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Revision 0

Surveillance and Maintenance Plan for the Plutonium Uranium Extraction (PUREX) Facility

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Richland, Washington

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CONTENTS

1.0 INTRODUCTION 1-1

2.0 FACILITY ACTIVITIES 2-1
2.1 HISTORICAL BACKGROUND 2-1
2.2 FACILITY DESCRIPTION 2-1
2.2.1 PUREX Storage Tunnels 1 and 2 2-1
2.2.2 Annual PUREX Storage Tunnels Inspection 2-7
2.2.3 Inactive Waste Sites 2-7
2.2.4 Operating System Description 2-7
2.3 SURVEILLANCE ACTIVITIES 2-9
2.3.1 Environmental Monitoring of the 291-A-1 Main Stack 2-9
2.3.2 Quarterly Surveillances 2-9
2.3.3 Routine Surveillances 2-10

3.0 MAINTENANCE IMPLEMENTATION PLAN 3-1
3.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION 3-1
3.2 TRAINING AND QUALIFICATION OF MAINTENANCE PERSONNEL 3-1
3.2.1 On-the-Job Training 3-1
3.2.2 Training in Root-Cause Analysis 3-1
3.3 MAINTENANCE FACILITIES, EQUIPMENT, AND TOOLS 3-2
3.4 TYPES OF MAINTENANCE 3-2
3.4.1 Types of Maintenance and Frequency 3-2
3.5 MAINTENANCE PROCEDURES 3-2
3.6 PLANNING, SCHEDULING, AND COORDINATION OF MAINTENANCE 3-3
3.7 CONTROL OF MAINTENANCE ACTIVITIES 3-3
3.8 POST-MAINTENANCE TESTING 3-3
3.9 PROCUREMENT OF PARTS, MATERIALS, AND SERVICES 3-3
3.10 MATERIAL RECEIPT, INSPECTION, HANDLING, STORAGE, RETRIEVAL, AND ISSUANCE 3-3
3.11 CONTROL AND CALIBRATION OF MEASURING AND TEST EQUPMENT 3-3
3.12 MAINTENANCE TOOLS AND EQUIPMENT CONTROL 3-4
3.13 FACILITY INSPECTION 3-4
3.14 MANAGEMENT INVOLVEMENT 3-4
3.15 MAINTENANCE HISTORY 3-4
3.16 ANALYSIS OF MAINTENANCE PROBLEMS 3-5
3.17 MODIFICATION WORK 3-5
3.17.1 Maintenance Program Interface with Modifications 3-5
3.18 SEASONAL FACILITY PRESERVATION REQUIREMENTS 3-5

CONTENTS (cont.)

4.0 QUALITY ASSURANCE 4-1

5.0 TRAINING AND QUALIFICATION 5-1

6.0 ENVIRONMENTAL COMPLIANCE/PROTECTION 6-1
6.1 THE PUREX PLANT STORAGE TUNNELS 1 AND 2 6-1
6.2 PUREX FACILITY AIR PERMITTING 6-6
6.3 REGULATORY FILES/DOCUMENTATION 6-6
6.4 HAZARDOUS MATERIAL PROTECTION 6-8

7.0 RADIOLOGICAL CONTROLS 7-1

8.0 EMERGENCY MANAGEMENT 8-1
8.1 EMERGENCY PREPAREDNESS 8-1
8.2 EMERGENCY PLANNING 8-1
8.3 EMERGENCY RESPONSE 8-1
8.4 EMERGENCY PREVENTION 8-2
8.5 INCIDENT RESPONSE 8-2

9.0 HEALTH AND SAFETY 9-1
9.1 FIRE HAZARD ANALYSIS 9-1
9.2 OCCUPATIONAL SAFETY AND HEALTH 9-1

10.0 SAFEGUARDS AND SECURITY 10-1
10.1 SECURITY 10-1

11.0 COST AND SCHEDULE 11-1
11.1 SCHEDULE 11-1

12.0 REFERENCES 12-1

APPENDICES

A HAZARDOUS MATERIAL REMAINING AT THE PUREX FACILITY A-1

CONTENTS (cont.)

FIGURES

2-1. PUREX Facility S&M Site Plan 2-2
2-2. PUREX Ventilation Stack Locations 2-3
2-3. PUREX Pipe and Operating Gallery Surveillance Route (West End) 2-11
2-4. PUREX Pipe and Operating Gallery Surveillance Route (East End) 2-12
2-5. PUREX Storage Gallery Surveillance Route (West End) 2-13
2-6. PUREX Storage Gallery Surveillance Route (East End) 2-14
2-7. PUREX Office and Lunchroom Area Surveillance Route 2-15

TABLES

2-1. S&M PUREX Facility Buildings and Structures 2-4
6-1. PUREX Regulatory Compliance during S&M 6-2
6-2. PUREX Storage Tunnels S&M Regulatory Compliance Actions 6-6
10-1. PUREX Facility Residual Nuclides Summary 10-1
11-1. Surveillance and Maintenance Cost Estimate 11-1

ACRONYMS AND ABBREVIATIONS

ALARA	as low as reasonably achievable
ARA	airborne radiation area
BED	Building Emergency Director
BHI	Bechtel Hanford, Inc.
BWHC	B&W Hanford Company
CA	contamination area
CEDAC	central data acquisition and control
CFR	Code of Federal Regulations
DIS	Document and Information Services
DOE	U.S. Department of Energy
EM	Office of Environmental Management
EP	environmental protection
EPA	U.S. Environmental Protection Agency
ERC	Environmental Restoration Contractor
FCA	fixed contamination area
FHA	fire hazards analysis
HCA	high contamination area
HEPA	high efficiency particulate air
HRA	high radiation area
HVAC	heating, ventilation, and air conditioning
I&C	instrument and control
KVA	kilovolt-amp
OSHA	Occupational Safety and Health Act
PCB	polychlorinated biphenyl
PM	periodic maintenance
PMII	Project Manager's implementing instructions
PR	product removal
PUREX	plutonium uranium extraction
RBA	radiological buffer area
RCRA	*Resource Conservation and Recovery Act of 1976*
RCT	Radiological Control technician
RL	U.S. Department of Energy, Richland Operations Office
RWP	radiation work permit
SAMCONS	Surveillance, Monitoring, and Control System
S&M	surveillance and maintenance
TEDF	treatment effluent disposal facility
Tri-Party Agreement	*Hanford Federal Facility Agreement and Consent Order*
TSD	treatment, storage, and/or disposal
UO_3	uranium trioxide
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

