences, and conditions

- Assisting in the identification and application of lessons learned

- Conducting or assisting in inspections and walkthroughs, pre-occupancy inspections, etc., and administering the Safety Observer Program

- Maintaining and coordinating active ALARA and safety awareness programs to minimize hazard exposures, increasing health and safety awareness, alerting personnel to known hazards, and recognizing positive safety performance

- Providing expertise and administrative support to the President's Safety Council, Accident Prevention Council, and similar TSD unit or organization-specific activities

- Monitoring health and safety experience, providing performance and trend reports, and maintaining employee health and safety records

- Representing management in interfaces with DOE-RL and other contractors regarding occupational health and safety programs, experience, and records

- Preparing and issuing health and safety performance measures, indicators, and trend analyses

- Preparing and submitting health and safety experience reports as required by the U.S. Department of Energy and other governmental agencies

- Developing and submitting to Pacific Northwest Laboratory the Hanford Environmental Health Foundation employee radiation and chemical exposure records

- Maintaining occupational health and safety records as required by the U.S. Department of Energy and applicable management.

8.1.1.14 Health and Safety Assurance Manager and Engineer. Responsibilities of the Health and Safety Assurance managers and engineers include the following:

- Performing and conducting independent safety reviews and overviews of management controlled activities and programs to ensure compliance with the letter and intent of applicable health, safety, and fire protection regulations, standards, directives, and recognized good practices

- Developing and interpreting policy, standards, and programs to assist in achieving and maintaining full compliance with occupational health and safety requirements and nuclear safety requirements

- Reviewing external standards, public laws, and U.S. Department of Energy Orders and directives

- Incorporating the appropriate requirements into policy, standards, and programs for occupational health and safety, fire protection, and nuclear safety

- Reviewing TSD unit documents, operations, and programs to ensure compliance

- Maintaining an organization staffed and qualified to interpret and apply the U.S. Department of Energy Orders and other mandated requirements or recommended practices relative to fire protection, industrial hygiene, occupational safety, radiation protection, and nuclear safety

- Establishing and interpreting safety policies, standards, and limits, and originating Level 2 safety manuals to be used in operations, activities, and TSD units

- Providing and conducting independent audits, appraisals, assessments and surveillances in the technical safety areas for the purpose of determining compliance with U.S. Department of Energy Orders, other agency standards, and other applicable requirements, as appropriate

- Identifying deficiencies that require corrective action and following up on corrective actions taken

- Conduct multidisciplinary safety design and document review for the purpose of verifying compliance with mandated statutory safety requirements, standards, and recommended practices

- Administering and coordinating contract 'work for others' relative to health and safety support requests

- Representing management in interfaces with the U.S. Department of Energy, other contractors, federal, state, and local agencies relative to health and safety regulation and compliance

- Eliciting and facilitating program improvements

- Directing that work be stopped or units be shut down to protect personnel or property from imminent danger

- Interfacing with management, the U.S. Department of Energy, and other organizations and personnel in the conduct of assigned responsibilities.

8.1.1.15 Hanford Fire Department. Responsibilities of the Hanford Fire Department include the following:

- Responding to emergencies

- Providing fire suppression for fires and/or explosions

- Assisting in the control and containment of radioactive and/or mixed waste and hazardous material accidents and/or incidents when applicable

- Providing emergency medical attention for injured personnel.

8.1.2 Training Content, Frequency, and Techniques [H-1b]

This section provides an overview of job-specific training provided to personnel in job positions discussed in the previous sections. In addition to normal plant conditions, personnel with these job positions are instructed on communication and alarm systems and the proper response to abnormal conditions and emergencies such as fire, radiological incidents, dangerous waste incidents, and shutdown of operations.

8.1.2.1 Overview of Training for Specific Positions. All PUREX Facility personnel receive applicable general, plant-specific, and job-specific training. The courses are provided in classroom settings, on-the-job training, self-study units, and computer-based training. Tables 8-1 through 8-5 consist of matrices that relate job position to the individual training courses. Table 8-6 provides employee work categories definitions. The following sections provide an overview of job-specific training.

8.1.2.1.1 PUREX/UO_3 Plant Manager and Deputy Manager Training. The PUREX UO_3 Plant manager and deputy manager complete specific courses that prepare them for their work assignments, including hazardous material and dangerous waste training courses. These courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan, and use of emergency and monitoring equipment.

8.1.2.1.2 PUREX Operations Manager Training. The PUREX Operations manager completes specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment. The PUREX Operations manager is required to be qualified for the assigned job through a systematic process as determined by management.

8.1.2.1.3 PUREX Shift Surveillance Manager Training. The PUREX Shift Surveillance managers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment. The PUREX Shift Surveillance managers are required to be qualified for the assigned job through a systematic process as determined by management.

8.1.2.1.4 Nuclear Operator Training. Nuclear operators complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address PUREX Facility waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include implementation of the PUREX Facility contingency plan, routine inspections, and use of emergency and monitoring equipment.

Nuclear operators are required to be certified for assigned jobs. Those who are certified have completed appropriate dangerous waste training. Operators recertify for assigned jobs at least biennially. Operators must complete the progression tests (general radio-chemical operator and plant-specific courses) at least annually. Once a nuclear operator reaches the nuclear process operator level, the progression tests are referred to as requalification tests and are a biennial requirement supplemented by intervening biennial emergency procedures and abnormal plant conditions test. The combination of requalification tests and the emergency procedures and abnormal plant conditions tests ensures that nuclear process operators continue to comply with the annual emergency training requirements.

8.1.2.1.5 PUREX Dispatcher Training. The PUREX dispatchers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include implementation of the PUREX Facility contingency plan, routine inspections, and use of emergency and monitoring equipment.

The PUREX dispatchers are nuclear operators who are required to be certified for assigned job. Those who are certified have completed appropriate dangerous waste training. Dispatchers recertify for assigned jobs at least biennially. Dispatchers must complete the progression tests (general radio-chemical operator and plant-specific courses) at least annually. Once a nuclear operator (dispatcher) reaches the nuclear process operator level, the progression tests are referred to as requalification tests and are a biennial requirement supplemented by intervening biennial emergency procedures and abnormal plant conditions test. The combination of requalification tests and the emergency procedures and abnormal plant conditions tests ensures that nuclear process operators continue to comply with the annual emergency training requirements.

8.1.2.1.6 Planner Training. The planners complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address PUREX Facility waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment.

8.1.2.1.7 Health Physics Supervisor Training. The health physics supervisor completes specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment.

8.1.2.1.8 Health Physics Technician Training. The health physics technicians complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment.

The health physics technicians are required to be certified for assigned jobs. The health physics technicians must certify for the level at which they are assigned work (i.e., health physics technician or senior health physics technician). They must complete their next-level certification tests between 15 and 18 months after they arrive at the current level. Once health physics technicians reach the senior health physics technician level, they must recertify at least biennially thereafter. The health physics technicians also must complete corresponding general and specific on-the-job training for each level.

The health physics technicians must complete the appropriate on-the-job training at least every 4 years thereafter. All health physics technicians must comply with the emergency procedures and abnormal plant conditions requirements and must complete the hazardous worker training refresher course at least annually. Compliance is accomplished by health physics technicians completing the requirement with a written test or an on-the-job training checklist in alternating years.

8.1.2.1.9 PUREX Engineering Manager and Cognizant Engineer Training. The PUREX Engineering manager and cognizant engineers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use, inspection, repair, and replacement of emergency and monitoring equipment.

8.1.2.1.10 PUREX Regulatory Compliance Training. The PUREX regulatory compliance manager completes specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of the PUREX Facility contingency plan and use of emergency and monitoring equipment.

8.1.2.1.11 Quality Assurance Manager and Quality Assurance Engineer Training. The PUREX Quality Assurance manager and Quality Assurance engineers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address applicable waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of applicable contingency plans and use of emergency and monitoring equipment.

8.1.2.1.12 Quality Control Manager and Quality Control Inspector Training. The Quality Control manager and Quality Control inspectors complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address applicable waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of applicable contingency plans and use of emergency and monitoring equipment.

8.1.2.1.13 Occupational Health and Safety Manager and Engineer Training. The Occupational Health and Safety manager and engineers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address applicable waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of applicable contingency plans and use of emergency and monitoring equipment.

8.1.2.1.14 Health and Safety Assurance Manager and Engineer Training. The Health and Safety Assurance manager and engineers complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address applicable waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of applicable contingency plans and use of emergency and monitoring equipment.

8.1.2.1.15 Hanford Fire Department Training. The Hanford Fire Department personnel complete specific courses in preparation for work assignments, including hazardous material and dangerous waste training courses. The courses address applicable waste management procedures, U.S. Department of Energy directives, applicable policies, and federal and state regulations. The courses include the implementation of applicable contingency plans and use of emergency and monitoring equipment.

Hanford Fire Department firefighters meet the requirements of the National Firefighters Protection Association [NFPA 472 and 1001 (NFPA 1989)], 29 CFR 1910.1200, 1910.120 (paragraph Q), and the Washington State requirements for emergency medical personnel response.

8.1.2.1.16 Nonessential Personnel Training. Employees not identified as essential personnel and other U.S. Department of Energy-contractor personnel who must enter the units managed by PUREX Facility management are required to complete "PUREX Facility Orientation" or must be escorted. Non-U.S. Department of Energy-contractor personnel must complete a security and safety orientation before working in or around the PUREX Storage Tunnels.

8.1.2.2 Training Matrix: Job Positions and Training. The PUREX Facility training program encompasses general, plant-specific, and job-specific training courses. Tables 8-1 through 8-5 consist of matrices that relate job title to the individual training courses applicable to the PUREX Storage Tunnels. The matrices indicate if the courses are introductory or continuing and also if the course is part of a certification program required for specific personnel or required only for new employees.

Some courses are introductory and must be completed one time only (often referred to as orientation) and other introductory courses are the first course in a program. Continuing courses are those that must be repeated according to a specified frequency.

8.1.2.3 Training Course Descriptions. Appendix 8A contains brief descriptions of selected courses, including course description, the target audience, instructional delivery, evaluation method, length of course, and frequency of retraining.

8.1.3 Training Director [H-1c]

There is no one individual designated as training director. This responsibility is shared among PUREX Facility Management, Technical Training, and Occupational Health and Safety. This distribution of training responsibilities is provided in Figure 8-1. Using the system noted in Figure 8-1, PUREX Facility management can access training resources and experts in many different areas of hazardous material, dangerous waste, and industrial safety, rather than relying on the knowledge of one person or a small number of individuals. General responsibilities for training are discussed in the following sections.

8.1.3.1 PUREX Facility Management Responsibilities. PUREX Facility Management has the following responsibilities related to training:

- Establishing operations training requirements
- Reviewing and approving training material
- Requesting and/or conducting training
- Maintaining field training records and certifications
- Tracking retraining.

8.1.3.2 Technical Training Responsibilities. Sections groups with technical training responsibilities are listed in the following sections.

8.1.3.2.1 Training Support and Accreditation. Training Support and Accreditation is responsible for the following:

- Conducting job analysis
- Designing training programs
- Developing training programs
- Providing training program accreditation assistance
- Providing consultation to other training organizations regarding training development.

8.1.3.2.2 Safety and Quality Technical Training. Safety and Quality Technical Training is responsible for the following:

- Developing and implementing general training courses to comply with federal and state regulations
- Conducting safety training courses
- Developing and providing health physics technician classroom certification training

- Conducting radiation safety training courses
- Conducting respiratory protection classes.

8.1.3.2.3 Environmental Training. Environmental Training is responsible for the following:

- Developing and implementing environmental training courses to comply with U.S. Department of Energy directives and federal and state regulations
- Conducting hazardous and dangerous waste-handling and management courses.

8.1.3.2.4 Training Records. Training Records is responsible for the following:

- Operating and maintaining central training record files
- Notifying organizations management of retraining requirements for employees.

8.1.3.2.5 Health Physics Technical Training. Health Physics Technical Training is responsible for the following:

- Establishing health physics personnel training requirements
- Developing and conducting health physics on-the-job training
- Maintaining health physics technician field training records and certifications
- Tracking health physics technician retraining.

8.1.3.2.6 Defense Operations Technical Training. Defense Operations Technical Training is responsible for the following:

- Developing training courses/program for PUREX Facility employees
- Developing and providing study material and examinations
- Preparing and administering examinations
- Coordinating classes and other training requirements to complete and maintain certifications
- Developing and maintaining on-the-job training requirements.

8.1.3.2.7 Maintenance Training. Maintenance Training is responsible for developing training materials and providing instruction for maintenance personnel.

8.1.3.3 Occupational Health and Safety Responsibilities. Training responsibilities for this organization include the following:

- Maintaining current knowledge of Occupational Safety and Health Administration regulations
- Ensuring that PUREX Facility Management is in compliance with Occupational Safety and Health Administration regulations through audits, design and procedure reviews, and surveillances
- Providing instructions for selected classes
- Consulting with Technical Training and Solid Waste Management in the development and reevaluation of current training programs.

8.1.4 Relevance of Training to Job Position [H-1d]

The training program for the PUREX Facility was developed after an initial job analysis was completed. Tasks performed by the nuclear operators, PUREX Shift Surveillance managers, and PUREX Operations manager were identified and evaluated to determine training requirements. In addition, training needs are assessed in relation to current federal and state regulations on a continual basis. These evaluations could result in modifying or adding new material to the current training program.

Certification is required for the PUREX Operations manager, PUREX Shift Surveillance managers, and nuclear operators who work in the PUREX Facility. To become certified, an employee must successfully complete classroom training and on-the-job training. Classroom instruction is designed to provide employees with fundamental knowledge required to perform work safely at areas managed by PUREX Facility management.

On-the-job training requires PUREX Facility personnel to gain experience with what is contained in the operating procedures. All work that involves hazardous material and dangerous waste is performed according to approved operating procedures; therefore, an understanding of procedures is crucial to ensure the proper and safe operation of units managed by PUREX Facility. Understanding is accomplished by having individuals perform, simulate, and/or describe a particular task as specified by the appropriate operating procedure. The individual demonstrating the required skills and knowledge is observed by another certified nuclear operator and the PUREX Operations manager or PUREX Shift Surveillance manager before being certified.

Additionally, management must complete their own certification requirements, which include self-study and on-the-job training.

8.1.5 Training to Emergency Response [H-1e]

Effective response to emergencies, and familiarity with emergency equipment and emergency systems, are covered under the classroom and on-the-job training requirements as outlined in Tables 8-1 through 8-5 and Appendix 8A.

Federal and state regulations require that personnel be able to respond effectively to emergencies and that personnel be familiar with emergency procedures, emergency equipment, and emergency systems. Specific topics addressed include the following:

- Building emergency director training
- Building emergency plan checklist training
- PUREX Facility-specific training
- PUREX Facility orientation
- PUREX nuclear operator emergency procedures and abnormal plant conditions training
- PUREX supervisor emergency procedures and abnormal plant conditions training
- PUREX health physics technicians (all) emergency procedures and abnormal plant conditions training.

8.2 IMPLEMENTATION OF TRAINING PROGRAM [H-2]

The PUREX Facility training program is in place and has been fully implemented. Certification for the PUREX Facility is required before working without supervision. Certification requires personnel to successfully complete identified classroom and on-the-job training requirements. Certification requires management to successfully complete self-study, classroom, and on-the-job training requirements. Training content is reviewed and updated as appropriate.

General training of new employees is to be completed within the first six months of assignment to areas managed by PUREX Facility. After the initial training, employees are required to recertify annually or biennially as applicable. Uncertified employees are not permitted to work at the PUREX Facility without the supervision of a certified employee. The PUREX Operations manager is responsible for ensuring that new employees are trained and that certifications are maintained.

Official training record files for PUREX Facility employees are stored in the Training Records Information System. This database is managed by the Technical Training Records organization. Technical Training Records inputs the completed training records into a computer file. The computer file is accessible on a local area network to allow remote accessing of employee training records via a computer terminal. A tickler file is available from the database to inform the PUREX Plant operations manager when training is within 90 days of expiration. A computerized copy of completed training and qualifications for employees is available at the PUREX Facility. Training records for supporting organizations also are stored in the Training Records Information System, and copies of completed training and qualifications are available at their respective organization's locations. Training records on former employees will be kept for 3 years from the date the employee last worked at the PUREX Facility.

Specific employee training records are available, at reasonable times, to the regulators on a demonstrated need-to-know basis. Copies of these records will be marked _Sensitive Information_ and are expected to be handled in accordance with the *Privacy Act of 1974*.