Metric Conversion Chart

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

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	Millimeters	millimeters	0.039	Inches
inches	2.54	Centimeters	centimeters	0.394	Inches
feet	0.305	Meters	meters	3.281	Feet
yards	0.914	Meters	meters	1.094	Yards
miles	1.609	Kilometers	kilometers	0.621	Miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.0836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	Acres
Mass (weight)			**Mass (weight)**		
Ounces	28.35	grams	grams	0.035	Ounces
Pounds	0.454	kilograms	kilograms	2.205	Pounds
Ton	0.907	metric ton	metric ton	1.102	Ton
Volume			**Volume**		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters			
fluid ounces	30	milliliters			
cups	0.24	liters			
pints	0.47	liters	liters	2.1	Pints
quarts	0.95	liters	liters	1.057	Quarts
gallons	3.8	liters	liters	0.264	Gallons
cubic feet	0.028	cubic meters	cubic meters	35.315	cubic feet
cubic yards	0.765	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	Multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
curies	3.7×10^{10}	becquerel	becquerel	2.7×10^{-11}	Curies

1.0 INTRODUCTION

This document provides a plan for implementing surveillance and maintenance (S&M) activities to ensure the Plutonium Uranium Extraction (PUREX) Facility is maintained in a safe, environmentally secure, and cost-effective manner until subsequent closure during the final disposition phase of decommissioning. This plan has been prepared in accordance with the guidelines provided in the U.S. Department of Energy (DOE), Office of Environmental Management (EM) *Decommissioning Resource Manual* (DOE/EM-0246) (DOE 1995), and Section 8.6 of TPA change form P-08-97-01 to the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology, et al. 1996). Specific objectives of the S&M program are as follows:

- Ensure adequate containment of remaining radioactive and hazardous material.
- Provide security control for access into the facility and physical safety to surveillance personnel.
- Maintain the facility in a manner that will minimize potential hazards to the public, the environment, and surveillance personnel.
- Provide a plan for the identification and compliance with applicable environmental, safety, health, safeguards, and security requirements.

2.0 FACILITY ACTIVITIES

2.1 HISTORICAL BACKGROUND

The PUREX Facility, located in the 200 East Area of the Hanford Site, was designed and constructed to provide fuel reprocessing capability to separate plutonium and uranium products from irradiated fuel. The plant was constructed between 1953 and 1955 and began operation in 1956. In October 1990, the U.S. Department of Energy, Richland Operations Office (RL) directed B&W Hanford Company (BWHC) to initiate transition to standby activities for the PUREX Facility. The standby condition was achieved in September 1992.

In December 1992, the DOE Assistant Secretary for Environmental Restoration and Waste Management authorized the termination of both the PUREX and Uranium Trioxide (UO_3) facilities and directed RL to proceed with shutdown planning and terminal clean out activities. In October 1993, the PUREX/UO_3 Deactivation Project was initiated in preparation for transfer from the DOE Office of Facility Transition and Management (EM-60) to the Office of Environmental Restoration (EM-40). End point criteria for deactivation activities for PUREX were defined in WHC-SD-WM-TPP-053, *PUREX Deactivation End Points* (WHC 1995), and used to isolate the facility, mitigate contamination migration, and achieve facility stability through the removal, stabilization, disposal, or excessing of major radioactive sources, dangerous chemicals and waste. This included flushing and removal of dangerous waste constituents from the treatment, storage, and/or disposal (TSD) vessels. Completion of these activities has established a safe and environmentally secure configuration suitable for a long-term S&M program.

2.2 FACILITY DESCRIPTION

S&M of the PUREX Facility includes surveillance and monitoring of the 202-A Building, ancillary buildings, and their associated equipment within the PUREX perimeter fence. (See Figures 2-1 and 2-2.) Table 2-1 lists and describes the PUREX building and structures included in this S&M program.

The 218-E-14 and 218-E-15 storage tunnels are included in this document for completeness. BWHC maintains the responsibility and management for the storage tunnels and associated railroad cut. All comments or questions pertaining to the operations and management of these tunnels shall be directed to BWHC.

2.2.1 PUREX Storage Tunnels 1 and 2

The PUREX storage tunnels 1 and 2 are miscellaneous TSD units used for storage of mixed waste subject to the requirements of *Washington Administrative Code* (WAC) 173-303. The two tunnels provide long-term storage for process equipment removed from the PUREX plant and waste from the 324 and 325 Buildings.

Figure 2-1. PUREX Facility Surveillance and Maintenance Site Plan

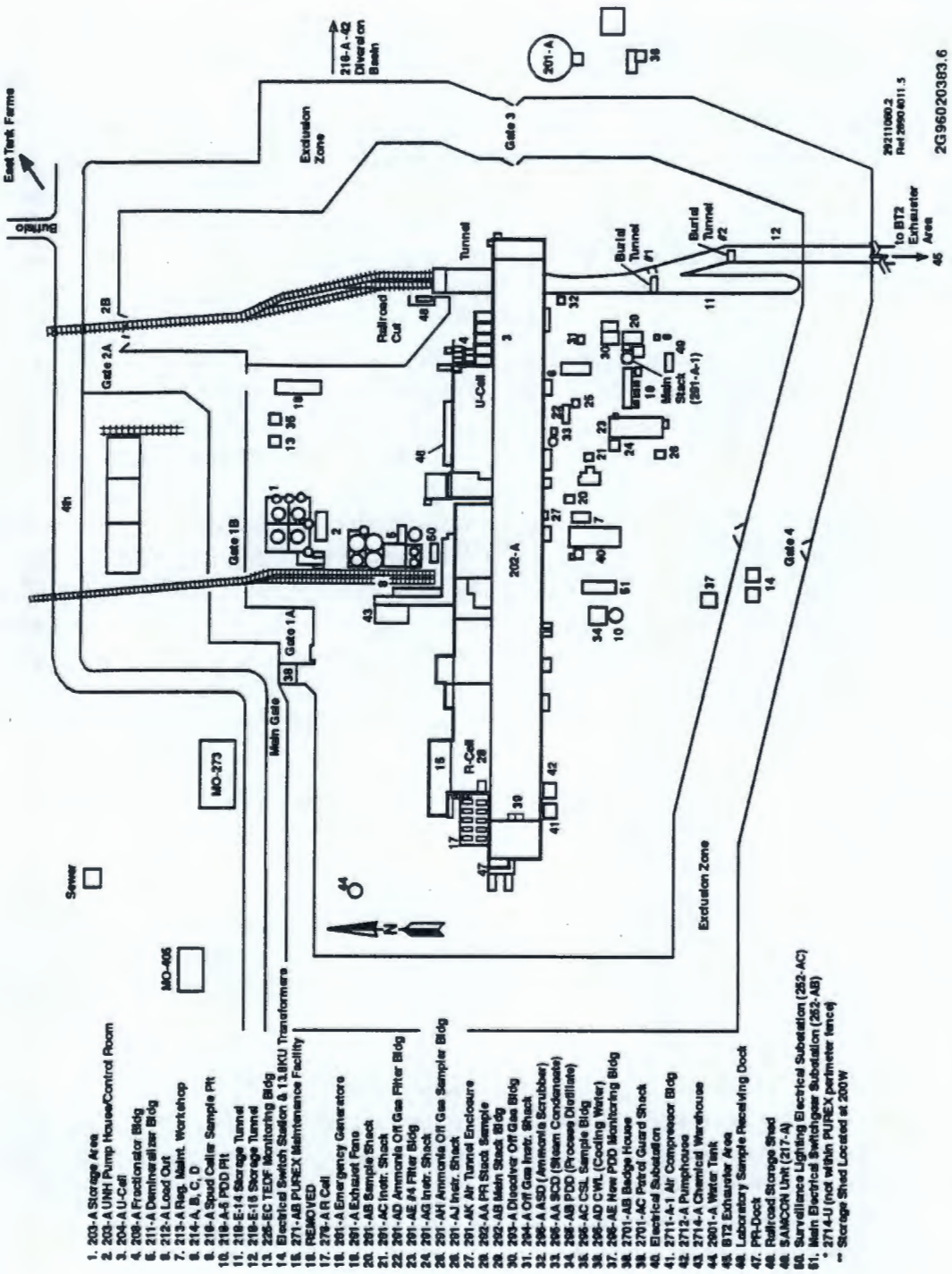


Figure 2-2. PUREX Ventilation Stack Locations

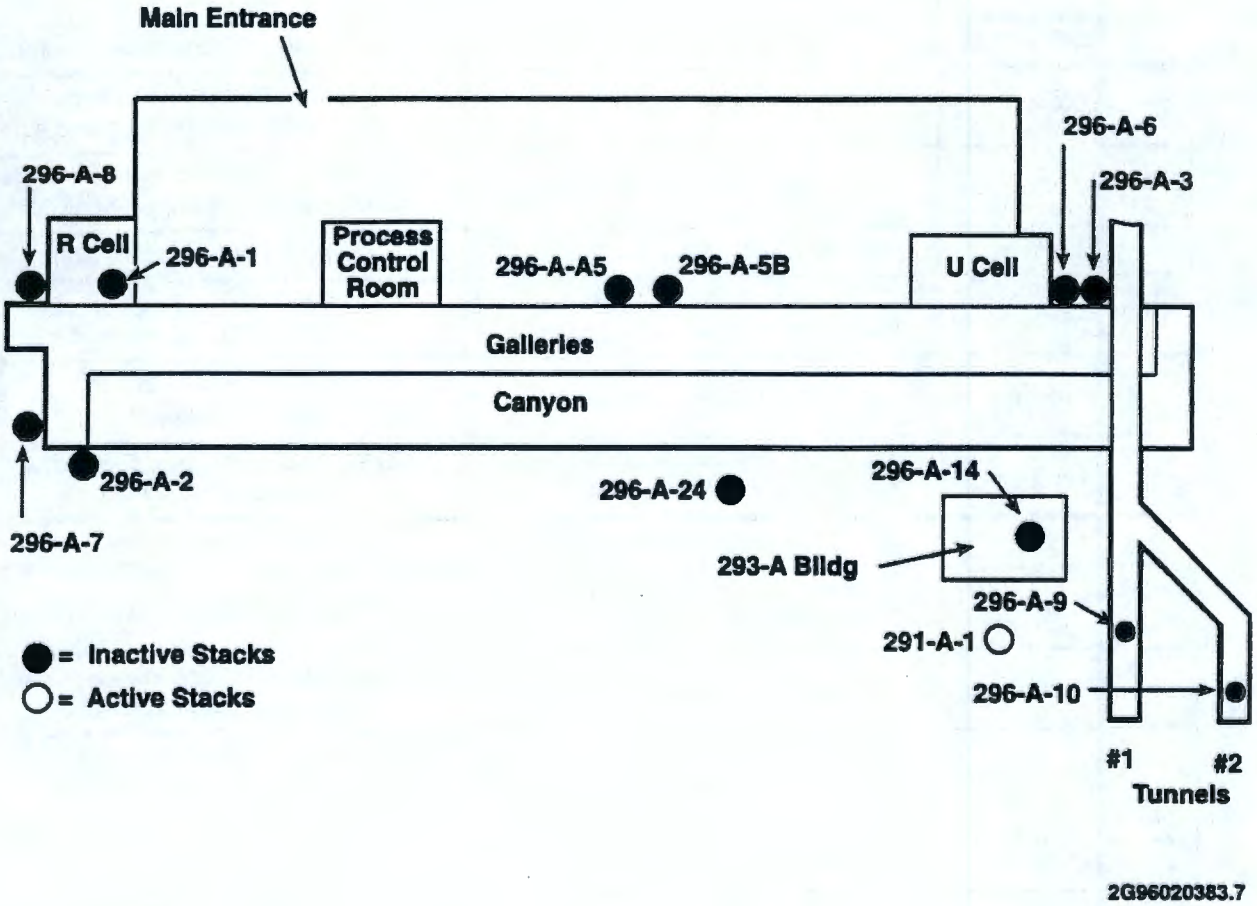


Table 2-1. Surveillance and Maintenance of the PUREX Facility Buildings and Structures (sheet 1 of 3)