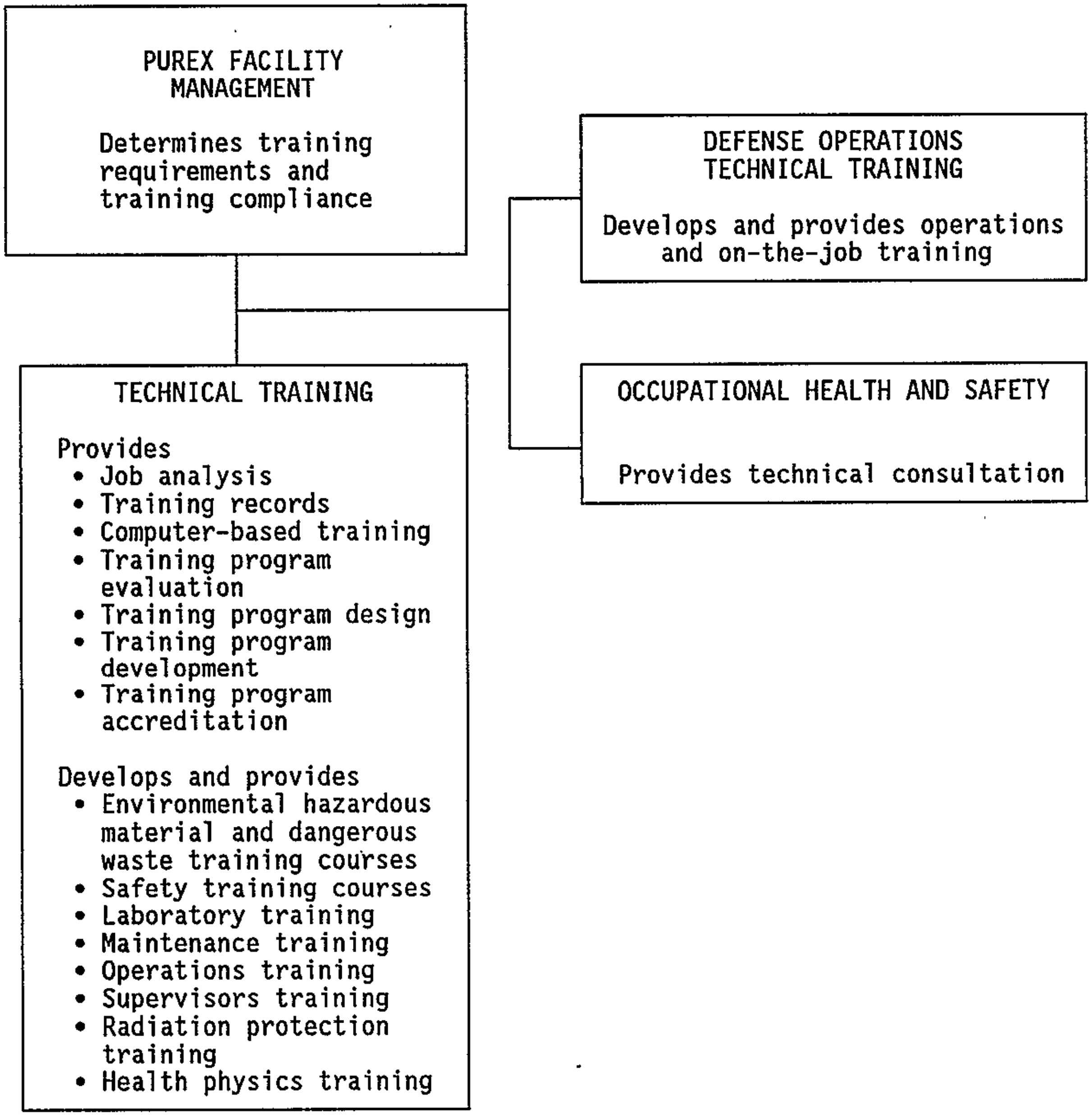

Figure 8-1. Distribution of Training Responsibility for PUREX Facility Management.

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Table 8-1. General Training Matrix.

Course	Type	Target audience													
		OM	NO	PL	HP	HPT	PM	PC	PD	PE	NF	QA	QC	IS	FD
Radiation safety training	I	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Radiation safety requalification	C	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Hanford general employee training	I,C	X	X	X	X	X	X	X	X	X	X	X	X	X	X
New employee safety training	I	2	2	2	2	2	2	2	2	2	2	2	2	2	2
On-the-job training instructor training	I	3	3	-	3	3	-	-	3	-	-	-	-	-	-
Environmental and hazardous material safety training requirements (Tables 8-4, 8-5)	I,C	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Building emergency director training	I,C	X	-	-	-	-	X	X	-	-	-	-	-	-	-
Orientation to DOE Order 5000.3A occurrence reporting	I	X	X	-	X	-	X	X	X	X	X	X	X	X	-
Managers and first-line managers conduct of operations, DOE Order 5480.19	I	X	-	-	X	-	X	X	-	X	X	X	X	X	-

OM = PUREX shift surveillance managers
NO = Nuclear operators
PL = Planners
HP = Health physics supervisor
HPT = Health physics technicians
PM = PUREX/UO_3 Plant manager and deputy manager
PC = PUREX operations manager
PD = PUREX dispatcher
PE = PUREX engineering manager and cognizant engineers
NF = PUREX regulatory compliance manager
QA = Quality Assurance managers and engineers
QC = Quality Control managers and inspectors
IS = Occupational Health and Safety managers and engineers, and Health and Safety Assurance managers and engineers
FD = Hanford Fire Department
I = Introductory course
C = Continuing course
X = Required course
\- = Not applicable
1 = Not used
2 = Required only for new employees
3 = Required as determined by management for designated personnel.

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Table 8-2. Plant-Specific Training Matrix.

Course	Type	Target audience													
		OM	NO	PL	HP	HPT	PM	PC	PD	PE	NF	QA	QC	IS	FD
PUREX Plant orientation	I	X	X	X	X	X	X	X	X	X	X	X	X	X	X
PUREX Building Emergency Plan checklist	C	4	4	4	4	4	4	4	4	4	4	4	4	4	4

OM = PUREX shift surveillance managers
NO = Nuclear operators
PL = Planners
HP = Health physics supervisor
HPT = Health physics technicians
PM = PUREX/UO_3 Plant manager and deputy manager
PC = PUREX operations manager
PD = PUREX dispatcher
PE = PUREX engineering manager and cognizant engineers
NF = PUREX regulatory compliance manager
QA = Quality assurance managers and engineers
QC = Quality control managers and inspectors
IS = Occupational health and safety managers and engineers, and health and safety assurance managers and engineers
FD = Hanford Fire Department
I = Introductory course
C = Continuing course
X = Required course
4 = Required only for personnel assigned to unit.

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Table 8-3. Job-Specific Training Matrix. (sheet 1 of 2)

Course	Type	Target audience													
		OM	NO	PL	HP	HPT	PM	PC	PD	PE	NF	QA	QC	IS	FD
General radio-chemical operator training	I,C	X[a]	X	-	-	-	-	-	X	-	-	-	-	-	-
PUREX Plant-specific training	I,C	X[a]	X	-	-	-	-	-	X	-	-	-	-	-	-
Solid waste handling certification	C	X	X	-	-	-	-	-	-	-	-	-	-	-	-
Dispatcher certification	C	-	-	-	-	-	-	-	X	-	-	-	-	-	-
PUREX nuclear operator certifications	C	-	X	-	-	-	-	-	X	-	-	-	-	-	-
PUREX nuclear operators emergency procedures and abnormal plant conditions training	C	-	X[b]	-	-	-	-	-	X[b]	-	-	-	-	-	-
PUREX shift surveillance manager certification	C	X	-	-	-	-	-	X	-	-	-	-	-	-	-
PUREX operational safety requirements	C	X	-	-	-	-	-	X	-	-	-	-	-	-	-
PUREX shift surveillance manager emergency procedures and abnormal plant conditions training	C	X	-	-	-	-	-	X	-	-	-	-	-	-	-
Health physics technician-trainee certification	I	-	-	-	-	X[c]	-	-	-	-	-	-	-	-	-
Health physics technician-trainee general on-the-job training	C	-	-	-	-	X[d]	-	-	-	-	-	-	-	-	-
Health physics technician-trainee PUREX on-the-job training	C	-	-	-	-	X[d]	-	-	-	-	-	-	-	-	-
Health physics technician certification	I	-	-	-	-	X[e]	-	-	-	-	-	-	-	-	-
Health physics technician general on-the-job training	C	-	-	-	-	X[f]	-	-	-	-	-	-	-	-	-

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Table 8-3. Job-Specific Training Matrix. (sheet 2 of 2)

Course	Type	Target audience													
		OM	NO	PL	HP	HPT	PM	PC	PD	PE	NF	QA	QC	IS	FD
Health physics technician PUREX on-the-job training	C	-	-	-	-	X^f	-	-	-	-	-	-	-	-	-
Senior health physics technician certification	C	-	-	-	-	X^g	-	-	-	-	-	-	-	-	-
Senior health physics technician general on-the-job training	C	-	-	-	-	X^g	-	-	-	-	-	-	-	-	-
PUREX health physics technicians emergency procedures and abnormal plant conditions training	C	-	-	-	-	X^h	-	-	-	-	-	-	-	-	-

OM = PUREX shift surveillance managers
NO = Nuclear operators
PL = Planners
HP = Health physics supervisor
HPT = Health physics technician
PM = PUREX/UO_3 Plant manager and deputy manager
PC = PUREX operations manager
PD = PUREX dispatcher
PE = PUREX engineering manager and cognizant engineers
NF = PUREX regulatory compliance manager
QA = Quality Assurance managers and engineers
QC = Quality Control managers and inspectors
IS = Occupational Health and Safety managers and engineers, and Health and Safety Assurance managers and engineers
FD = Hanford Fire Department
I = Introductory course
C = Continuing course
X = Required course
X^a = Introductory course for PUREX shift surveillance managers
X^b = Only nuclear process operations must complete this course in alternating years in conjunction with the general radio-chemical operator
X^c = Required only for those health physics technicians hired at the junior health physics technician level
X^d = Required for junior health physics technicians, health physics technologists, and senior health physics technologists
X^e = Required only for those health physics technologists hired at the health physics technologist level or who progress from the junior health physics technologist level
X^f = Required for health physics technologists and senior health physics technologists
X^g = Required for senior health physics technologists only
X^h = Required for health physics technician-trainees, health physics technicians, and senior health physics technicians.
- = not applicable

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Table 8-4. Environmental and Hazardous Material Safety Initial Training Requirements Matrix.

Employee category [a]	Course title														Total hours
	Hazardous Communication and Waste Orientation (1 hour)	Generator Hazards Safety Training (4 hours)	Hazardous Materials Waste Job-Specific Training [b]	Radiation Worker Training (8 hours)	Waste Site-Basic (16 hours)	Scott SKA-PAK [c] Training (2 hours)	Cardiopulmonary Resuscitation (4 hours)	Fire Extinguisher Safety (1 hour)	Waste Site Advanced (24 hours)	Waste Site Field Experience (24 hours)	Hazardous Waste Shipment Certification (24 hours)	Certification of Hazardous Material Shipments (8 hours)	Hazardous Waste Site Supervisor/Manager (8 hours)	Compliance Category [d]	
1. All Employees	X														1
2. General Worker		X	X											1	5 + unit-specific training
3. General Supervisor/ Manager		X	X											1	5 + unit-specific training
4. General Nonradiological Shipper		X	X								X			1,2	29 + unit-specific training
5. General Hazardous Material Shipper		X	X									X		1,2	13 + unit-specific training
6a. Hazardous Waste Worker (known hazards)		X	X	X	X									1,3	28 + unit-specific training + field experience
6b. Hazardous Waste Worker (unknown hazards)		X	X	X		X	X	X	X	X				1,4	44 + unit-specific training + field experience
7. Hazardous Waste Supervisor/Manager		X	X	X		X	X	X	X	X			X	1,5	52 + unit-specific training + field experience
8. Hazardous Waste Shipper		X	X	X		X	X	X	X	X	X	X		1,2,4	76 + unit-specific training + field experience

[a] Category definitions are in Table 8-6.
[b] Length varies for each TSD unit.
[c] Scott SKA-PAK is a trademark of Figgie International, Incorporated.
[d] Compliance categories:

1 WAC 173-303, 29 CFR 1910.1200
2 49 CFR 173
3 29 CFR 1910.120 (24-hour requirement)
4 29 CFR 1910.120 (40-hour requirement)
5 29 CFR 1910.120 (40-hour plus 8-hour requirement)

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Table 8-5. Environmental and Hazardous Material Safety Retraining Requirements Matrix.

Employee category[a]	Course title (length/frequency)				
	Generator Hazards Safety Training (4 hours/2 years)	Hazardous Materials Waste Job-Specific Training (1 year)[b]	Hazardous Waste Site Retraining (8 hours/1 year)	Hazardous Waste Shipment Certification (24 hours/1 year)	Certification of Hazardous Material Shipments (8 hours/2 years)
1. All Employees		Not required			
2. General Worker	X	X			
3. General Supervisor/Manager	X	X			
4. General Nonradiological Shipper	X	X		X	
5. General Hazardous Material Shipper	X	X			X
6a. Hazardous Waste Worker (known hazards)	X	X	X		
6b. Hazardous Waste Worker (unknown hazards)	X	X	X		
7. Hazardous Waste Supervisor/Manager	X	X	X		
8. Hazardous Waste Shipper	X	X	X	X	X

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[a] Category definitions are in Table 8-6.
[b] Length varies for each TSD unit.

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2 Table 8-6. Employee Work Categories Definitions. (sheet 1 of 2)

		Employee category	Definition
3		Employee category	Definition
4	1.	All employees	All employees and unescorted contract personnel.
5	2.	General worker	Any employee who is or has the potential to be exposed to hazardous chemicals in the workplace. Also, any employee who generates, packages, stores, or ships hazardous waste or who directly affects the management of hazardous chemicals or hazardous waste.
6	3.	General Supervisor or Manager	Supervisor or manager who qualifies under the definition of General Worker (No. 2) or who has subordinates who qualify as general workers.
7	4.	General Nonradiological Dangerous Waste Shippers	Employees who are responsible for preparing and signing the Uniform Hazardous Waste Manifests.
8	5.	General Hazardous Material (Radiological) Shippers	Employees who certify the compliance of radioactive Hanford Site hazardous material shipments.

9 Categories 6 through 8 as defined in OSHA 29 CFR 1910.120 *Hazardous Waste*
10 *Operations and Emergency Response*, are as follows:

11	6a.	Hazardous Waste Site Worker - hazards known	Employees who work within or require entry into RCRA-permitted portions of hazardous waste TSD units.
12	6b.	Hazardous Waste Site Worker - hazards unknown	Employees who work within or require entry into CERCLA/RCRA remediation sites or units where cleanup work could present unknown hazards or where there is potential for conditions to change and present unknown hazards.
13			Examples at the Hanford Facility: decontamination and decommissioning work/operations; tank farms; Grout Treatment Facility; crib/ditch/pond work including, but not limited to, the following; characterization, monitoring, sampling, and maintenance.

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Table 8-6. Employee Work Categories Definitions. (sheet 2 of 2)

Employee category	Definition
7. Hazardous Waste Site Supervisor or Manager	Supervisors or managers who oversee work of employees who qualify as Hazardous Waste Site Workers (6a and 6b).
8. Hazardous Waste Site Shipper	Employees who are responsible for certifying shipments of nonradioactive hazardous waste, hazardous and radioactive material, and/or mixed waste.

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9.0 EXPOSURE INFORMATION REPORT

The PUREX Storage Tunnels are being permitted as a miscellaneous unit under the provisions of WAC 173-303-680. These regulations require that miscellaneous unit permit terms and provisions address appropriate requirements provided for other TSD facilities.

Appropriate requirements for a container storage facility are addressed for the PUREX Storage Tunnels because its construction and operation most closely resemble this type of facility. The PUREX Storage Tunnels do not treat, store, or dispose of waste in a surface impoundment or landfill as defined in 40 CFR 270.10 and RCRA, Section 3019. Therefore, exposure information is not required.

This Part B permit application is written under the assumption that authority for administration of miscellaneous units under WAC 173-303-680 will be extended to Ecology by the time the PUREX Storage Tunnels permit is finalized and issued.

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CONTENTS

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10.0 WASTE MINIMIZATION PLAN

The PUREX Storage Tunnels receive waste for storage from the PUREX Plant. No dangerous waste is generated in the PUREX Storage Tunnels. Waste minimization is performed before transfer of the waste out of the PUREX Plant. A *PUREX Plant Waste Minimization Plan* [WHC-SD-WM-EV-021 (WHC 1991b)] is currently in effect. This waste minimization plan will be included in the PUREX Plant Dangerous Waste Permit Application.

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CONTENTS

CONTENTS (cont)

APPENDIX

FIGURES

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11.0 CLOSURE AND POSTCLOSURE REQUIREMENTS [I]

This chapter presents the closure plan for the PUREX Storage Tunnels. Closure will comply with WAC 173-303-610 regulations for the closure of dangerous waste facilities. The PUREX Storage Tunnels are used only for the storage of equipment and materials removed from the PUREX Plant. Detailed records are maintained of all materials (both dangerous waste and nondangerous waste) that are stored within the tunnels. As a controlled storage unit with limited dangerous waste storage (lead, mercury, and silver salts), the PUREX Storage Tunnels are not anticipated to become extensively contaminated (the use of the word contaminated refers to contamination by dangerous waste regulated by Ecology). All equipment and material are stored in a retrievable manner on railcars; therefore, the closure approach will be clean closure. Consistent with the criteria that must be met to clean close a facility, no postclosure activities will be necessary. This chapter describes the performance standard that will be met and closure activities that will be conducted to achieve clean closure in accordance with WAC 173-303-610 requirements.

11.1 CLOSURE PLAN [I-1]

Because of the high radiation levels associated with the equipment stored within the PUREX Storage Tunnels, an engineering study (Appendix 11A) was conducted to evaluate different strategies for closure. This engineering study considered two categories of disposal alternatives: (1) clean closure of the PUREX Storage Tunnels after retrieval of all stored equipment and materials and (2) in situ disposal. The results of the engineering study indicated that the preferred course of action is clean closure, using the alternative involving the retrieval, processing, and disposal at an appropriate disposal unit. A no action alternative was not considered viable within the regulatory framework governing the disposal of the equipment.

The closure of the PUREX Storage Tunnels will occur after removal of all stored equipment that contains dangerous waste and after the determination is made that the waste management unit is no longer needed. A written notification will be submitted to Ecology at least 45 days before the initiation of closure activities.

As presently envisioned, removal of the equipment stored within the PUREX Storage Tunnels will be performed in conjunction with the processing and disposal of the equipment presently in place at the PUREX Plant. An area within the PUREX Plant might be modified as required to locate, remove, and separate the dangerous waste from process equipment. Alternatively, the process equipment could be removed and transported to an onsite TSD unit for processing. Separation of the dangerous waste from the process equipment will reduce the volume of material that must be treated or stored as dangerous waste and allow for the disposal of the majority of the waste volume as nonregulated low-level radioactive waste.

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Closure of the PUREX Storage Tunnels will be accomplished in two phases. The first phase will ensure that the structures and associated components are not contaminated with dangerous waste. Decontamination will take place if contamination with dangerous waste is detected above background or regulatory threshold levels and will continue until contamination is equal to or below background or regulatory thresholds. The second phase will entail sampling of the storage area and surrounding areas to verify that no contaminants above background or regulatory threshold levels are present outside the unit at closure.

Activities that are planned to achieve clean closure are presented in the following sections.

11.1.1 Closure Performance Standard [I-1a]

The following sections address closure performance standards and waste removal and decontamination standards.

11.1.1.1 Performance Standard [I-1a(1)]. Closure of the PUREX Storage Tunnels will be conducted in a manner that meets the following closure performance standards of WAC 173-303-610(2)(a):

- Minimize the need for future maintenance
- Control, minimize, or eliminate to the extent necessary to protect human health and the environment, the postclosure escape of dangerous waste, dangerous constituents, leachate, contaminated run-off, or dangerous waste decomposition products to the ground, surface water, groundwater, or atmosphere
- Return the land to the appearance and use of surrounding land areas to the degree possible given the nature of the dangerous waste activities.

In general, these standards will be achieved by removing, to below background levels or regulatory thresholds, dangerous waste from the unit and decontaminating or removing all equipment, structures, soils, or other materials containing or contaminated with dangerous waste or waste residue as specified by WAC 173-303-610(2)(b). Non-attainment of the standards stipulated in WAC 173-303-610(2)(b) will necessitate compliance with the postclosure requirements stipulated in WAC 173-303-610(7) through (11).

11.1.1.2 Removal or Decontamination Standard [I-1a(2)]. Before the initiation of closure, equipment containing dangerous waste will be retrieved for separation, processing, and treatment. Should decontamination of the tunnels be necessary, as determined by authoritative sampling, all materials (excluding soils) contaminated with dangerous waste will be removed and disposed of in accordance with WAC 173-303-610(2)(b).

Background threshold concentrations and significance levels will be based on information including mean concentrations and variance for each constituent of concern. Soil background levels will be based on established and accepted Hanford Site soil background information (WHC 1991c) or established by soil sampling per SW-846 (EPA 1986). Background sampling will be done at the time of closure.

11.1.2 Partial Closure Activities [I-1b]

No partial closure is anticipated for the PUREX Storage Tunnels. It is anticipated that closure of the PUREX Storage Tunnels will take place as part of the closure of the PUREX Plant.

A recent evaluation of the structural integrity of Tunnel Number 1 (Hand and Stevens 1991) concluded that the timbers should be sound and remain so through the year 2001. However, should future structural analysis indicate an unacceptable risk, closure of the tunnel could be initiated in advance of planned closure activities. This would represent a partial closure of the TSD unit and would not effect the operation of Tunnel Number 2. Tunnel Number 1 closure would be performed in accordance with the established closure plan.

11.1.3 Maximum Waste Inventory [I-1c]

The eight railcar capacity for Tunnel Number 1 was reached in January 1965. The combined volume of equipment stored on the eight railcars in Tunnel Number 1 is approximately 780 cubic yards (596 cubic meters).

As of September 30, 1991, the combined volume of equipment stored on the 17 railcars in Tunnel Number 2 is approximately 1,780 cubic yards (1,360 cubic meters). Tunnel Number 2 has a maximum storage space of 40 railcars. Based on projections for future equipment storage, it is anticipated that another 16 railcars of equipment will be stored in Tunnel Number 2 before PUREX Plant closure. The projected volume of Tunnel Number 2 (33 railcars total) does not include relocation of any railcars currently in Tunnel Number 1.

Because of the limitations in projecting the types of equipment to be stored in the future and the amount to be placed on the railcars, the total volume of equipment in storage at any one time is uncertain. The maximum volume of waste to be stored within Tunnel Number 2 is estimated to be approximately 3,500 cubic yards (2,675 cubic meters). This estimate assumes the average volume of equipment presently stored on the railcars will be representative of the average volume of equipment on the 16 railcars anticipated to be placed in the tunnels in the future. The maximum quantity of mixed waste to be stored in the PUREX Storage Tunnels in the future also is uncertain. Assuming the 16 railcars anticipated to be placed into storage contain the same fraction of mixed waste as the 25 railcars currently stored in the PUREX Storage Tunnels, an additional 4,220 pounds (1,915 kilograms) of lead, 1,100 pounds (500 kilograms) of silver, and 200 pounds (91 kilograms) of mercury will be placed into the tunnels. This will bring the maximum total inventory of mixed waste in storage in the PUREX Storage Tunnels to an estimated 14,000 pounds (6,350 kilograms).

Waste minimization, to the extent feasible, will be conducted by the waste generating unit (PUREX Plant) before storage of the equipment at the PUREX Storage Tunnels. Removal or treatment of dangerous waste associated with process equipment removed from the PUREX Plant currently are not anticipated and there are no plans to treat waste at the PUREX Storage Tunnels.

11.1.4 Inventory Removal or Disposal and Decontamination of Equipment, Structures, and Soils [I-1d]

The PUREX Storage Tunnels will be closed in a manner that protects public health and the environment and minimizes or eliminates the escape of waste constituents to the groundwater, surface water, or to the atmosphere. The PUREX Storage Tunnels closure plan provides for the following:

- Establishment of local background concentrations for soil
- Sampling to determine concentrations of the dangerous waste constituents of concern using an authoritative sampling scheme of biased grab samples
- Soil sampling and dangerous waste decontamination activities
- Disposal of all contaminated material and rinsate generated during closure activities
- Certification that closure activities have been completed in accordance with the approved plan.

11.1.4.1. Removal of Tunnel Inventory. Before closure, all railcars will be removed from the storage area of the tunnels. Removal of railcars will occur in the reverse order of placement into the tunnels as each tunnel is provided with access from only one direction. Railcars will be retrieved one at a time by a remotely operated locomotive or other appropriate means. Additional details associated with removal of railcars from the tunnel storage area are included in Chapter 4.0, Section 4.1.3.

11.1.4.2. Background Soil Sampling. Background soil sampling will be done at the time of closure. Five initial samples will be taken at a distance from the PUREX Storage Tunnels such that the soil would not be impacted by the storage unit operations, but would still be in a similar geologic strata. Standard statistical analyses will be performed to approximate the background population distribution function. Metals are expected to be found in a log normal distribution in the soil; therefore, the natural logarithm of the analytical value will be calculated for use in determining means and standard deviations and in comparing data from the soil immediately surrounding the PUREX Storage Tunnels. Other dangerous constituents are expected to follow in a normal distribution in the soil, so actual analytical values will be used for calculations and comparisons. If the variance is large and, therefore, the computed background threshold value (based on at least 90 percent confidence) is too large, further background sampling might be necessary.

For those cases where comparisons with the background threshold value are not applicable, samples will be compared to regulatory thresholds. Soil samples will be considered contaminated if the constituent levels are above a 3-sigma tolerance limit on the background mean.

11.1.4.3 Equipment Processing. Clean closure activities will follow removal of the railcars and equipment. The known dangerous waste present in the tunnels is not expected to have migrated from the railcars to the gravel and soil. The lead and silver could only be expected to migrate through fluid transport, and the history of the tunnels does not indicate water infiltration and migration as a known occurrence. The mercury is contained in heavy gage stainless steel that would have to fail for migration to occur. Failure of the equipment would lead to the mercury contaminating the railcar, and/or the gravel ballast and soil of the tunnel floor. The evaluation of the railcars and equipment during removal activities (Chapter 4.0, Section 4.1.3) will provide guidance for sampling. If visual evaluations indicate that there is no failure of the dangerous waste containment, the detail of the sampling plan will be less rigorous than a sampling plan that considers failed equipment and potential spillage.

11.1.4.4 Tunnel(s) Contaminated Equipment and Components. The PUREX Storage Tunnels contain dangerous waste in solid (lead, silver) and liquid (mercury) form that is mostly contained in heavy gage stainless or carbon steel. The lead and silver waste, as well as the encapsulated mercury, does not present a credible scenario for contamination of the internal structural components, the rail or rail ballast (gravel), or the soil within the tunnels. If visual evidence of containment failure is observed during equipment removal, a phased approach to identification of contamination will be instituted based on the dangerous waste present in the equipment. Accordingly, the gravel or soil will be sampled through an authoritative, biased scheme at the perimeter of a railcar unless otherwise indicated by the above-mentioned visual evidence. The aboveground structures and equipment directly related to the tunnels also are not expected to be contaminated with the dangerous waste from the storage of equipment in the tunnels.

11.1.4.5 Decommissioning of the Storage Tunnels. Clean closure of the tunnels in accordance with WAC 173-303-610 does not mandate dismantling of the tunnel structures unless the structures are contaminated with dangerous waste. Therefore, the closure plan for the PUREX Storage Tunnels only addresses the need for certification of clean closure for the dangerous waste that was stored in the tunnels. The long-term use for the tunnels has not been specified and there may be another Hanford mission for the tunnels in the future. After a determination has been made that the tunnels are no longer needed, the final decommissioning and dismantling of the structures will be integrated into the overall closure strategy for the operable unit(s) that include the tunnels. An operable unit at Hanford is a group of land disposal sites placed together for the purposes of doing remedial investigation/ feasibility studies and subsequent cleanup actions. The primary criteria for placement of a site into an operable unit includes geographic proximity, similarity of waste characteristics and site types, and the possibilities for the economies of scale. The PUREX Storage Tunnels are within operable units 200-PO-1 and 200-PO-2.

11.1.4.6 Uncontaminated Equipment and Components. No significant cost recovery opportunities through salvage and reuse have been identified for any of the equipment or storage tunnel components. Therefore, the uncontaminated equipment and components will be either left in place, dismantled, or removed for disposal as scrap in a permitted disposal unit.

11.1.4.7 Soil Sampling. Soil sampling and analyses will be conducted as appropriate for constituents known to have been stored at each mixed waste railcar location. An authoritative sampling scheme based on biased grab samples will be developed for sampling suspect areas.

Soil samples will be taken at the surface, at a 1 foot (0.3 meter) depth, at a 2 foot (0.6 meter) depth, and at a 3 foot (0.9 meter) depth. It can be shown that concentrations of inorganic constituents added to the soil by sorption are greatest in the upper few inches, and decreases with increased thickness of the soil column. Because of the well known process of sorption (Pendias and Pendias 1984; Routson and Fecht 1979; Conway 1982; Freeze and Cherry 1979), any contamination remaining in the soil would be the result of equilibrium reactions and/or irreversible sorption. In either case, residual contamination would be concentrated mostly in the uppermost part of the soil column, with rapidly decreasing concentrations downward. Therefore, the uppermost part of the soil column is most likely to contain contamination if contamination is present. Because the potential contamination from the PUREX Storage Tunnels would remain in the upper part of the soil column, a maximum sampling depth of 3 feet (0.9 meter) is considered adequate.

A precleaned, hand-operated soil auger will be placed at each sampling location, and soil/gravel will be removed to a total depth of 3 feet (0.9 meter). If access to the sampling location is restricted, a small shovel or trowel will be used. Samples from the hole will be placed immediately in a laboratory prepared sample container to minimize loss of volatiles and will be stored in an ice cooler at 39 °F ±3.6 °F (4 °C ±2 °C). The soil auger, as well as all sampling equipment, will be decontaminated and cleaned before use at each sample location.

Excess soil that is removed from each hole will be containerized in a U.S. Department of Transportation-approved container until results of the soil analyses are received. The container will be stored at the PUREX Facility until designation is complete.

The soil samples will be analyzed for the constituents known to have been stored at each mixed waste railcar location. The analyses will follow the protocol outlined in SW-846 (EPA 1986). If contamination is detected, remediation of the soil will be deferred until final remediation is conducted of operable units 200-PO-1 and 200-PO-2, and the PUREX Plant TSD unit.

11.1.4.8 Decontamination of Equipment Used for Closure. The equipment used during closure activities to remove dangerous waste will be cleaned three times with a steam cleaner or other appropriate technology as required to effectively clean the surfaces. The rinsate from cleaning will be collected in approved containers, sampled, and disposed of in accordance with WAC 173-303-610.

11.1.4.9 Closure of Containers [I-1d(1)]. Before closure, all containers (loaded railcars) will be removed from the storage tunnels. All dangerous waste residue will be removed from any local containment system components if such components are used. Any contaminated equipment will be decontaminated or removed. All dangerous waste and contained rinsate will be tested and disposed of as dangerous waste or mixed waste.

11.1.4.10 Closure of Tanks [I-1d(2)]. Operation of the PUREX Storage Tunnels does not involve the storage of dangerous waste in tanks. Therefore, the requirements of WAC 173-303-640 are not applicable to the PUREX Storage Tunnels.

11.1.4.11 Closure of Waste Piles [I-1d(3)]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in piles. Therefore, the requirements of WAC 173-303-660 are not applicable to the PUREX Storage Tunnels.

11.1.4.12 Closure of Surface Impoundments [I-1d(4)]. Operation of the PUREX Storage Tunnels does not involve the placement of dangerous waste in surface impoundments. Therefore, the requirements of WAC 173-303-650 are not applicable to the PUREX Storage Tunnels.

11.1.4.13 Closure of Incinerators [I-1d(5)]. Operation of the PUREX Storage Tunnels does not involve the incineration of dangerous waste. Therefore, the requirements of WAC 173-303-670 are not applicable to the PUREX Storage Tunnels.

11.1.4.14 Closure of Land Treatment Facilities [I-1d(6)]. Operation of the PUREX Storage Tunnels does not involve the land treatment of dangerous waste. Therefore, the requirements of WAC 173-303-655 are not applicable to the PUREX Storage Tunnels.

11.1.5 Closure of Disposal Units [I-1e]

The PUREX Storage Tunnels do not contain any waste piles, landfills, or surface impoundments. In addition, the dangerous waste or contaminated materials will not remain at the PUREX Storage Tunnels after closure. Therefore, this section is not applicable.

11.1.6 Schedule for Closure [I-1f]

A schedule of the closure activities is presented in Figure 11-1. Closure will be completed 180 days after the last shipment of waste from the tunnels. The activities representing the greatest portion of time will be decontamination and verification sampling of the floor area(s) and related components. An estimate of 90 days is given for initial sampling and analysis tasks. This estimate assumes a rapid turnaround time of 10 working days or less for laboratory analyses.

11.1.7 Extension of Closure Time [I-1g]

It is expected that the final closure of the PUREX Storage Tunnels will be completed within the 180-day period allowed by regulations, after the last shipment of waste from the tunnels. Factors such as the number of sampling iterations or the extent of radiological contamination might present information affecting the overall closure plan and could necessitate an extension beyond the 180-day period. In that case, an extension will be requested.

11.1.8 Amendments to Closure Plan

Should changes be required to the approved closure plan, an amended plan will be prepared and submitted to Ecology for approval in accordance with 40 CFR 264.112(c) and WAC 173-303-610(3)(a).

11.1.9 Certification of Closure and Survey Plat

Within 60 days of final closure, the DOE-RL will submit to Ecology a certification of closure. The certification will be signed by both DOE-RL and an independent professional engineer registered in the state of Washington, stating that the PUREX Storage Tunnels have been closed in accordance with the approved closure plan. The certification will be submitted by registered mail or an equivalent delivery service. Documentation supporting the independent professional engineer's closure certification will be retained and furnished to Ecology upon request. This documentation will be maintained by the DOE-RL contact (or the successor) identified in Section 11.9 of this closure plan.

11.1.9.1 Closure Certification. The DOE-RL and the independent professional engineer registered in the state of Washington will certify that closure is complete with a document similar to Figure 11-2.

11.1.9.2 Survey Plat. The PUREX Storage Tunnels are planned to be cleaned closed. Because dangerous waste is not expected to be left in place after the operational period, the requirement for producing a survey plat is not applicable to the PUREX Storage Tunnels.

11.1.10 Notice to Local Land Authority

The PUREX Storage Tunnels are planned to be clean closed. Because dangerous waste is not expected to be left in place after the operational period, the requirement for notification to the local land authority is not applicable to the PUREX Storage Tunnels.

11.2 POSTCLOSURE PLAN [I-2]

The PUREX Storage Tunnels are planned to be clean closed. Because dangerous waste is not expected to be left in place after the operational period, the requirement for postclosure activities is not applicable to the PUREX Storage Tunnels.

11.3 NOTICE IN DEED [I-3]

The PUREX Storage Tunnels are planned to be clean closed. Because dangerous waste is not expected to be left in place after the operational period, the requirement for a notice in deed is not applicable to the PUREX Storage Tunnels.

11.4 CLOSURE COST ESTIMATE [I-4]

In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1)(c), this estimate is not required for federal facilities. The Hanford Facility is a federally owned facility for which the federal government is the operator, and this estimate is therefore not applicable to the PUREX Storage Tunnels.

An annual report updating projections of anticipated closure and postclosure costs for the Hanford Facility TSD units having final status will be submitted to Ecology in accordance with WAC 173-303-390 by October 30 (beginning in 1992).

11.5 FINANCIAL ASSURANCE MECHANISM FOR CLOSURE [I-5]

In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1)(c), this section is not required for federal facilities. The Hanford Site is a federally owned facility for which the federal government is the operator and this section is therefore not applicable to the PUREX Storage Tunnels.

11.6 POSTCLOSURE COST ESTIMATE [I-6]

In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1)(c), this estimate is not required for federal facilities. The Hanford Facility is a federally owned facility for which the federal government is the operator, and this section is therefore not applicable to the PUREX Storage Tunnels.

An annual report updating projections of anticipated closure and postclosure costs for the Hanford Facility TSD units having final status will be submitted to Ecology in accordance with WAC 173-303-390 by October 30 (beginning in 1992).

11.7 FINANCIAL ASSURANCE MECHANISM FOR POSTCLOSURE CARE [I-7]

In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1)(c), this section is not required for federal facilities. The Hanford Site is a federally owned facility for which the federal government is the operator and this section is therefore not applicable to the PUREX Storage Tunnels.