FACILITY #	FUNCTION	DESCRIPTION
202-A	PUREX Facility Building	Main Fuel Reprocessing Canyon Building, Lab and attached annex
203-A	Acid Pump House/Acid Storage and Handling Facility	Storage Tanks/Pumps/Piping Used for Transferring Concentrated Nitric Acid/UNH
204-A	U-Cell	Acid Storage Vault (Below Grade)
206-A	Fractionator Building	Equipment/Piping used to Recover/ Concentrate Contaminated Nitric Acid
211-A	Bulk Cold Chemical Tank Farm	Pump House/Tank Farm For Bulk Process Chemicals/Process Water Demineralizer Units
212-A	Fission Product Load Out	Liquid Waste Load Out Station
213-A	Fission Product Load In (Currently Maintenance Workshop)	Temporary Storage for Contaminated Dry Waste
214-A/B/C/D	PUREX Facility Warehouse	PUREX Warehouse/Hazardous Material Storage Area
215-A	Sodium Hydroxide Instrument Pad (Concrete Pad Remaining)	Former Sodium Hydroxide Handling Facilities (never used)
216-A	Spud Cellar Sample Pit	Valve Control Facility
225-EC	Treatment Effluent Disposal Facility (TEDF) Monitoring Building	TEDF Monitoring Electronic System
271-AB	PUREX Maintenance Facility	Annex Attached to 202-A Facility, Contains Offices and Maintenance Shop
276-A	R Cell	Solvent Recovery and Storage Building Containing Process Towers from R-Cell Regeneration
281-A	Emergency Generators Facility	Standby Power
291-A	Exhaust Fans	Canyon Exhaust Air Filter/Stack Plenum
291-AB	Exhaust Air Sample Shack	Stack Monitoring Instrument Shack
291-AC	Exhaust Air Instrument House	Stack Monitoring Instrument Shack
291-AD	Ammonia Off-Gas Filter Building	Ammonia Filter Pit and Stack
291-AE	#4 Filter Building	Exhaust Stack Monitoring Instrument Shack
291-AG	Sample Station #2	Exhaust Stack Monitoring Instrument Shack (Inactive)
291-AH	Ammonia Off-Gas Sample Station	Exhaust Stack Monitoring Instrument Shack (Inactive)

Table 2-1. Surveillance and Maintenance of the PUREX Facility Buildings and Structures (sheet 2 of 3)

FACILITY #	FUNCTION	DESCRIPTION
291-AJ	Sample Station #3	Exhaust Stack Monitoring Instrument Shack (Inactive)
291-AK	Air Tunnel Enclosure	Tunnel Spray Enclosure/Caissons
291-A-1	202-A Main Stack	200 ft Concrete Stack southwest of Main Canyon Building
292-AA	PR Stack Sample House	PR Exhaust Sampling and Monitoring
292-AB	Gaseous Effluent Monitoring Building (Main Stack Building)	East of Main Stack, Contains Monitoring, Sampling and Flushing Equipment.
293-A	Dissolver Off-Gas Station	4 Process Cells, 2 Absorption Towers
293-AA	Former Hydrogen Peroxide Storage (Concrete Pad Remaining)	Concrete Retention Area, Deactivated in 1993 (used to house tanks and pumps)
294-A	Off-Gas Instrument Shack	Off-Gas Treatment/Monitoring Station
295-A	ASD Sample Station	Effluent Sample Shack
295-AA	SCD Sample/Pump Station	Effluent Sample Shack
295-AB	PDD Sample Station	Effluent Sample Shack
295-AC	CSL Sample Station	Effluent Sample Shack
295-AD	CWL Sample Station	Effluent Sample Shack
295-AE	PDD Monitoring Building	New PDD (Never Used)
296-A-1	Stack	202-A N and Q Cell and PR Room Exhaust
296-A-2	Stack	202-A West Sample Gallery Hoods Exhaust
296-A-3	Stack	East Sample Gallery Exhaust
296-A-5A	Stack	Lab Hoods Exhaust
296-A-5B	Stack	Lab Hoods Exhaust
296-A-6	Stack	Sample Gallery and U Cell Exhaust
296-A-7	Stack	West Sample Gallery, PR Corridor, N and R Cell Exhaust
296-A-8	Stack	Pipe and Operating Gallery, White Room Exhaust
296-A-9	Stack	Storage Tunnel #1 Exhaust
296-A-10	Stack	Storage Tunnel #2 Exhaust
296-A-14	Stack	293-A Off-Gas Treatment/Recovery Building

Table 2-1. Surveillance and Maintenance of the PUREX Facility Buildings and Structures (sheet 3 of 3)

FACILITY #	FUNCTION	DESCRIPTION
296-A-24	Ammonia Off-Gas	Ammonia Off-Gas
2701-AB	Badge House	Upper Area Plus Basement
2701-AC	Patrol Guard Shack	Northwest Corner of 202-A Roof
2711-A-1	Air Compressor Building	Equipment for Dry Air to Gloveboxes
2712-A	Pump House	Air Sampling Vacuum Pumps
2714-A	Chemical Warehouse	North of 202A,Storage for Dry and Liquid Containerized Chemicals.
2714-U	Warehouse	Warehouse at 200W Area
2901-A	Water Tank	
218-E-14	PUREX Storage Tunnel 1	Owned And Operated By BWHC See Section 2.2.1
218-E-15	PUREX Storage Tunnel 2	Owned And Operated By BWHC See Section 2.2.1
N/A	Electrical Switch Station	Electrical Switch Station and 13.8kV Transformers
217-A	Surveillance, Monitoring and Control System (SAMCONS) Instrument and Control (I&C) Unit	Main Acquisition Center for Monitoring Data
252-AC	Surveillance Lighting Electrical Substation	Supplies 750 kilovolt-amps (KVA) to Surveillance Lighting
252-AB	Main Electrical Switchgear Substation	Supplies 1500 KVA to Remaining Operating Systems

Tunnel 1, 218-E-14, is approximately 109 m long and provides storage for eight railcars. Between June 1960 and January 1965, all eight railcar positions were filled and the tunnel was subsequently sealed. The combined volume of the equipment stored is approximately 596 m^3. The maximum process design capacity is approximately 4,129 m^3.

Tunnel 2, 218-E-15, is approximately 514 m long and provides storage space for 40 railcars. As of September 1996, 28 railcars containing 2,204 m^3 of discarded equipment and associated waste have been placed in the tunnel, filling 70 percent of the storage area. The maximum design capacity for storage is approximately 19,878 m^3. A complete description of the PUREX storage tunnels may be found in DOE/RL-90-24, *PUREX Storage Tunnels Dangerous Waste Permit Application* (DOE-RL 1990)

End point criteria were developed and completed to deactivate the tunnels in preparation for S&M. Storage tunnel 2 has sufficient capacity for future waste storage from other onsite sources. However, additional waste storage would require an evaluation of the waste and upgrades to the tunnels' ventilation system, as described in the tunnels' permit application. BWHC is responsible for the operation and management of the tunnels including the fenced railroad cut, tracks, and associated contamination area (CA).

2.2.2 Annual PUREX Storage Tunnels Inspection

External inspections for evidence of structural deterioration, tunnel subsidence, erosion of the earth cover, vent stack damage, and proper placement of "warning signs" at access points are performed annually by BWHC as specified in their surveillance procedure.

2.2.3 Inactive Waste Sites

The scope of the S&M program is limited to the facilities described in Section 8.0 of the Tri-Party Agreement; therefore, waste sites are not addressed in this document.