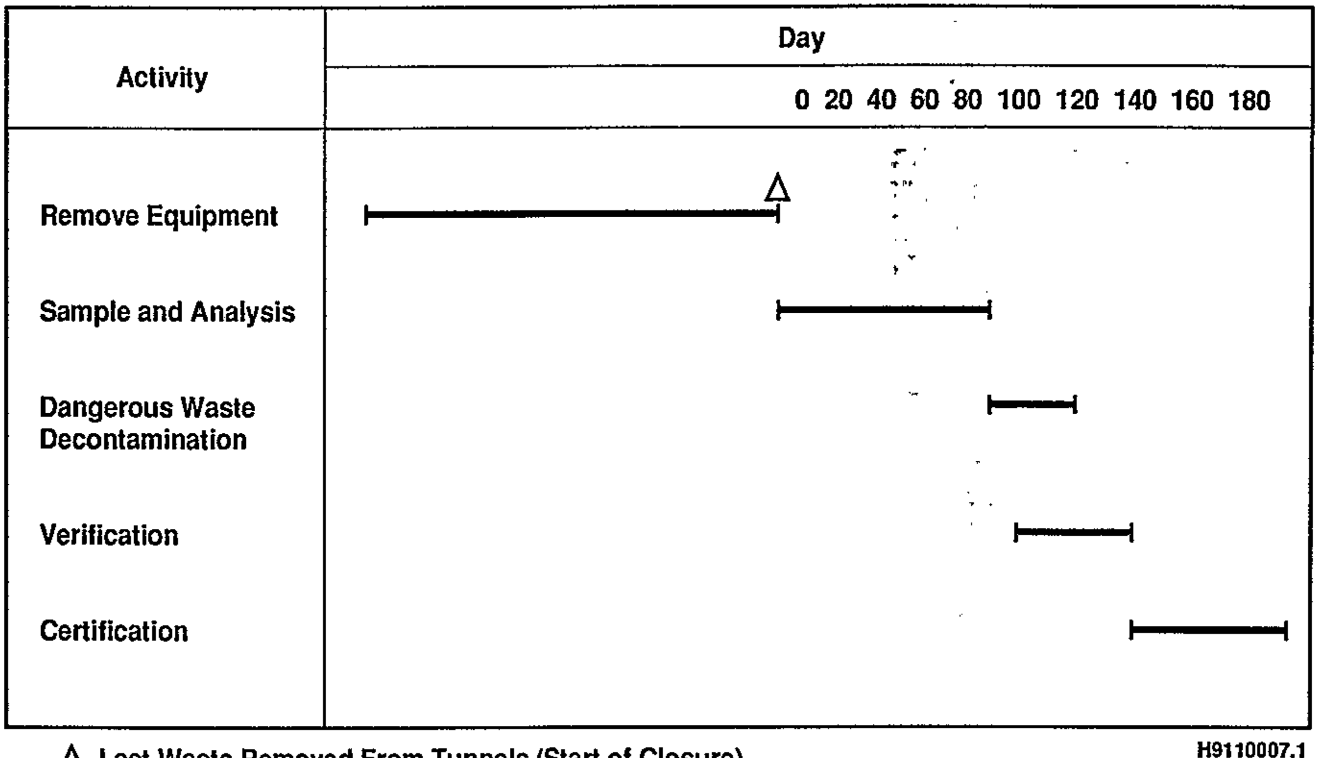
11.8 LIABILITY REQUIREMENTS [I-8]

In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1)(c), this section is not required for federal facilities. The Hanford Site is a federally owned facility for which the federal government is the operator and this section is therefore not applicable to the PUREX Storage Tunnels.

11.9 CLOSURE CONTACTS

The following office (or its successor) is the contact for the PUREX Storage Tunnels.

Office of Environmental Assurance
Permits and Policy
U.S. Department of Energy
DOE Richland Field Office
P.O. Box 550
Richland, Washington 99352
(509) 376-5441



△ Last Waste Removed From Tunnels (Start of Closure)

Figure 11-1. Closure Plan Schedule.

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CLOSURE CERTIFICATION
FOR

____

Hanford Facility
U.S. Department of Energy, DOE Richland Field Office

We, the undersigned, hereby certify that all ____________________ ____________________ closure activities were performed in accordance with the specifications in the approved closure plan.

____
Owner/Operator Signature DOE-RL Representative Date
(Typed Name)

______________________________ P.E. No. ______________________
Signature Independent Registered Professional Engineer Date
(Typed Name and Washington State Professional Engineer License Number)

Figure 11-2. Typical Closure Certification Document.

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CONTENTS

FIGURE

TABLE

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12.0 REPORTING AND RECORDKEEPING

This chapter summarizes the PUREX Storage Tunnels reporting and recordkeeping requirements. The reports are submitted to Ecology and/or the EPA as required by applicable regulations, and required records are maintained by the PUREX Plant or other Hanford Facility organizations as appropriate. Required reports and records will be accessible through a centralized Hanford Facility Regulatory File index, currently under development. This index, once fully developed, can be used to provide regulatory agency access to the PUREX Storage Tunnels regulatory compliance records required by WAC 173-303.

The Regulatory File is maintained by the Environmental Data Management Center. Each TSD unit will undergo a periodic review by an Environmental Data Management Center Regulatory File Custodian to ensure standardized collection and maintenance of unit-specific reports and records (operating records) (DOE-RL 1991). A general reporting requirement applicable to all dangerous waste TSD units (notification) is described, as well as reporting and recordkeeping requirements for generators, transporters, and TSD facilities. Reports and records applicable to the PUREX Storage Tunnels are summarized in Table 12-1.

12.1 NOTIFICATION OF DANGEROUS WASTE ACTIVITIES

Regulations require that facilities involved in the generation or transportation of dangerous waste, or the owner or operator of a TSD facility, have a current EPA/State Identification Number. The Hanford Facility is a single RCRA facility operating under EPA/State Identification Number WA7890008967. The PUREX Storage Tunnels, a TSD unit within the Hanford Facility, operates under this same EPA/State identification number.

12.2 GENERATOR REQUIREMENTS

The Hanford Facility complies with the generator reporting and recordkeeping regulations. Operation of the PUREX Storage Tunnels does not generate regulated dangerous waste. Therefore, generator reporting and recordkeeping requirements are not applicable.

12.3 TRANSPORTER REQUIREMENTS

The Hanford Facility does not transport dangerous waste offsite. Transporters having their own EPA/State Identification Numbers are used to transport dangerous waste from the Hanford Facility to a permitted offsite TSD facility. Waste transfers onsite, including waste transferred to the PUREX Storage Tunnels, are recorded and tracked in accordance with Hanford Facility procedures (Section 12.4.1.1). Therefore, transporter records required by 40 CFR 263.22 and WAC 173-303-260 are not maintained by either the PUREX Facility or by the Hanford Facility. Reports such as discharge reports required by 40 CFR 263.30 and WAC 173-303-270 are not applicable.

12.4 TREATMENT, STORAGE, AND/OR DISPOSAL REQUIREMENTS

The Hanford Facility reporting and recordkeeping procedures are discussed in this section. The TSD reports are described, the operating records and miscellaneous support records contents are detailed, and plans maintained at the PUREX Facility and submitted with this permit application are described.

12.4.1 Reports

This section discusses the reporting requirements of WAC 173-303 and applicable parts of Title 40, Code of Federal Regulation's relating to aspects of dangerous waste. The following are included in reporting requirements:

- Waste manifest reports
- Annual reports
- Biennial reports
- Groundwater monitoring reports
- Contingency plan incident notifications
- Spills, discharges, and leaks reports
- Closure reports
- Postclosure reports.

Additional details of these reports are provided in the following sections. Copies of these reports are maintained by the PUREX Facility or other Hanford Site organizations as appropriate.

12.4.1.1 Waste Manifest Reports. The waste manifest is the source of two possible reports, the manifest discrepancy report and the unmanifested waste report. Because the PUREX Storage Tunnels do not receive offsite waste, waste manifest reports are not required.

Equipment transfers to and from the PUREX Storage Tunnels are documented on the storage tunnel checklist (Chapter 2.0, Section 2.8 and Appendix 2F). The checklist identifies the equipment placed into and removed from storage and is prepared for each transfer into and out of the PUREX Storage Tunnels. Information provided in the checklist includes a description of the equipment, equipment identification number (if applicable), radiation level, tunnel position number, and transfer date. Quantities of dangerous waste and dangerous waste code numbers also are included for equipment containing dangerous waste. Information regarding the dangerous waste is extrapolated from fabrication drawings, specifications, and process knowledge. Finalized checklists are maintained as part of the tunnel storage records located in the PUREX Facility.

All equipment transferred from the PUREX Plant to the PUREX Storage Tunnels subsequent to January 1, 1990 has been documented on the storage tunnel checklist. Equipment placed into the tunnels for storage before January 1, 1990 was documented as required by the controlling procedure in effect at the time of storage. A summary of the equipment stored in the tunnels as of September 30, 1991 is included in Appendix 11A. Chapter 3.0, Table 3.1, includes an estimate of the quantities of dangerous waste stored in the PUREX Storage Tunnels as of September 30, 1991.

12.4.1.2 Annual Reports. The state of Washington, pursuant to WAC 173-303-390, requires an overall annual report for each facility that holds an active EPA/State identification number. The report is due to Ecology on March 1 of each year. The report contents for the PUREX Storage Tunnels include the following:

- The EPA/State identification number
- Name and address of the Hanford Facility
- Calendar year covered by the report
- Sources of the waste stored at the PUREX Storage Tunnels
- Description and quantity of the waste stored in the PUREX Storage Tunnels
- TSD methods
- Certification statement signed by an authorized representative.

The report form and instructions in the "TSD Facility Annual Dangerous Waste Report"--Forms 4 and 5 are used for this report.

A report updating projections of anticipated closure and postclosure costs for the Hanford Facility TSD units having final status is due to Ecology by October 30 (beginning in 1992).

12.4.1.3 Biennial Reports. The EPA requires, pursuant to 40 CFR 264.75, that an overall report describing each dangerous waste facility activity be submitted on March 1 of each even-numbered year. Ecology has been extended administrative responsibilities for biennial reporting as required by 40 CFR 264.75. A specific biennial report is not prepared and submitted as all reporting requirements are satisfied by submittal of the annual report to Ecology.

12.4.1.4 Groundwater Monitoring Reports. The PUREX Storage Tunnels are not operated as a dangerous waste surface impoundment, waste pile, land treatment unit, or landfill as defined in WAC 173-303-645(1)(a). Therefore, no groundwater monitoring or reporting is required for this unit.

12.4.1.5 Contingency Plan Incident Notifications. The building emergency director, PUREX Facility line management, and the contractor's environmental protection organization are responsible for making appropriate notifications (Appendix 7A). Notifications of all emergency situations requiring contingency plan implementation are made as required by 40 CFR 264.56 and WAC 173-303-360, U.S. Department of Energy Order 5000.3A.

In the event of a fire or an explosion, the building emergency director or the PUREX Facility line management immediately must notify the Patrol Operations Center by telephone at 811. All emergency incident calls to the emergency number (811) are reported by the Patrol Operations Center to the Hanford Fire Department and the Occurrence Notification Center. In the event of an unplanned release of hazardous or dangerous waste or material, the building emergency director immediately notifies the contractor's environmental protection organization who notifies the DOE-RL and the Occurrence Notification Center. The DOE-RL must be notified by telephone as soon as possible on the day of the incident. The building emergency director or the PUREX Plant line management must document the incident on an Occurrence Report (Figure 12-1) to the DOE-RL within 24 hours of categorization of the incident. A copy of the occurrence reports is retained at the PUREX Facility as part of the operating record.

If the PUREX Storage Tunnels stops operations in response to a fire, an explosion, or a release that could present a hazard to human health or the environment, the building emergency director notifies DOE-RL, via line management, that the PUREX Storage Tunnels are operational and emergency cleanup is complete.

The DOE-RL is responsible for three types of notifications: an immediate notification, the incident assessment report, and the TSD unit restart notification. Details of these notifications are provided in the following sections.

12.4.1.5.1 Immediate Notification. The Occurrence Notification Center (376-2900) immediately will notify affected county emergency management, Ecology, and the individual designated as the on-scene coordinator for the southeastern Washington area of the National Response Center (800-424-8802) if the PUREX Storage Tunnels has had a fire, explosion, or release that could threaten human health or the environment outside the PUREX Storage Tunnels.

The report will contain the following information:

- Name and telephone number of reporter
- Name and address of the TSD unit
- Time and type of incident
- Name and quantity of material(s) involved to the extent known
- Extent of injuries if any

- Possible hazards to human health or the environment outside the PUREX Storage Tunnels

- Actions already taken to mitigate the situation.

12.4.1.5.2 Incident Assessment Report. The DOE-RL will provide a written report to Ecology within 15 days of any incident that requires implementation of the contingency plan. This report will include the following:

- Name, address, and telephone number of the owner or operator

- Name, address, and telephone number of the TSD unit

- Date, time, and type of incident

- Name and quantity of material(s) involved

- Extent of injuries if any

- Assessment of actual or potential hazards to human health or the environment where this is applicable

- Estimated quantity and disposition of recovered material that resulted from the incident

- Cause of the incident

- Description of corrective action taken to prevent recurrence of the incident.

12.4.1.5.3 Unit Restart Notification. If the PUREX Storage Tunnels stop operations in response to a fire, an explosion, or a release that could present a hazard to human health or the environment, the DOE-RL will notify Ecology and the appropriate local authorities before operations are resumed in the affected area(s). The notification will indicate that cleanup procedures are complete and that emergency equipment is clean and fit for its intended use.

12.4.1.6 Spills, Discharges, and Leaks Reports. Because of the nature of the stored waste and the design and operation of the PUREX Storage Tunnels, the possibility of spills, discharges, and leaks of dangerous waste to the environment are considered negligible. Therefore, requirements for reporting spills, discharges, and leaks will be addressed only at closure when safe access to the tunnels is possible (Chapter 11.0, Section 11.1).

12.4.1.7 Closure Reports. Reports regarding the closure of the PUREX Storage Tunnels will be made in accordance with the requirements of 40 CFR 264.115 and .116 and WAC 173-303-610(6) and (9). These reports include notification of beginning of closure and certification of closure.

12.4.1.7.1 Notification of Closure. Ecology will be notified in writing at least 45 days before the date on which closure of the PUREX Storage Tunnels is expected to begin.

12.4.1.7.2 Certification of Closure. Within 60 days of completion of closure of the PUREX Storage Tunnels, a certification signed by the DOE-RL and an independent registered professional engineer will be submitted to the regulatory authority. The certification will be sent by registered mail or an equivalent delivery service. The certification will state that the PUREX Storage Tunnels were closed in accordance with the approved closure plan. Documentation supporting the independent registered engineer's certification will be supplied upon request of the regulatory authority.

12.4.1.7.3 Survey Plat. The PUREX Storage Tunnels are not a disposal facility. This determination eliminates the requirement for producing a survey plat.

12.4.1.8 Postclosure Reports. Postclosure reports required by 40 CFR 264.119 and .120, and WAC 173-303-610(9), (10), and (11) are not required because the PUREX Storage Tunnels are not a disposal facility.

12.4.2 Recordkeeping Requirements

Records retained at the PUREX Facility for the PUREX Storage Tunnels include plans described in other portions of this permit application, operating records, miscellaneous support records, and records of reports made to the regulatory authority. These records are described in the following sections.

12.4.2.1 Permit Application Plans. Plans described in other portions of this permit application and retained at the PUREX Facility for the PUREX Storage Tunnels include the following:

- Waste analysis data
- Contingency plan and amendments
- Training plan
- Closure plan
- Inspection plans.

Copies of these plans are maintained for the life of the PUREX Storage Tunnels. Modifications or amendments required as a result of changing regulatory or operational requirements will be submitted to the regulatory authority and added to the plans maintained at the PUREX Facility as required.

12.4.2.2 Operating Records. Operating records maintained at the PUREX Facility for the PUREX Storage Tunnels include the following:

- Description and quantity of the dangerous waste placed into the PUREX Storage Tunnels for storage and the method(s) and date(s) of storage as required by 40 CFR 264, Appendix I and WAC 173-303-380

- Location of dangerous waste stored within the PUREX Storage Tunnels and the quantity at each location

- Waste analysis results

- Contingency plan incident reports

- Inspection records.

12.4.2.2.1 Waste Description and Quantity. A description of and the quantity of dangerous waste placed into the PUREX Storage Tunnels is maintained in the PUREX Facility records. Records describing the types and quantities of waste are maintained as part of the operating record.

12.4.2.2.2 Waste Location. The contents of each railcar and the specific position of the railcar within the PUREX Storage Tunnels are documented on the storage tunnel checklist. The checklists are maintained as part of the operating record.

12.4.2.2.3 Waste Analysis Data. Records of the information necessary for storing waste in the PUREX Storage Tunnels are maintained as part of the operating record.

12.4.2.2.4 Contingency Plan Incident Report. Records documenting the details of any incidents requiring the implementation of the contingency plan are maintained as part of the PUREX Storage Tunnels operating record as required by 40 CFR 264.73 and WAC 173-303-380. In addition to these records, occurrence reports are generated to document incidents. The occurrence reports describe all incidents, including those that are judged too minor to require the implementation of the contingency plan but that are identified as offnormal events, unusual occurrences, or emergencies.

12.4.2.2.5 Inspection Records. Records of the PUREX Storage Tunnels general inspections are maintained at the PUREX Facility for a period of at least 5 years from the inspection date. The records include the following:

- Date and time of inspection

- Inspector's printed name and handwritten signature

- Notations of observations

- Date and nature of any repairs or other remedial actions.

12.4.2.2.6 Waste Minimization Certification. Annual certification by the DOE-RL that the Hanford Facility is in compliance with the waste minimization requirements is inserted into the Hanford Facility operating record as required by 40 CFR 264.73(b)(9).

12.4.2.2.7 Land Disposal Restriction Records. All of the dangerous waste stored within the PUREX Storage Tunnels is subject to land disposal restrictions. Because the PUREX Storage Tunnels receive onsite waste only from the PUREX Plant and because records associated with the operation of the PUREX Storage Tunnels are maintained at the PUREX Facility, land disposal restriction records required by 40 CFR 264.73(b)(10) and (16) are not addressed in this permit application. Methods for preparation and maintenance of land disposal restriction records will be addressed in the PUREX Plant Dangerous Waste Permit Application.

12.4.2.3 Miscellaneous Support Records. Miscellaneous support records include the following:

- Training documentation
- Liability coverage documentation
- Closure and postclosure cost estimates
- Report Records.

12.4.2.3.1 Training Documentation. The names of each employee and the waste management position held are maintained by the PUREX Facility. Training records document that employees have received the training or have the job experience required for that position. Training records on current employees are kept until closure of the unit. Training records on former employees are kept for 3 years from the date the employee last worked at the PUREX Facility. Auditable copies of these records are maintained by the contractor's training organizations. Specific employee training records are available on a demonstrated need-to-know basis. Copies of these records will be marked *Sensitive Information* and are expected to be handled in accordance with the *Privacy Act* (Chapter 8.0, Section 8.2).

12.4.2.3.2 Liability Coverage Documentation. In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1), this documentation is not required for federal facilities. The Hanford Facility is a federally owned facility for which the federal government is the operator and this documentation is therefore not applicable to the PUREX Storage Tunnels.

12.4.2.3.3 Closure and Postclosure Cost Estimates. In accordance with 40 CFR 264.140(c) and WAC 173-303-620(1), these estimates are not required for federal facilities. The Hanford Facility is a federally owned facility for which the federal government is the operator and these estimates are therefore not applicable to the PUREX Storage Tunnels.

An annual report updating projections of anticipated closure and postclosure costs for Hanford Facility TSD units having final status will be submitted in accordance with WAC 173-303-390 to Ecology by October 30 (beginning in 1992)

12.4.2.3.4 Report Records. The reports described in Sections 12.1 and 12.4.1 are contained in records maintained either at the PUREX Facility or by other Hanford Facility organizations as noted in Table 12-1. Copies of the reports will be made available on the request of the EPA or Ecology.

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PART I

OCCURRENCE REPORT

(Name of Facility)

[]
(Facility Function Involved)

(Name of Laboratory Site or Organization)

(Facility Manager/Designee and Org. Code)

(Originator)

1. OCCURRENCE REPORT NUMBER:

2. REPORT TYPE AND DATE: DATE TIME

   [] Notification Report
   [] 10-Day Report
   [] Latest 10 Day Update
   [] Final

3. OCCURRENCE CATEGORY: []

4. DIVISION OR PROJECT: []

5. DOE PROGRAM OFFICE: []

6. SYSTEM, BLDG., OR EQUIPMENT: 7. UNCI: 8. PLANT AREA

9. DATE AND TIME DISCOVERED:
10. DATE AND TIME CATEGORIZED:
11. DATE AND TIME OF DOE PROGRAM NOTIFICATION(S):
12. DATE AND TIME OF OTHER NOTIFICATIONS:

13. SUBJECT OR TITLE OF OCCURRENCE:

14. NATURE OF OCCURRENCE: []

15. DESCRIPTION OF OCCURRENCE:

1 | Figure 12-1. Typical Occurrence Report. (sheet 1 of 4)

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16. OPERATING CONDITIONS OF FACILITY AT TIME OF OCCURRENCE:

17. ACTIVITY CATEGORY: []

18. IMMEDIATE ACTIONS TAKEN AND RESULTS:

END OF NOTIFICATION REPORT

19. DIRECT CAUSE: []
20. ROOT CAUSE: []
21. CONTRIBUTING CAUSE(S): []

22. DESCRIPTION OF CAUSE:

23. EVALUATION: (By Facility Manager/Designee)

24. IS FURTHER EVALUATION REQUIRED? [] Yes [] No
IF YES, BEFORE FURTHER OPERATION? [] Yes [] No
BY WHOM:
BY WHEN:

25. CORRECTIVE ACTIONS:

TARGET COMPLETION DATE: COMPLETION DATE:

26. IMPACT ON ENVIRONMENT, SAFETY AND HEALTH:

27. PROGRAMMATIC IMPACT:

28. IMPACT UPON CODES AND STANDARDS:

Figure 12-1. Typical Occurrence Report. (sheet 2 of 4)

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29. FINAL EVALUATIONS AND LESSONS LEARNED:

---

30. SIMILAR OCCURRENCE REPORT NUMBERS:

---

31. DOE FACILITY REPRESENTATIVE INPUT:

---

32. DOE FACILITY REPRESENTATIVE NAME AND POSITION:

END OF PART I

1 | Figure 12-1. Typical Occurrence Report. (sheet 3 of 4)

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PART II

OCCURRENCE REPORT NUMBER:

33. QUEST SUBJECT CODE:

34. QUEST CONTRIBUTING FACTOR CODE:

35. QUEST ROOT CAUSE CODE:

36. PRIORITY/SEVERITY CATEGORY:

37. FACILITY MANAGERS ORGANIZATION CODE:

38. SIGNATURES:

Approved by: ______________________ Date: __________
Facility Manager

Reviewed by: ______________________ Date: __________
Impacted Oversight Organization

Reviewed by: ______________________ Date: __________
Impacted Oversight Organization

Reviewed by: ______________________ Date: __________
Impacted Oversight Organization

Reviewed by: ______________________ Date: __________
ADC/UCNI

Figure 12-1. Typical Occurrence Report. (sheet 4 of 4)

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Table 12-1. Reports and Records. (sheet 1 of 3)

Item	Storage	
	Retention time	Location[a]
Notification of dangerous waste activities	Life of PUREX Facility	Hanford Facility
GENERATOR REPORTS AND RECORDS:		
None required	NA[b]	NA
TRANSPORTER REPORTS AND RECORDS:		
None required	NA	NA
TREATMENT, STORAGE, AND/OR DISPOSAL REPORTS AND RECORDS:		
Permit Application Plans:		
Waste analysis plan	Life of PUREX Facility	PUREX Facility
Contingency plan and amendments	Life of PUREX Facility	PUREX Facility
Training plan	Life of PUREX Facility	PUREX Facility
Closure plan	Life of PUREX Facility	PUREX Facility
Postclosure plan	NA	NA
Inspection plans	Life of PUREX Facility	PUREX Facility
Operating Reports and Records:		
Waste description and quantity	Life of PUREX Facility	PUREX Facility
Waste location	Until closure	PUREX Facility
Waste analysis data	Life of PUREX Facility	PUREX Facility
Inspection records	Varies from 5 years from inspection date to life of PUREX Facility	PUREX Facility
Certification of waste minimization efforts	NA	NA

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Table 12-1. Reports and Records. (sheet 2 of 3)

Item	Storage: Retention time	Storage: Location[a]
Land Disposal Restriction Records:		
None required	NA	NA
Waste Manifest Reports and Records:		
None required	NA	NA
Groundwater Monitoring Reports and Records:		
None required	NA	NA
Contingency Plan Incident Reports and Records:		
Immediate notification--Occurrence Report	Life of PUREX Facility	PUREX Facility
Assessment report	Life of PUREX Facility	PUREX Facility
Unit restart notification	Life of PUREX Facility	PUREX Facility
Spills, Discharges, and Leaks Reports and Records:		
None required	NA	NA
Closure Reports and Records:		
Certification of closure	Life of Hanford Facility	PUREX Facility
Survey plat	NA	NA
Closure cost estimates (latest)	Life of PUREX Facility	PUREX Facility
Postclosure Reports and Records:		
None required	NA	NA

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Table 12-1. Reports and Records. (sheet 3 of 3)

Item	Storage	
	Retention time	Location[a]
Miscellaneous Support Reports and Records:		
Annual report	Life of PUREX Facility	PUREX Facility
Biennial report	NA	NA
Training documentation	Life of PUREX Facility	PUREX Facility
Liability coverage documentation	NA	NA

[a]Located at the PUREX Facility for 5 years from the date of origination, then transferred to a Hanford Facility central retention area for the remainder of the retention period. At the time of closure, all PUREX Storage Facility environmental records will be transferred to a Hanford Facility retention area.

[b]NA = not applicable.

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13.0 OTHER RELEVANT LAWS [J]

The PUREX Storage Tunnels are operated in compliance with applicable laws and regulations. Relevant environmental laws and regulations have been reviewed, necessary notifications have been made, and necessary approvals or permits have been obtained. No additional approvals or permits for the PUREX Storage Tunnels that would require action by either the EPA or Ecology have been identified.

This chapter provides a summary of the regulatory review performed to assist Ecology in determining that the PUREX Storage Tunnels have met its obligations with respect to other federal or state laws. The major environmental laws evaluated include the following, all as amended:

- *Atomic Energy Act of 1954*
- *Clean Air Act of 1977*
- *Clean Water Act of 1977*
- *Endangered Species Act of 1973*
- *Fish and Wildlife Coordination Act of 1934*
- *National Historic Preservation Act of 1966*
- *Wild and Scenic Rivers Act of 1968.*

In addition, a summary of other requirements that could apply is provided. Full references for each of these acts are included in Chapter 15.0.

13.1 ATOMIC ENERGY ACT OF 1954

The *Atomic Energy Act* provides that the U.S. Atomic Energy Commission (succeeded by the U.S. Department of Energy for conduct of nuclear related and research and development activities at the Hanford Site) is authorized to develop and implement regulations to govern activities related to the design, location, and operation of U.S. Department of Energy sites, to protect health, and to minimize danger to life or property. The radioactive component of mixed waste is interpreted by the U.S. Department of Energy to be regulated under the *Atomic Energy Act*; the nonradioactive dangerous component of mixed waste is interpreted to be regulated under the RCRA and WAC 173-303.

The U.S. Department of Energy has issued several orders to govern the activities of its sites and to manage the health protection aspects of mixed waste. These orders provide for a consistent approach to managing waste that results from U.S. Department of Energy activities. The orders set radiation exposure limits and concentration guidelines to minimize exposure to radiation and detail standards and procedures for managing mixed waste. The PUREX Storage Tunnels waste storage operations will be carried out in accordance with these orders.

13.2 CLEAN AIR ACT OF 1977

The *Clean Air Act* protects the public health by establishing national ambient air-quality standards, setting standards for abating existing air pollution, and preventing further deterioration of air quality. These standards are implemented and enforced primarily by state and local authorities. The PUREX Storage Tunnels comply with the applicable federal, state, and local requirements to control and abate air pollution. The applicable regulations include the following:

- *National Emission Standards for Hazardous Air Pollutants* (40 CFR 61) and National Emission Standards for Radionuclide Emissions From Department of Energy Facilities (40 CFR 61, Subpart H)
- Air pollution control regulations (WAC 173-400 through 495) issued under the authority of the *Washington Clean Air Act of 1967*
- *Radiation Protection-Air Emissions* (WAC 246-247) which promulgates the policies set forth in Chapter 70.98 of the *Revised Code of Washington*, *Nuclear Energy and Radiation*, issued under the authority of the *Washington Clean Air Act*.
- Benton-Franklin-Walla Walla Counties Air Pollution Control Authority regulation (1980).

The PUREX Storage Tunnels comply with pollution control standards established by General Regulation 80-7 of the Benton-Franklin-Walla Walla Counties Air Pollution Control Authority (1980).

Tunnel Number 1 does not have a stack in operation; therefore, it is not a registered stack under the *Washington Clean Air Act*. Tunnel Number 2 has an operating stack (296-A-10), and the stack is registered with the state of Washington. The only potentially hazardous pollutants identified for this stack are radionuclides. All exhaust from the tunnel stack is filtered through a single-stage, high-efficiency particulate air filter before release. This ensures that the emissions generated from this stack are maintained at levels that will not adversely impact the environment.

13.3 CLEAN WATER ACT OF 1977

Operation of the PUREX Storage Tunnels will not result in the discharge of any liquid effluents that would require a National Pollutant Discharge Elimination System permit; therefore, no permits or reviews pursuant to the *Clean Water Act* are applicable.

13.4 ENDANGERED SPECIES ACT OF 1973

The PUREX Storage Tunnels are located in the 200 East Area of the Hanford Facility (Chapter 2.0 provides site location information). This area has been developed extensively during past construction activities and during nuclear fuel and chemical processing activities. The site of the PUREX Storage Tunnels cannot be considered an undisturbed area or a major habitat for native plant and animal species. Also, this area is a very small fraction of the Hanford Facility and hence would not play a significant role in the ecology of the Hanford Facility. No listed or proposed endangered or threatened species or their habitats are expected to be affected by the PUREX Storage Tunnels activities.

13.5 FISH AND WILDLIFE COORDINATION ACT OF 1934

Operation of the PUREX Storage Tunnels does not involve the impoundment, diversion, or other control or modification of any body of water. Therefore, no permits or reviews pursuant to this statute are applicable.

13.6 NATIONAL HISTORIC PRESERVATION ACT OF 1966

The PUREX Storage Tunnels affect no areas that are eligible for nomination to the National Register of Historic Places. Construction of the PUREX Storage Tunnels occurred before the passage of the *National Historic Preservation Act* (construction completed in 1956 and 1964 for Tunnel Number 1 and Number 2, respectively). Any historical information present at the location during the time of construction of the PUREX Storage Tunnels already has been altered or removed.

Any future excavations associated with the PUREX Storage Tunnels will be reviewed for the presence of archaeological resources in accordance with regulations issued pursuant to, or other requirements of, the *American Antiquities Preservation Act of 1906*; the *American Indian Religious Freedom Act of 1978*; the *Historic Sites, Buildings and Antiquities Act of 1935*; the *Archaeological and Historic Preservation Act of 1960*; and the *Archaeological Resources Protection Act of 1979*. No known cultural resource impacts have occurred from PUREX Storage Tunnels activities.

13.7 WILD AND SCENIC RIVERS ACT OF 1968

Operation of the PUREX Storage Tunnels does not affect any rivers presently designated under the *Wild and Scenic Rivers Act*.

13.8 OTHER REQUIREMENTS

The application of insecticides and herbicides on or in the immediate vicinity of the PUREX Storage Tunnels will be conducted in compliance with the *Federal Insecticide, Fungicide, and Rodenticide Act of 1975*, the *Toxic Substances Control Act*, and the applicable provisions of the Washington State Water Quality Standards, WAC 173-201.

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14.0 CERTIFICATION [K]

The following certification, required by WAC 173-303-810(13), for all applications and reports submitted to Ecology is hereby included:

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 — 12/4/91

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

Thomas M. Anderson — 11/22/91

Co-operator — Date
Thomas M. Anderson, President
Westinghouse Hanford Company

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15.2 CODE OF FEDERAL REGULATIONS AND FEDERAL REGISTER

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10 CFR 962, *Radioactive Waste: Byproduct Material*, Title 10, Code of Federal Regulations, Part 962, as amended, U.S. Nuclear Regulatory Commission, Washington, D.C.

29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*, Title 29, Code of Federal Regulations, Part 1910.120, as amended, Occupational Safety and Health Administration, Washington, D.C.

40 CFR 52, *Approval and Promulgation of Implementation Plans*, Title 40, Code of Federal Regulations, Part 52, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 61, *National Emission Standards for Hazardous Air Pollutants*, Title 40, Code of Federal Regulations, Part 61, as amended, U.S. Environmental Protection Agency, Washington, D.C.

40 CFR 263, *Standards Applicable to Transporters of Hazardous Waste*, Title 40, Code of Federal Regulations, Part 263, as amended, U.S. Environmental Protection Agency, Washington, D.C.

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40 CFR 302, *Designation, Reportable Quantities, and Notification*, Title 40, Code of Federal Regulations, Part 302, as amended, U.S. Environmental Protection Agency, Washington, D.C.

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15.3 FEDERAL AND STATE ACTS

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Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 26 USC 1 et seq.

Clean Air Act of 1977, 42 USC 7401 et seq.

Clean Water Act of 1977, 33 USC 1251 et seq.

Endangered Species Act of 1973, 16 USC 1531 et seq.

Federal Insecticide, Fungicide, and Rodenticide Act of 1975, 7 USC 136 et seq.

Fish and Wildlife Coordination Act of 1934, 16 USC 661 et seq.

Historic Sites, Buildings and Antiquities Act of 1935, 16 USC 461-467 et seq.

National Historic Preservation Act of 1966, 16 USC 470 et seq.

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Wild and Scenic Rivers Act of 1968, 16 USC 1271 et seq.

15.4 WASHINGTON ADMINISTRATIVE CODE

WAC 173-201, *Water Quality Standards for Surface Waters of the State of Washington*, Washington State Department of Ecology, Olympia, Washington.

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15.5 THE U.S. DEPARTMENT OF ENERGY ORDERS

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5820.2A, *Radioactive Waste Management*, U.S. Department of Energy, Washington, D.C.

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APPENDICES

VOLUME 1

VOLUME 2

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APPENDIX 2A

HANFORD SITE MAPS

APPENDIX 2A

HANFORD SITE MAPS

H-6-958 Overall Hanford Facilities (Hanford Site Map)*

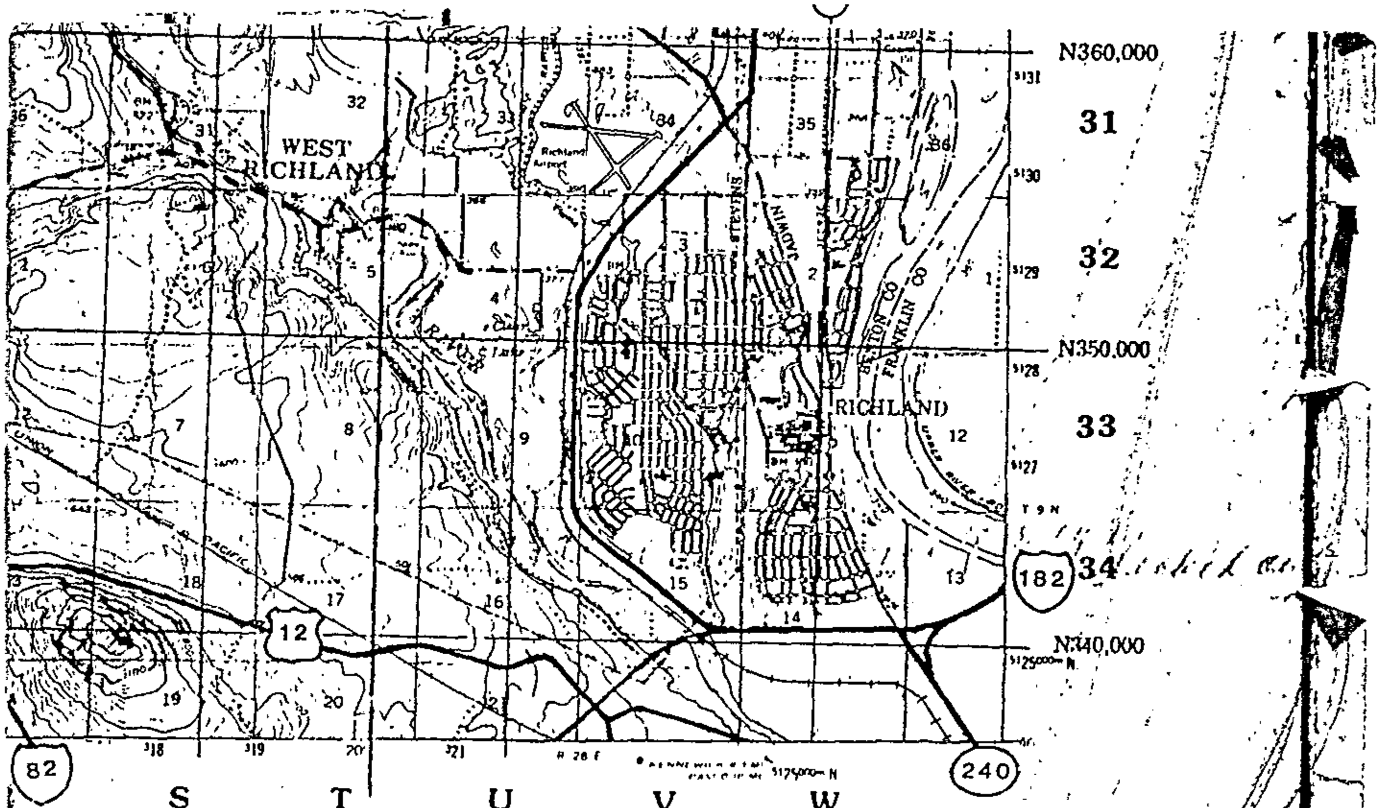
H-2-79998 Topographic Map--PUREX Storage Tunnels.