2.2.4 Operating Systems Description

The heating, ventilation, and air conditioning (HVAC) system, electrical system, the Surveillance, Monitoring, and Control System (SAMCONS) Instrument and Control (I&C) unit, and surveillance lighting are the only systems operating during the PUREX S&M phase. Implementation of BHI-00894, *D&D Project Manager's Implementing Instructions (PMII)* (BHI 1998) or equivalent, ensures a high level of performance with no significant environmental, safety, and/or health impacts from the remaining facility activities. The PMII translates the DOE and the Environmental Restoration Contractor (ERC) Conduct of Operations principles, guidelines, and procedures into performance requirements for all S&M personnel involved with the facility's S&M program. These instructions are based on a graded approach to DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, and are applied in the performance and maintenance of the following operating systems and surveillance activities.

2.2.4.1 Electrical. The original electrical distribution system to PUREX is isolated and disconnected. Two new electrical substations and transformers supply power to the HVAC system, dedicated surveillance lighting, and leak detection circuits. The main substation, located south of 202-A Building, supplies up to 1500 kilovolt-amps (KVA) of electrical power to the following loads:

292-AB stack monitoring building	291-AE No. 4 Filter Building and instrumentation
291-AH Building (SAMCONS instruments)	Canyon exhaust fans
SAMCONS I&C skid unit	Several smaller I&C loads
East Tank Farm loads (302-A)	Main power feeder to the mini-substation

The mini-substation, located at the chemical loading dock north of the AMU, supplies 750 KVA of electrical power to dedicated surveillance lighting and receptacles. Surveillance lighting is located throughout the 202-A surveillance routes and ancillary buildings requiring routine access. The lighting has a disconnect external to the 202-A Building and is energized only when performing surveillance. In addition, electric heat and cooling is supplied to the 291-AE and 292-AB buildings to protect instrumentation from extreme temperature variations.

2.2.4.2 Ventilation System

The PUREX Facility HVAC system consists of an operating canyon exhaust fan inducing airflow paths through the main building and the canyon. The airflow is cascaded throughout the facility from non-contaminated into high contamination areas. Two 200-horsepower backup canyon exhaust fans are maintained to provide a reliable ventilation system. Monthly rotation of the three fans is performed as preventive maintenance to ensure the fans' operability. Any mechanical or power failure of the operating canyon exhaust fan is detected by the SAMCONS monitoring unit which alarms and activates the operation of a backup fan.

2.2.4.3 Surveillance, Monitoring, and Control System

A SAMCONS I&C skid unit, located south of the 202-A Building, serves as the main data acquisition center for monitoring data. It monitors and/or controls the following:

- Controls air flow throughout the major air paths by measuring nine differential pressure transmitters; thus maintaining correct pressure gradients and a total flow rate of 40,000 cubic feet per minute.

- Temperature measurements for the canyon exhaust fans bearings, the air tunnel, the fourth filter building, the 292-AB Building, and the SAMCONS I&C unit.

- Liquid levels from the #2 filter catch tank (Tk-V11-1) and 291-A-1 main stack catch tank (216-A-Tk2).

- Humidity and dewpoint of the air flowing through the #2 deep bed filter.

- Condition and status of the main switchgear and motor control centers. This includes primary and secondary transformer voltages, currents, and phase relationships.

Data acquired by the SAMCONS unit is transmitted to a central data acquisition and control (CEDAC) station located at the 271-U Facility in the 200 West Area. The CEDAC station receives the flow of data and provides the appropriate operational control.

2.3 SURVEILLANCE ACTIVITIES

2.3.1 Environmental Monitoring of the 291-A-1 Main Stack

The 291-A-1 main stack has been designated as a major stack by the National Emissions Standards in Hazardous Air Pollutants criteria, 40 *Code of Federal Regulations* (CFR) 61 Subpart H. This designation is due to its potential to discharge sufficient radionuclides into the air, resulting in an offsite effective dose equivalent in excess of 0.1 mrem per year. However, since these emissions are not expected during S&M, monitoring activities have been reduced to a minimum, yet still meet the U.S. Environmental Protection Agency's (EPA) requirements (See Reference 14 [BHI-SH-05]). Therefore, environmental sampling of the 291-A-1 Main Stack consists of the following:

- Continuous stack particulate sampling, designed to provide an accurate release record for the stack.
- Monthly iodine sampling from the A007 location.

In 1995, the PUREX Facility released approximately 99 percent of iodine-129 released from the Hanford Site. The two potential sources of iodine-129 in recent years have been stored fuel elements and silver reactors. As of October 12, 1995, all fuel elements have been removed from the PUREX Facility. Since new sources are no longer introduced, iodine-129 release is low and continues to decrease every year.

The current iodine-129 releases from the PUREX Facility are significantly lower than offsite effective dose and are unlikely to impact ambient environmental levels. Sampling for iodine-129, although not a regulatory requirement, continues to document the downward trend. The need for continued sampling continues to be reevaluated until it is determined as obsolete.

2.3.2 Quarterly Surveillances

Quarterly surveillances of the PUREX Facility are necessary to ensure unfavorable conditions or trends are identified and evaluated in time to initiate appropriate action. These surveillances consist of internal and external surveillance and monitoring of selected portions of the PUREX 202-A Building and its ancillary facilities.

The indoor surveillance includes entries into 202-A, 202-A annex, maintenance shops, pipe and operating gallery level, storage gallery level, AMU basement, office and lunchroom area, the hot shop lobby, N-Cell (upper and lower levels), product removal (PR) corridor, PR room, Q-Cell, canyon lobby, white room, and the west stairwell. Entry into the 202-A Building is through the

AMU first floor door off the AMU dock. The SWP lobby and a buffer zone in the storage gallery have been designated as entry points into the radiological contamination areas. (See Figures 2-3 through 2-7.)

The outdoor surveillance consists of external monitoring and visual inspections of the facility's ancillary buildings and supporting areas including the outdoor contamination areas.

The surveillances involve checking for indications of structural defects, roof deterioration, posting deficiencies, contamination migration, suspect hazardous materials, hazardous conditions, unlabeled containers, unidentified friable asbestos, failed lights, and water, animal or insect intrusion. In addition, routine general housekeeping such as tumbleweed and miscellaneous debris removal is performed throughout the PUREX compound.

A quarterly facility-specific surveillance work package governs performance of the surveillances. It identifies radiological checkpoints, precautions, and access points. Data sheets are also included to document observations, findings, and any items requiring corrective actions.

2.3.3 Routine Surveillances

Routine surveillances governed by operations, maintenance, and radiological work packages are performed in addition to quarterly surveillances to ensure adequate operation and monitoring. These packages detail the frequency and activities necessary to prevent potential health and safety impacts and equipment failure.

The operations work package(s) describes the required surveillance and frequency for the remaining active equipment controlled by the SAMCONS unit. The maintenance work package(s) describes the periodic maintenance (PM) and instrument calibration methods to maintain the remaining active equipment controlled by the SAMCONS unit. The radiation protection procedures, radiation work permit (RWP), and radiological technical assessments describe the radiological control activities such as posting, access control, work place air monitoring, and radiological surveys.

Figure 2-3. PUREX Pipe and Operating Gallery Surveillance Route (West End)

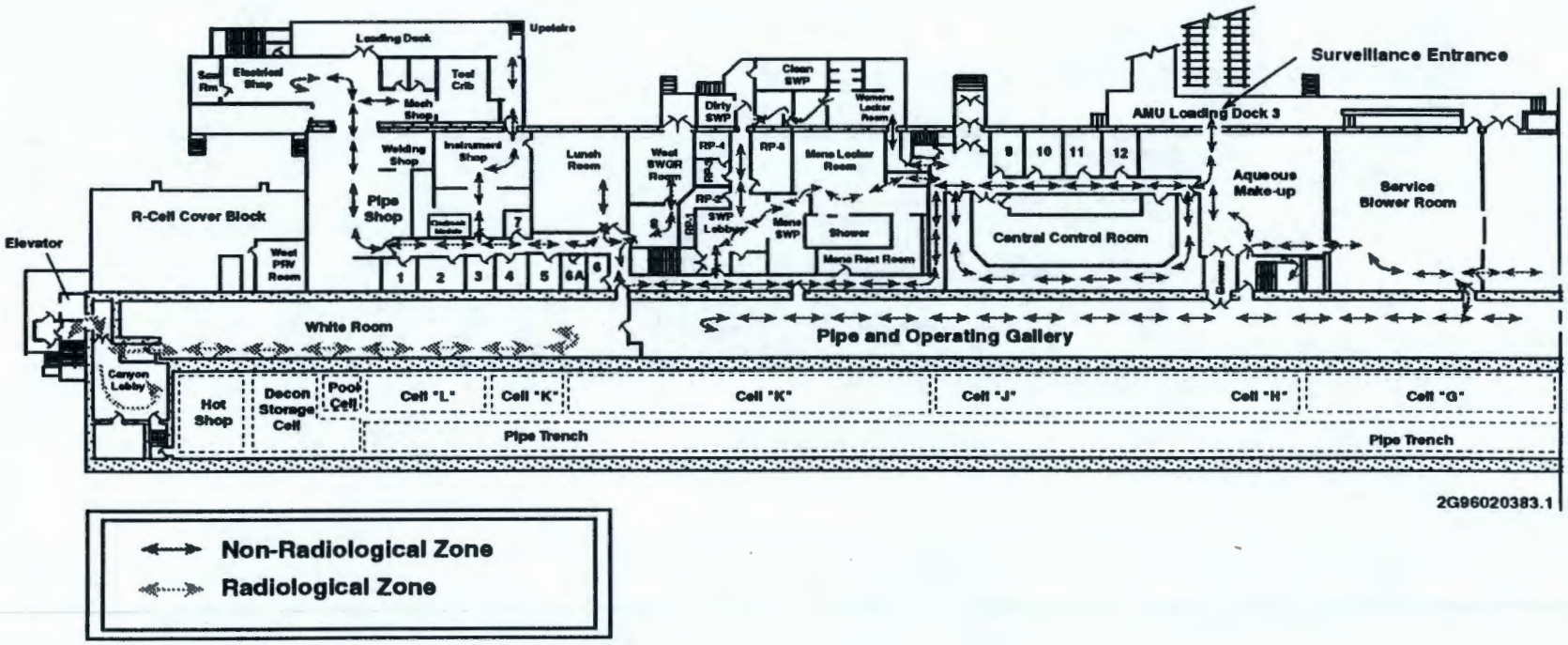


Figure 2-4. PUREX Pipe and Operating Gallery Surveillance Route (East End)

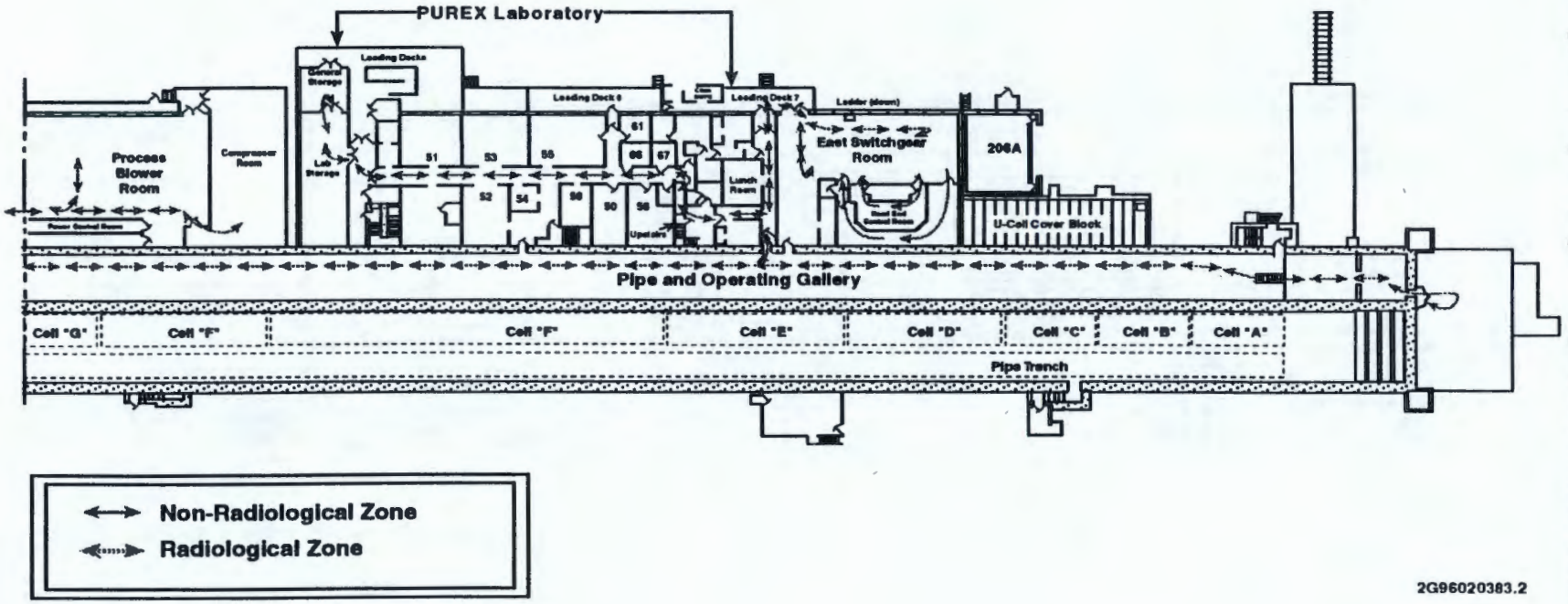


Figure 2-5. PUREX Storage Gallery Surveillance Route (West End)