Legal Description--PUREX Storage Tunnels.

* The Hanford Site Map (H-6-958) is being updated. The update will include two additional portions as part of the Hanford Site. These portions are:

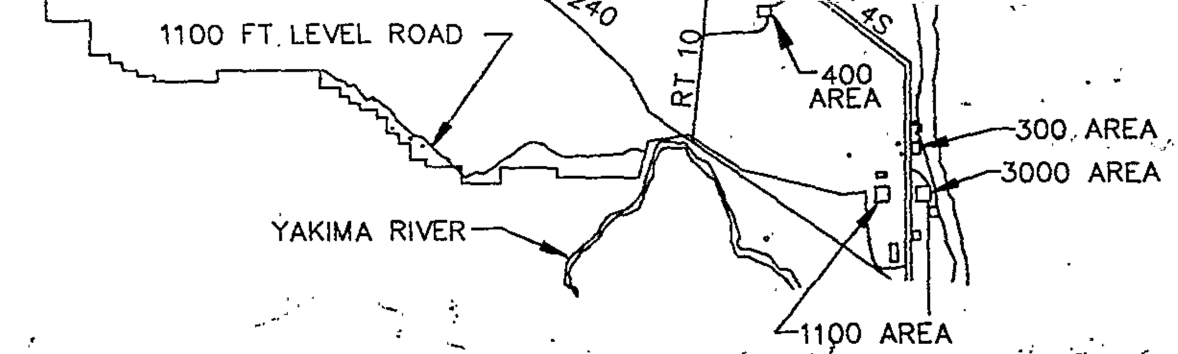
(1) The 1100 Area, as outlined--map grid coordinates V,29

(2) The small portion, as outlined--map grid coordinates W,29, located west of the marked 3000 Area.



DRAWING APPROVALS	DATE	
APPD FOR QUALITY ASSURANCE		U. S. Department of Energy Richland Operations Office
APPD	3/89	Westinghouse Hanford Company
APPD		OVERALL HANFORD FACILITIES
APPD		
RESPONSIBLE ENGINEER R.L. MARTELL		
DRAFTING APPD		
CHECKED		
DRAWN K.D. JUNT		SCALE AS SHOWN · 600 GEN · INDEX NO 0100
CLASSIFICATION NONE · BY NOT REQ'D		DRAWING NO H-6-958 · SHEET NO. 1 · SHEETS 1

91 PER	2
N-145778	1
SCRIPTION	LAST REV 2



KEY PLAN

SCALE: NONE

IMPACT LEVEL 4 | EDT 151447

DRAWN	C. ROBINSON	DATE 5-2-90
CHECKED	Larry J. Robinson	7-26-90
DFTG APVD	W. Coleman	7-26-90
COG ENGR	J.R. Ballou	7-26-90
QA		
OTHER	S. Thurston for J.M. Pailo	7/26/90
OTHER		
OTHER		
APVD FOR IMPLEMENTATION		
BY FOR:		DATE

U.S. DEPARTMENT OF ENERGY
Richland Operations Office
Westinghouse Hanford Company

TOPOGRAPHIC MAP
PUREX STORAGE TUNNELS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	218E	0103,0403 0500	H-2-79998	0

SCALE AS SHOWN | SHEET 1 OF 1

2 | CHK PRINT | DATE | COMMENT PRINT | DATE | 1

A

DWG NO H-2-79998 | SH 1 OF 1 | REV 0

UNIMPROVED

Legal Description
PUREX Storage Tunnels

OR: 0.999914802
ACTOR: 0.99994856

MONUMENTS AND R COORDINATES	
487.144	E 575,280.317
487.089	E 575,271.845
540.714	E 575,262.292
544.489	E 575,261.063
544.344	E 575,260.744
957.169	E 575,297.740
.957.177	E 575,257.851
438.191	E 575,296.325
.544.175	E 575,236.579
,422.970	E 575,236.900
,417.285	E 575,249.038
,417.302	E 575,256.727
,524.000	E 575,477.358
,860.011	E 575,479.179

NOTES

COORDINATES AND BASIS FOR BEARINGS ARE FROM GLOBAL POSITIONING SYSTEM MEASUREMENTS ON HANFORD 200E PLANT MONUMENTS 2E-27 AND 2E-31, BASED ON MONUMENT PUG 1947 NGS GEODETIC CONTROL DIAGRAM WALLA WALLA.

SITE BOUNDARY SURVEY MADE WITH H.P. 3820-A TOTAL STATION. PORTION OF BOUNDARY WAS A CLOSED TRAVERSE THROUGH MONUMENTS 2E-27 AND 2E-31. BUILDING CORNER MONUMENTS WERE DOUBLE TIED FROM TRAVERSE CORNERS, ALL DIMENSIONS ARE GROUND LEVEL DISTANCES EXPRESSED IN FEET.

ALL COORDINATES ARE BASED ON THE WASHINGTON COORDINATE SYSTEM OF 1983, SOUTH ZONE (WCS 83S) PER 58.20 RCW.

SITE LOCATION WITHIN SECTION OR SECTIONS IS SCALED FROM A 7.5' QUADRANGLE MAP, USING LATITUDE AND LONGITUDE.

⊕ INDICATES MAGNETICALLY LOCATABLE 3" ALUMINUM MONUMENT WITH 2.5 FOOT ALUMINUM SHAFT, MARKED WITH SITE DESIGNATION No., CORNER No. AND SURVEYOR IDENTIFICATION.

SURVEYOR'S CERTIFICATE

THIS MAP CORRECTLY REPRESENTS A SURVEY MADE UNDER MY DIRECT SUPERVISION IN CONFORMANCE WITH THE REQUIREMENTS OF THE SURVEY RECORDING ACT, CHAPTER [illegible] OF 1973 AT THE REQUEST OF THE U.S. DEPARTMENT OF ENERGY.

10/24/91
DATE

ROBERT [illegible] HACKWITH
WASHINGTON REGISTRATION No. 11003

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RICHLAND,

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APPENDIX 2B

CONSTRUCTION PHOTOGRAPHS

APPENDIX 2B

CONSTRUCTION PHOTOGRAPHS

CONTENTS

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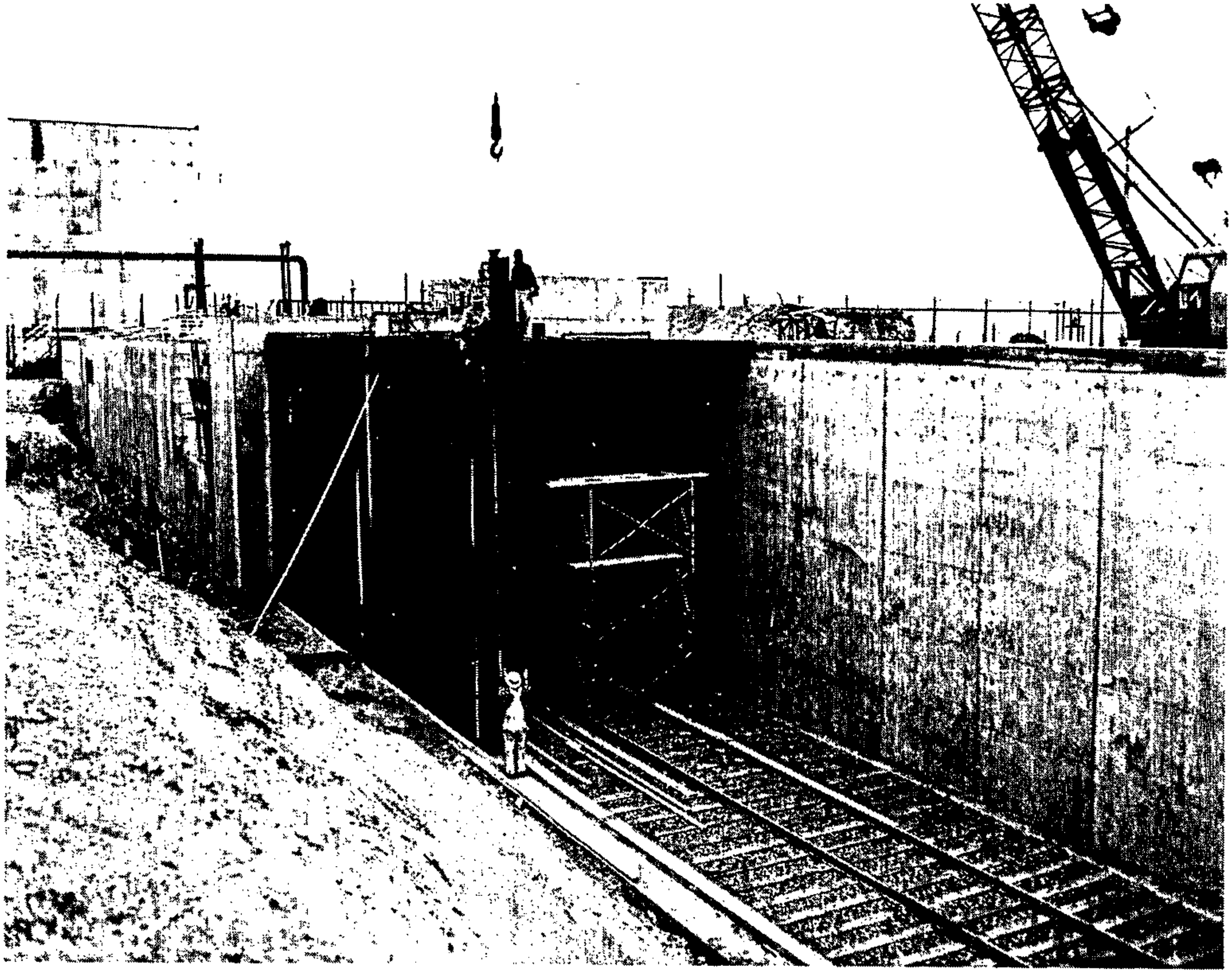
APP 2B-1



Tunnel No. 1 Construction Photograph Showing Placement of Structural Timbers.

Tunnel No. 1, Photo 1

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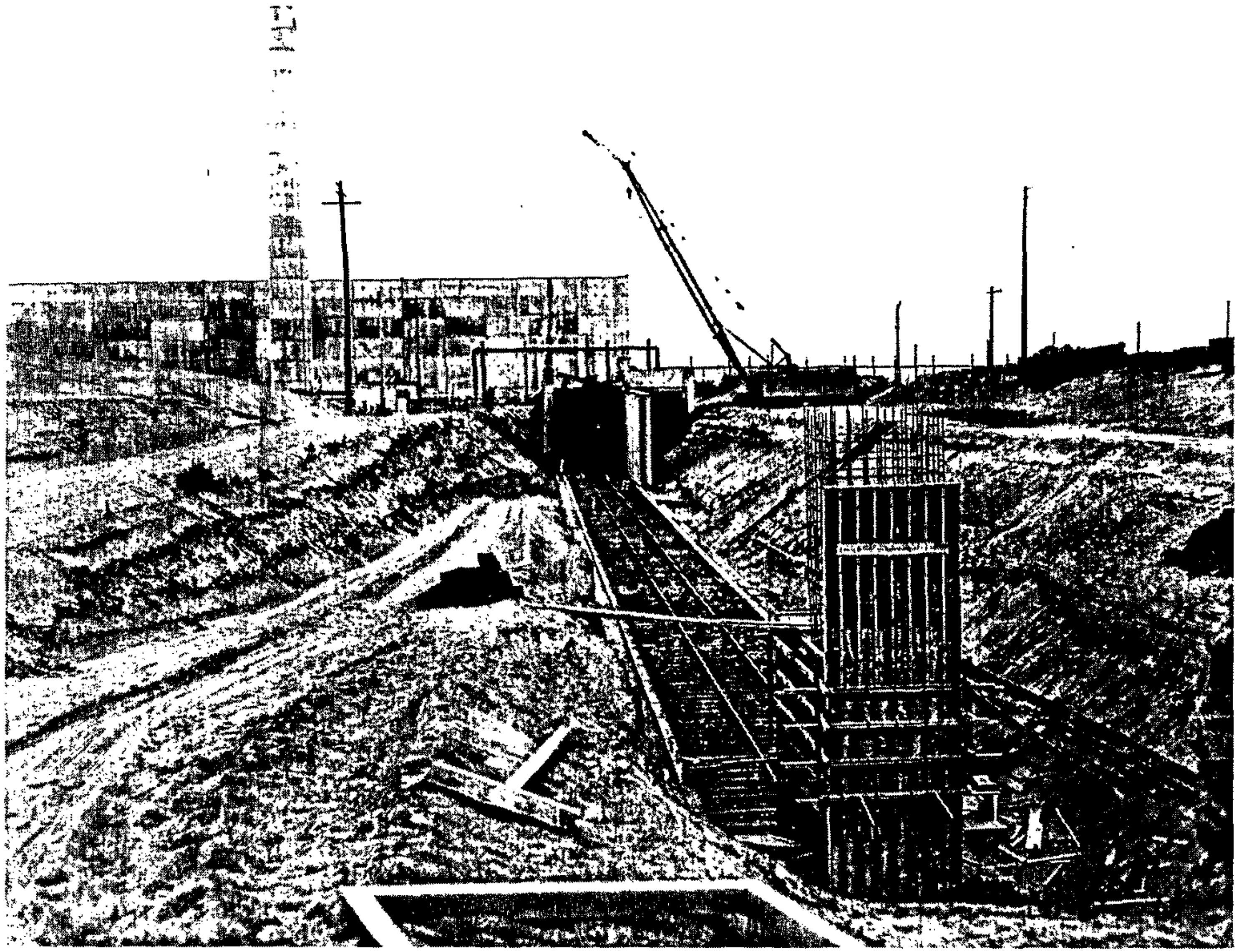
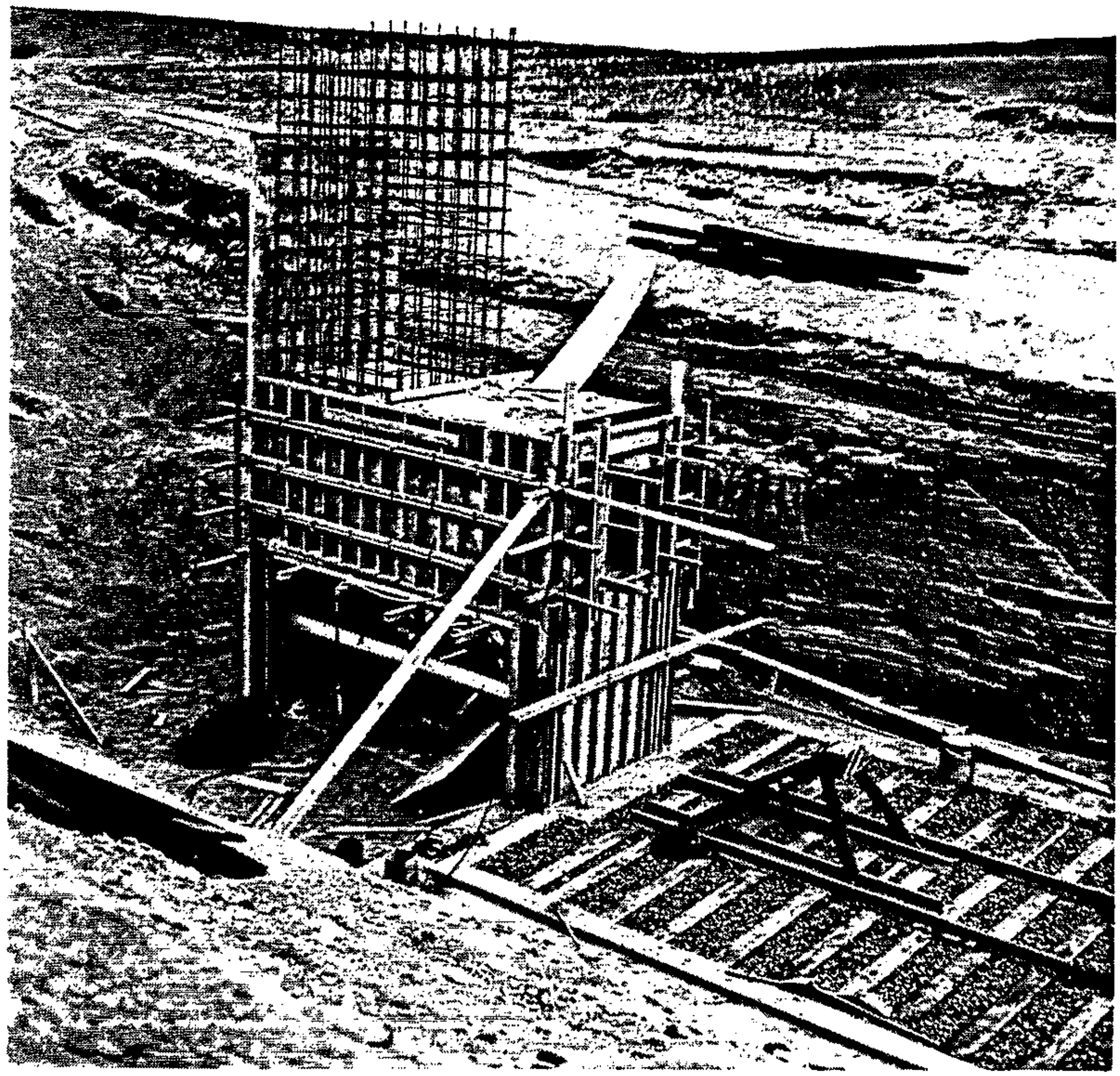
12/09/91