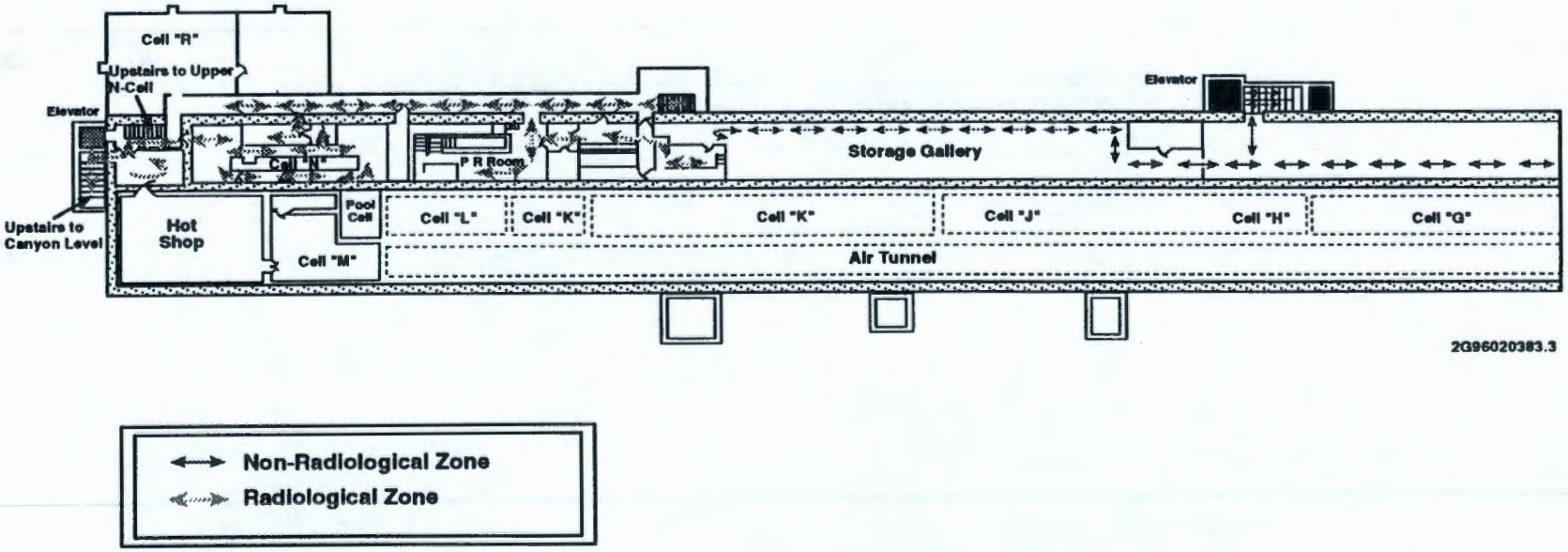


Figure 2-6. PUREX Storage Gallery Surveillance Route (East End)