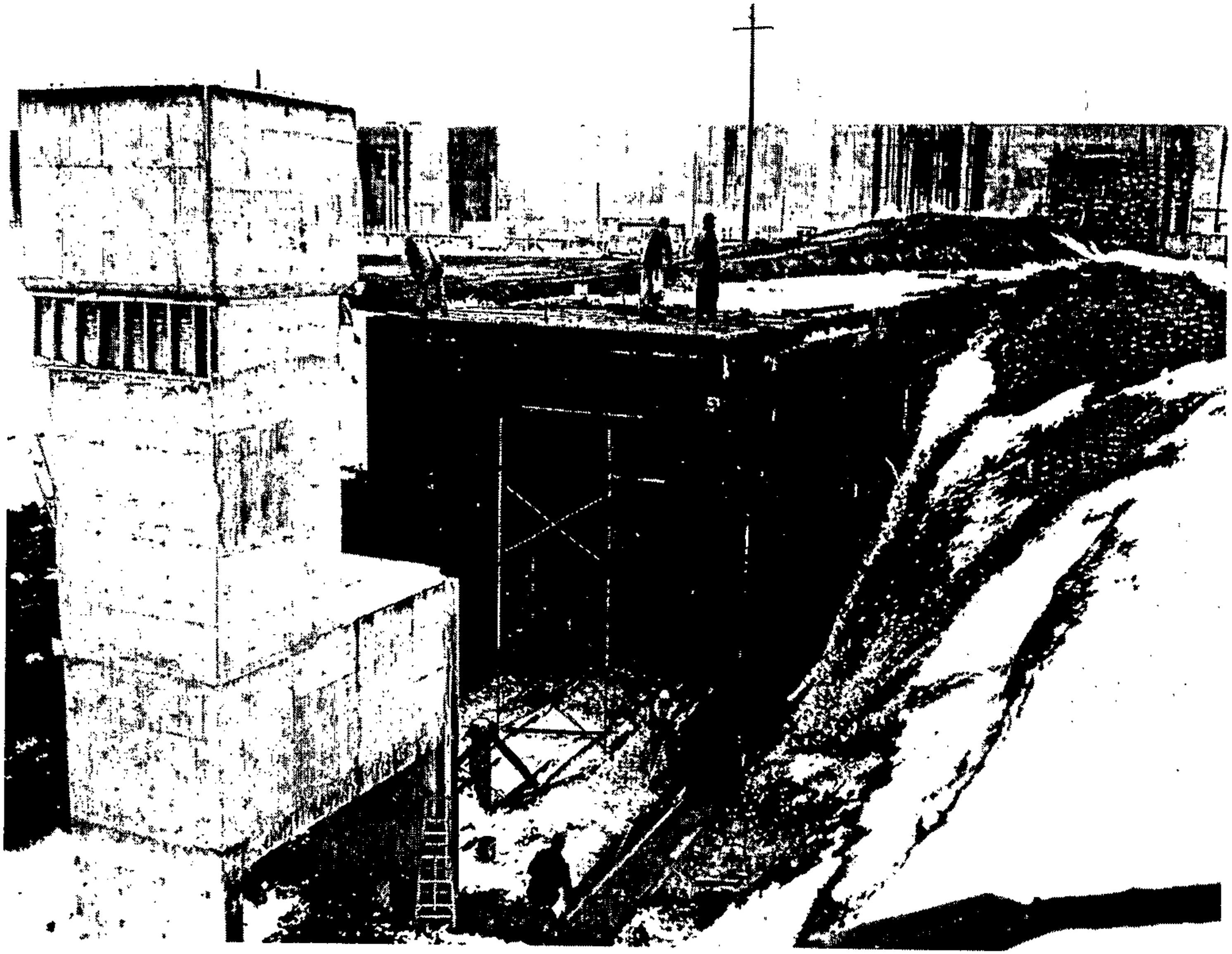


Tunnel No. 1 Construction Photograph Showing Excavation, Track, and Concrete Structure.

Tunnel No. 1, Photo 2

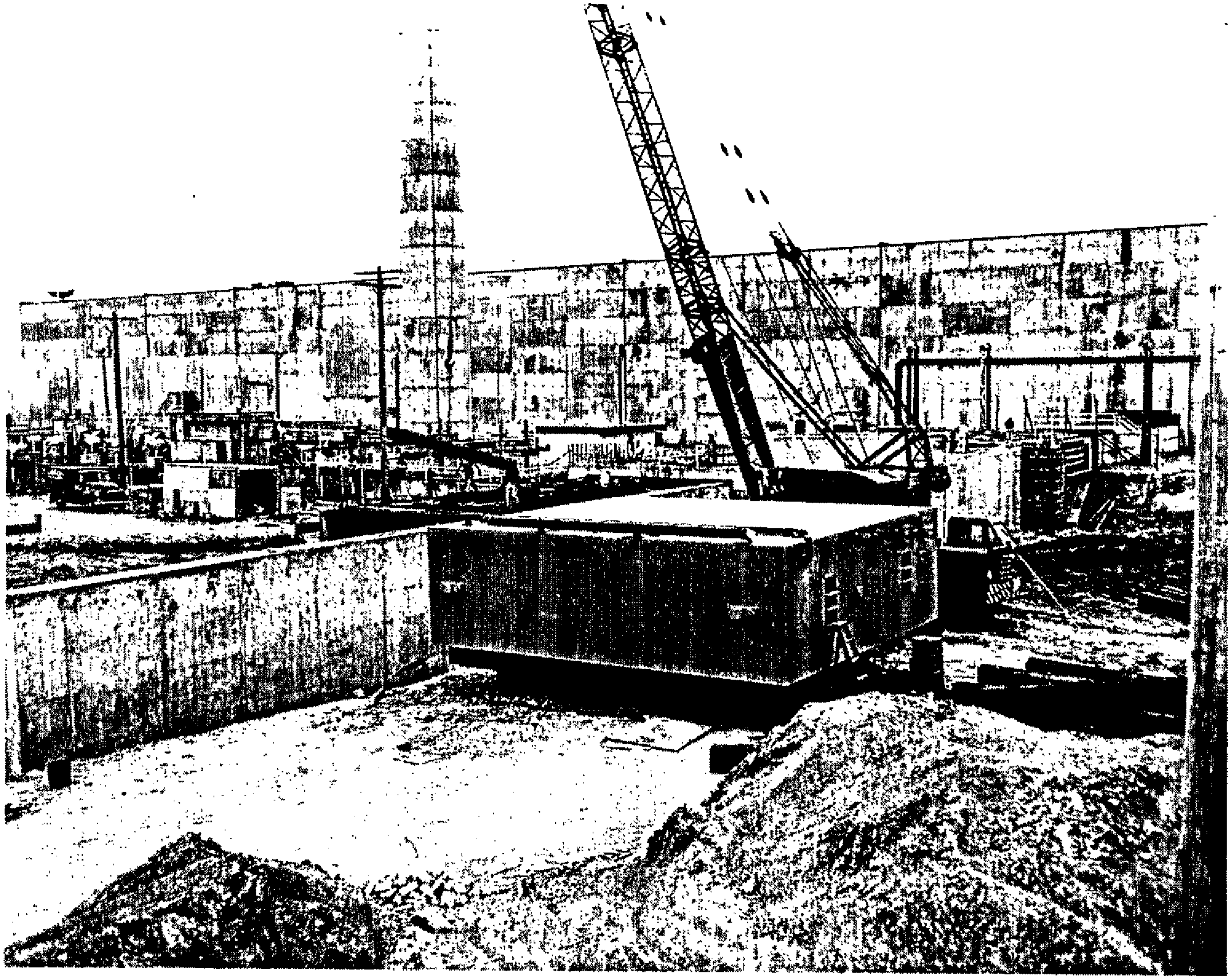


Tunnel No. 1 Photograph Showing Construction of Vent Shaft and Railcar Bumper.
Tunnel No. 1, Photo 3



Tunnel No. 1 Photograph Showing Final Placement of Structural Timbers and Completed Vent Shaft.

Tunnel No. 1, Photo 4



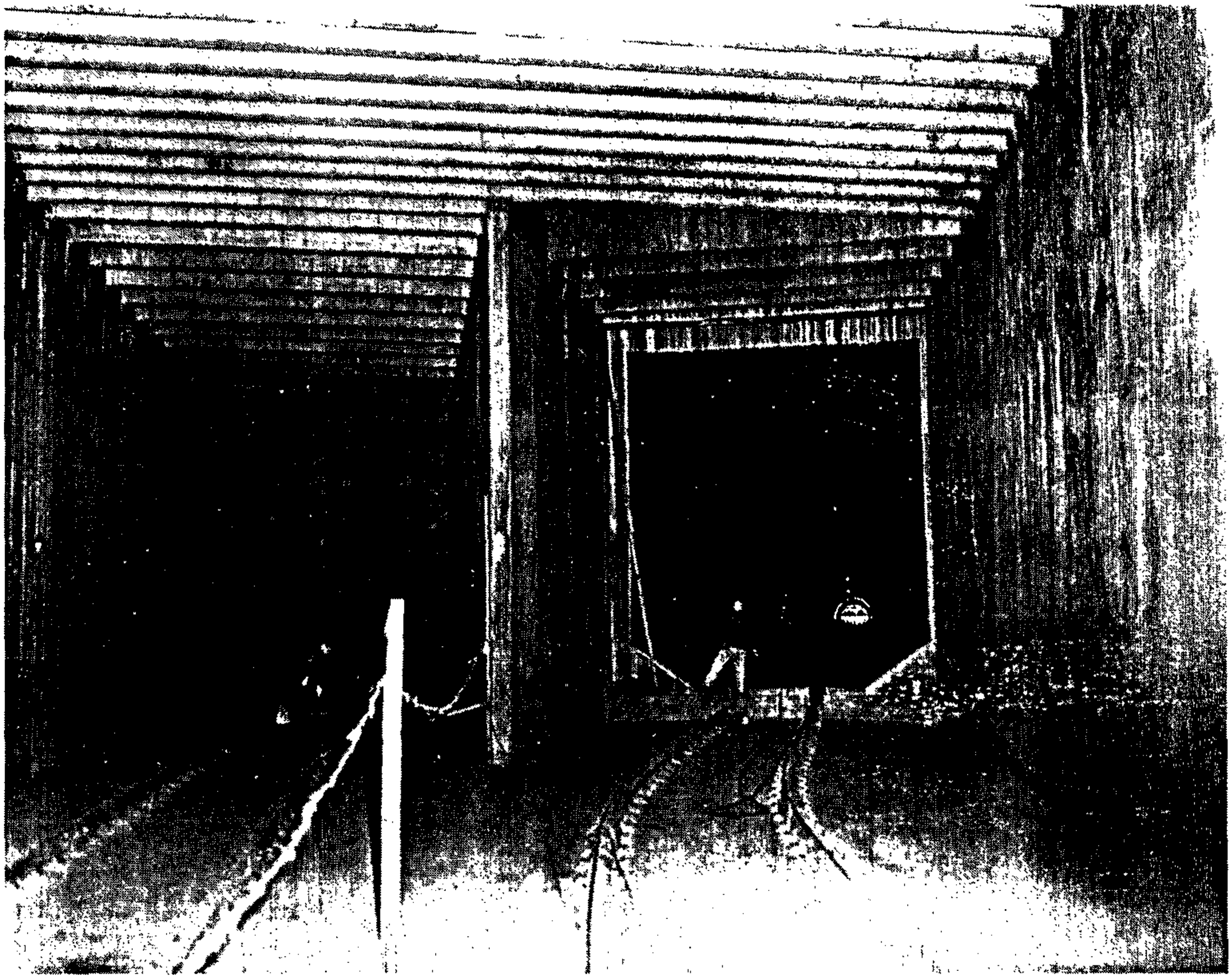
Tunnel No. 1 Photograph Showing Water-Fillable Door, Typical to Both Tunnels.

Tunnel No. 1, Photo 5

9 2 1 2 4 5 5 5

Tunnel No. 1 Photograph Taken Following Completion of Earth Barrier.

APP 2B-7



Tunnel No. 2 Photograph Showing Southern Portion of PUREX Plant Railroad Tunnel, and Interior of Tunnel No. 2 (under construction).

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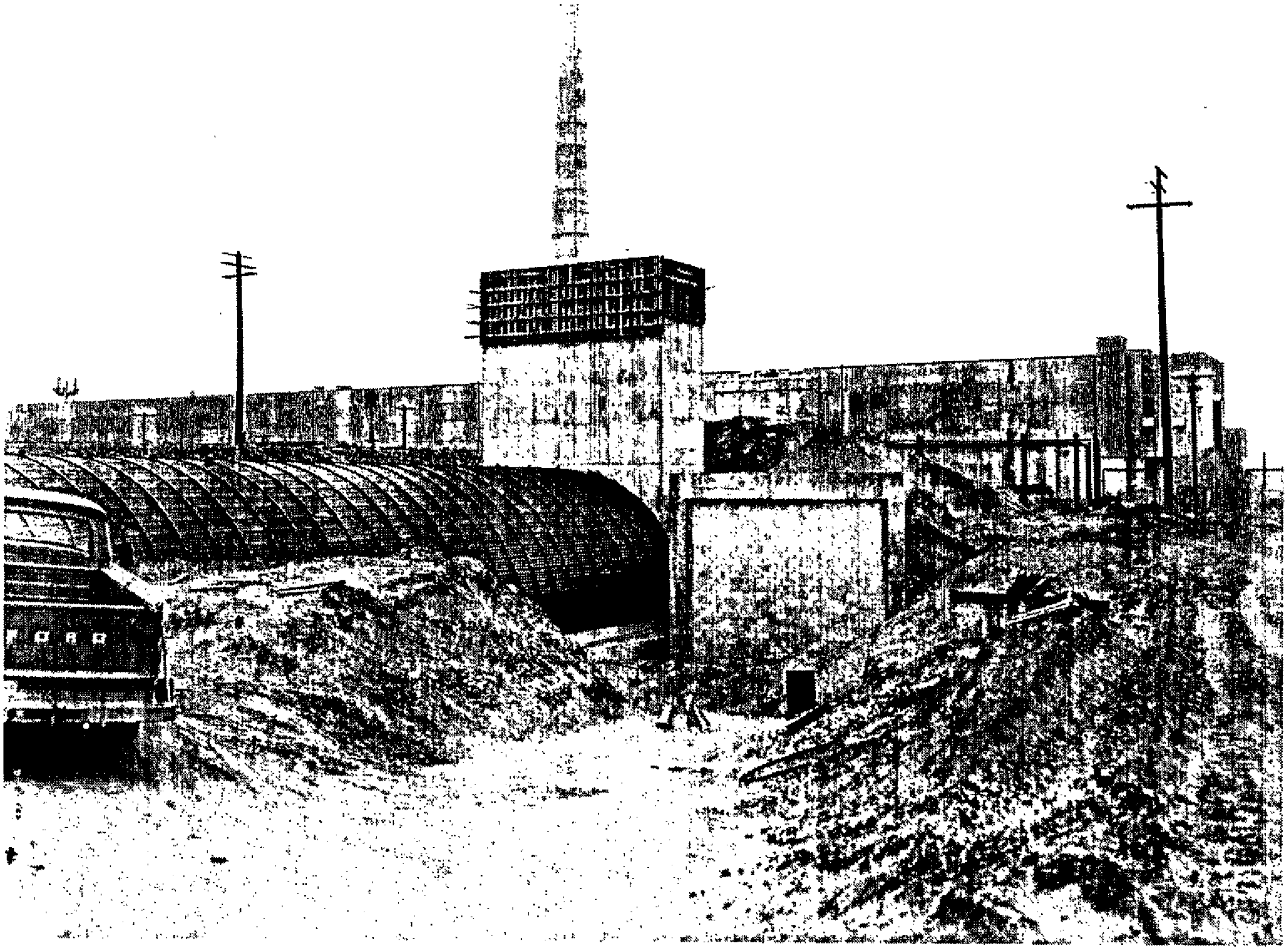
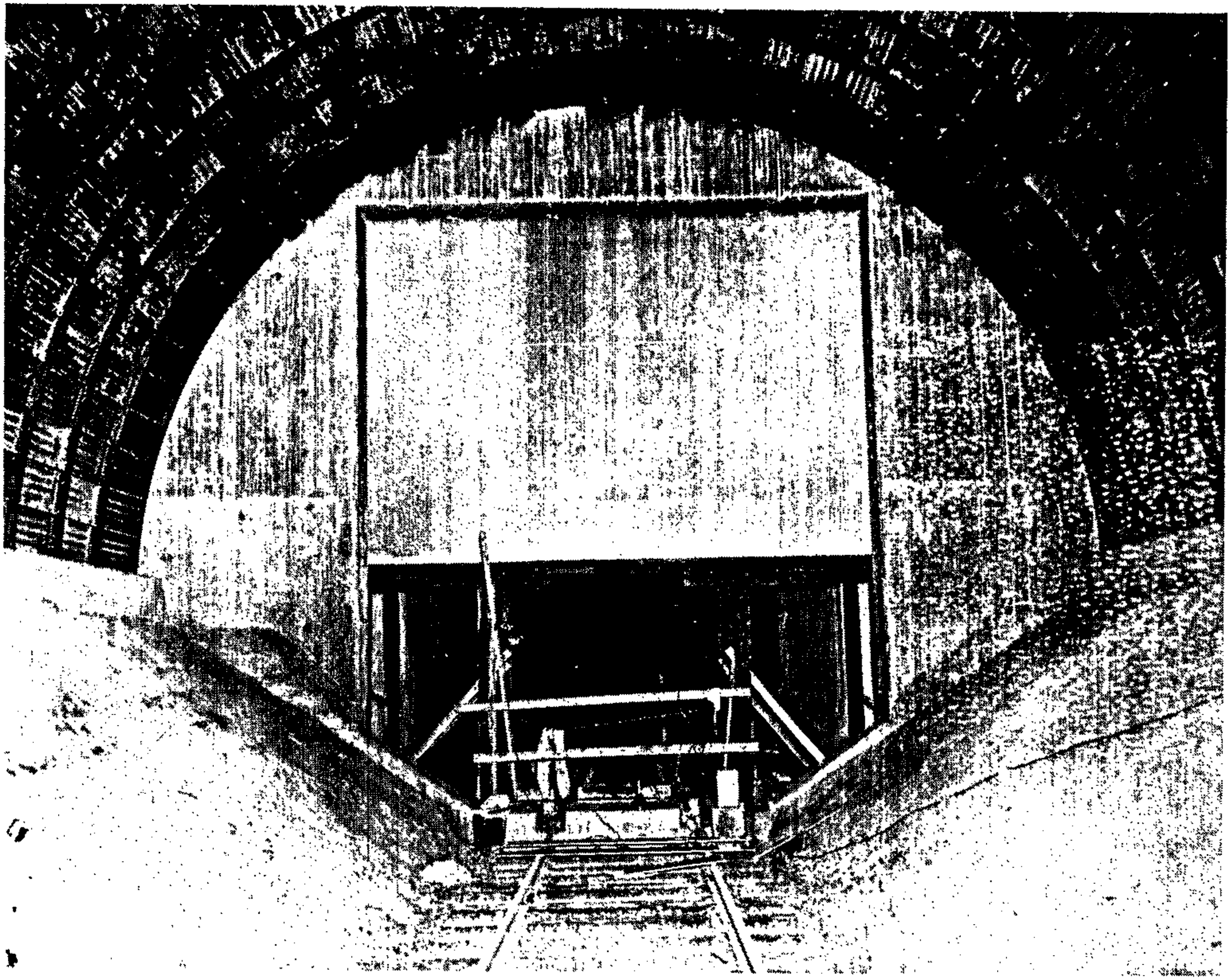
12/09/91



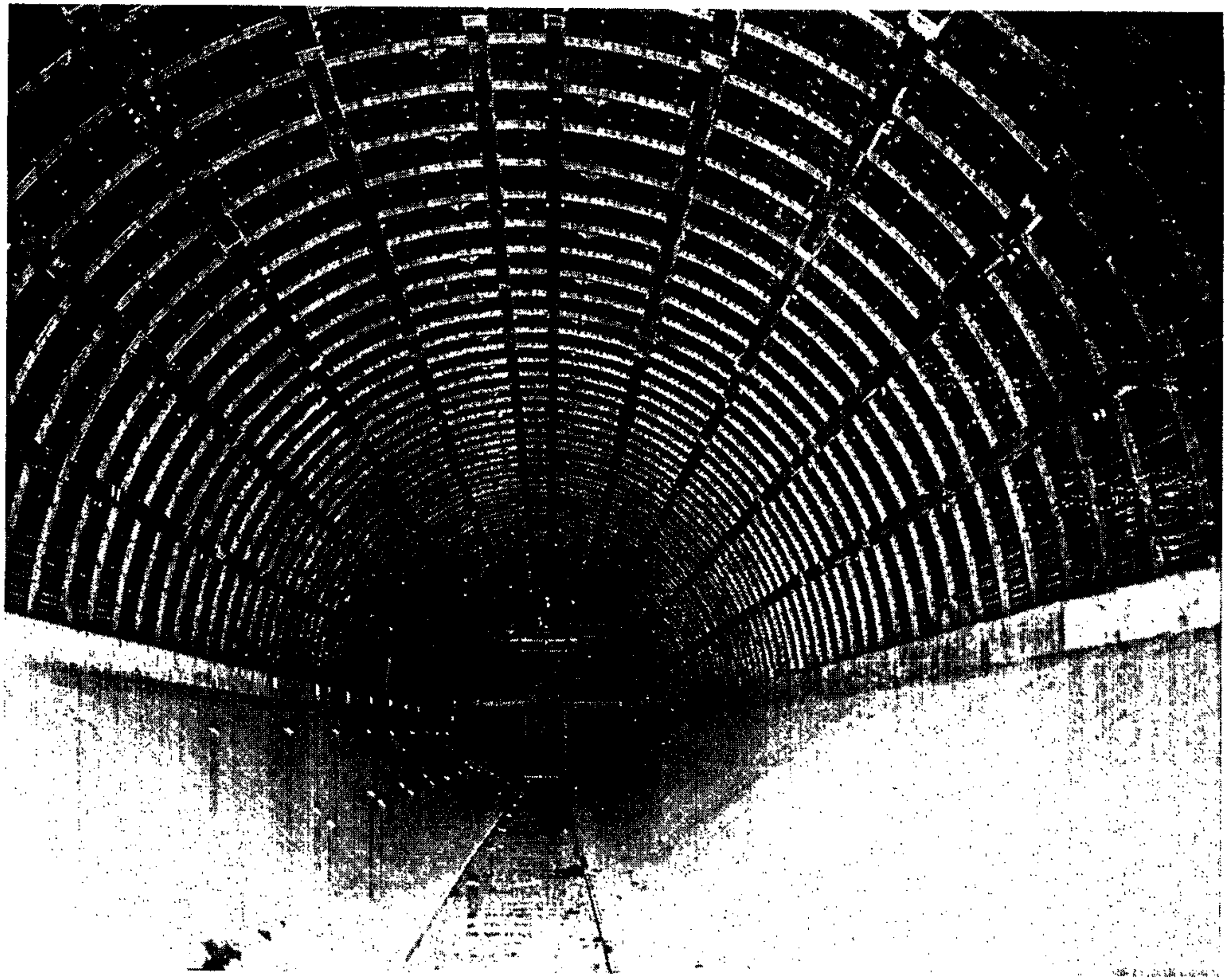
Tunnel No. 2 Construction Photograph Showing Water-Fillable Door Housing, Future Tunnel Entrance, and Metal Structure of the Tunnel.

Tunnel No. 2, Photo 2



Tunnel No. 2 Photograph Showing Tunnel Side Slopes and Water-Fillable Door in Partially Closed Position.

Tunnel No. 2, Photo 3



Tunnel No. 2 Construction Photograph Showing Interior of Tunnel Looking South.

Tunnel No. 2, Photo 4

9 2 1 2 4 . 5 0

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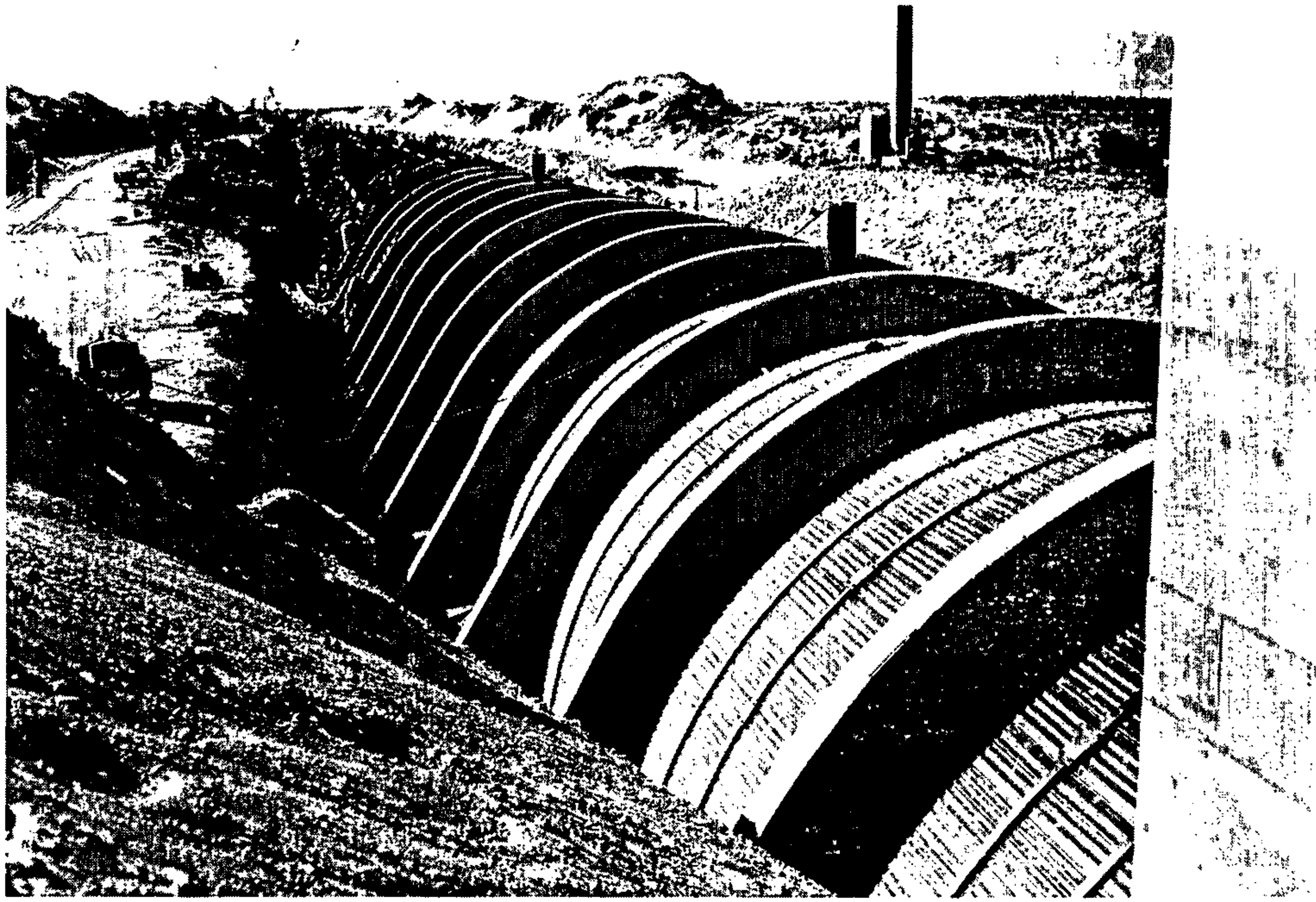
APP 2B-11



Tunnel No. 2 Photograph Showing Construction of Concrete Arches. Tunnel No. 1 Vent Stack in Foreground.

Tunnel No. 2, Photo 5

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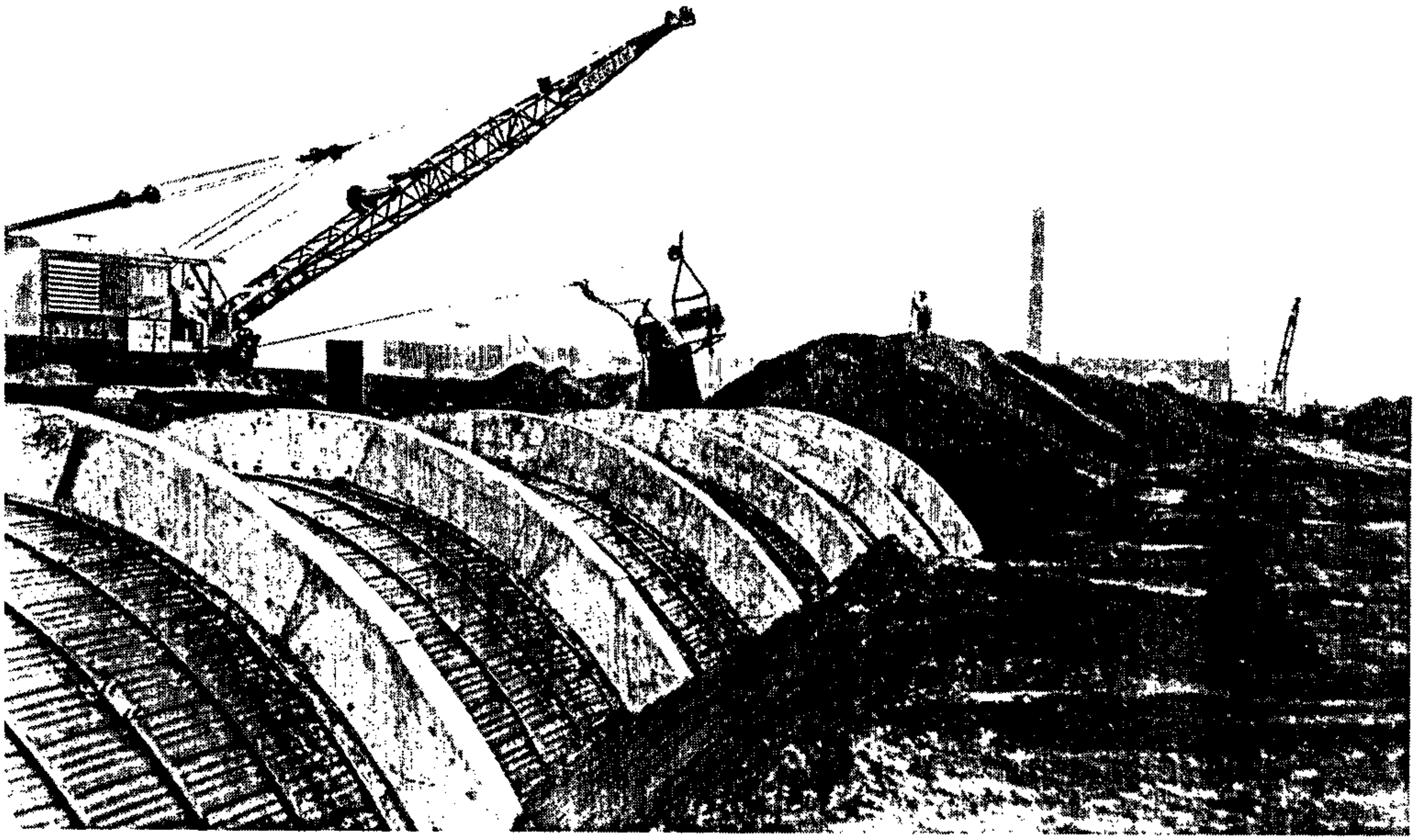
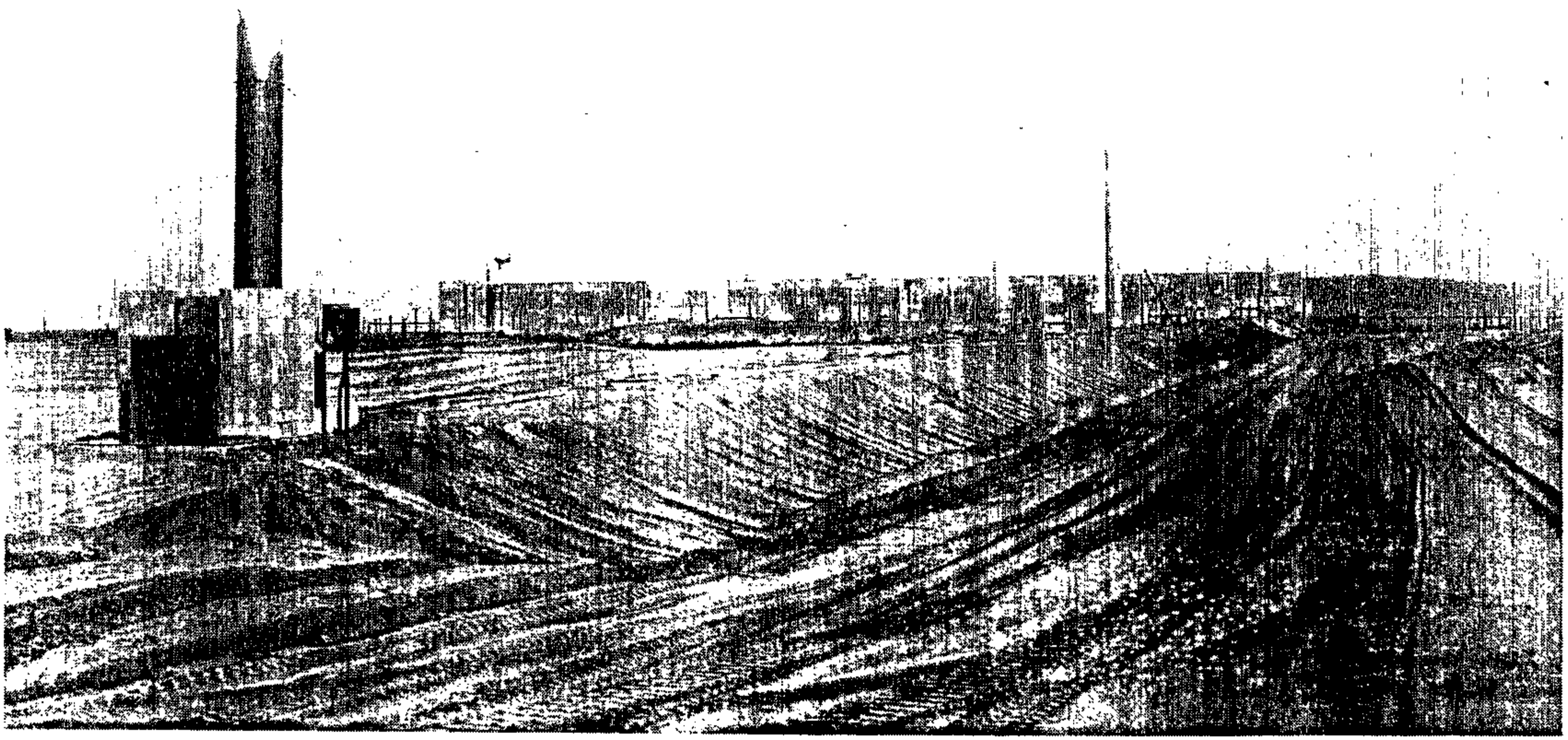
12/09/91



Tunnel No. 2 Placement of Earth Barrier.

Tunnel No. 2, Photo 6

APP 2B-13



Tunnel No. 2 Photograph Taken Following Final Completion of Earth Barrier.

Tunnel No. 2, Photo 7

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