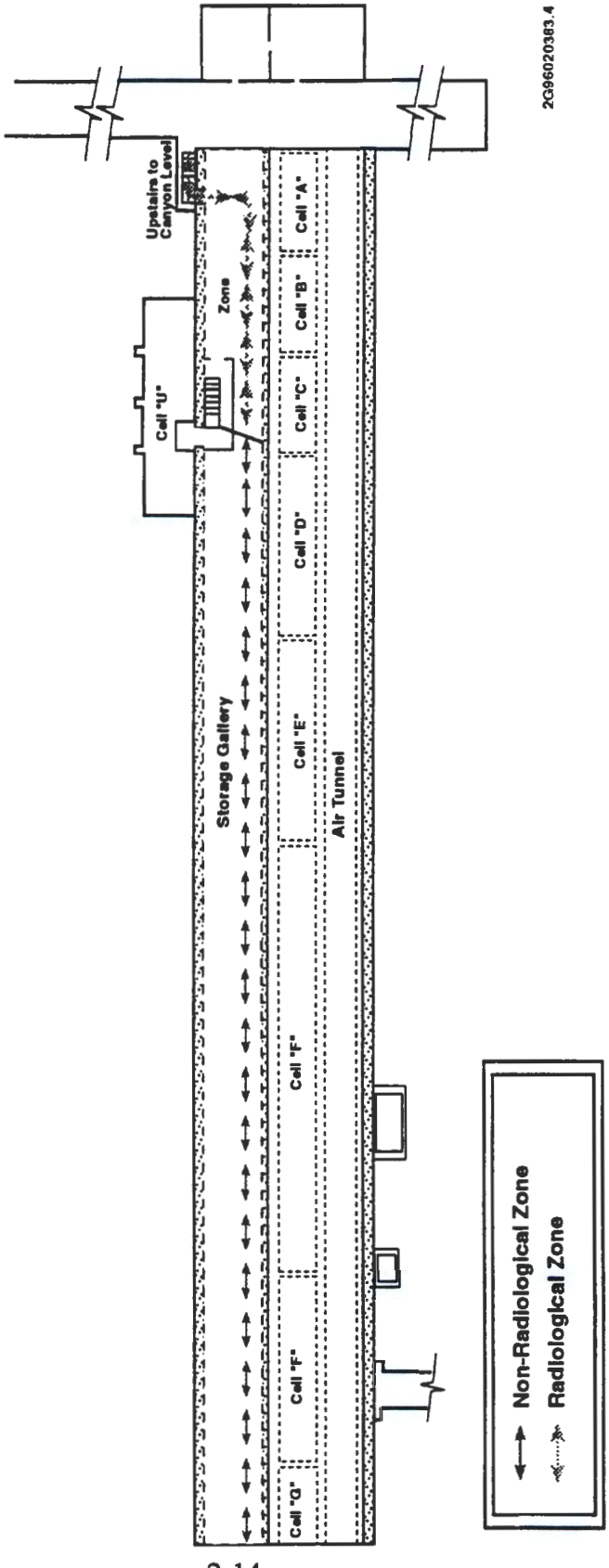
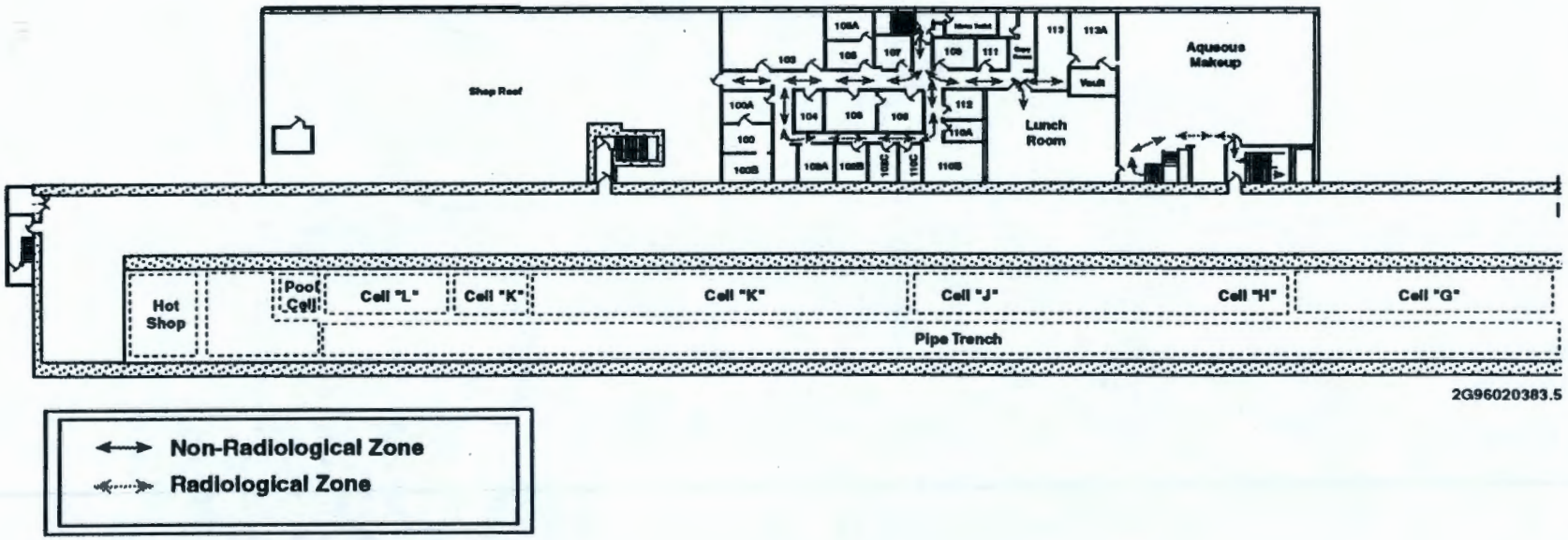


Figure 2-7. PUREX Office and Lunchroom Area Surveillance Route



3.0 MAINTENANCE IMPLEMENTATION PLAN

Maintenance activities are conducted in accordance with BHI-01044, *ERC Maintenance Implementation Plan for Nuclear Facilities* (BHI 1997a).

3.1 MAINTENANCE ORGANIZATION AND ADMINISTRATION

The maintenance organization and administration ensures a high level of performance through effective implementation and control of maintenance activities, necessary to maintain the plant in a manner that promotes worker health, environmental protection, equipment preservation, and cost effectiveness.

Maintenance Organization Policies establishing and communicating the policies, procedures, and standards for the administration of maintenance activities are conducted as directed in BHI-FS-01, *Field Support Administration*, Section 1.0, "Administration."

Maintenance Strategies describing the working relationships that exist within all organizations that support maintenance are covered in BHI-FS-01, Procedure 3.2, "Preventive Maintenance."

Staffing Resources and Personnel Accountability is covered by the program described in BHI-HR-01, *Human Resource Policies and Procedures*. It ensures the maintenance program has a sufficient number of qualified personnel to perform its functions and monitor personnel in the performance of their assigned responsibilities.

3.2 TRAINING AND QUALIFICATION OF MAINTENANCE PERSONNEL

A maintenance training and qualification program consistent with BHI-MA-02, *ERC Project Procedures*, Procedure 5.2, "ERC Training," is implemented to develop and maintain the knowledge and skills needed by S&M personnel to effectively perform and manage maintenance activities.

3.2.1 On-the-Job Training

A formal On-the-Job Training program does not exist given the relatively lower hazard level, the expected stable nature of the PUREX Facility, experience level of the maintenance work force, and the type of maintenance.

3.2.2 Training in Root-Cause Analysis

An appropriate number of individuals are trained in principles and methods of root-cause analysis and various approaches to cause and effect analysis as directed in BHI-MA-02, Procedure 2.4, "Root Cause."

3.3 MAINTENANCE FACILITIES, EQUIPMENT, AND TOOLS

Maintenance facilities, equipment, and tools effectively support facility maintenance and maintenance training. Shop, storage, and office facilities are located as stated in the Maintenance Implementation Plan (BHI 1997a).

3.4 TYPES OF MAINTENANCE

A proper balance of routine and preventive maintenance is employed to provide a high degree of confidence that facility equipment degradation is identified and corrected. Preventive and routine maintenance is conducted as described in BHI-FS-01, Procedure 2.1, "Work Control," and Procedure 3.2.

3.4.1 Types of Maintenance and Frequency

The following maintenance and frequencies are recommended to satisfy code and specification manufacturer's recommendations, and to ensure optimum equipment operating life during the S&M program.

Preventive Maintenance	Frequency
Inspect and lube exhaust fans and bearings EF-V11-1, -2, and –3	Monthly
Inspect vacuum pumps	Quarterly
Replace light bulbs	As needed
Calibration of equipment controlled by SAMCONS I&C	As recommended in procedures
Replacement of high efficiency particulate air (HEPA) filters	As determined from surveillance
Potential cold weather protection	See section 3.18
Canyon exhaust fan rotation	Monthly
Electrical system	Breaker PMs as recommended in procedures

3.5 MAINTENANCE PROCEDURES

Maintenance procedures are prepared, reviewed, and used as directed in BHI-FS-01, Procedure 2.3, "Task Instruction Development," and Section 2.1. They provide appropriate work direction and ensure that maintenance is performed safely and efficiently.

3.6 PLANNING, SCHEDULING AND COORDINATION OF MAINTENANCE

An effective system for planning, scheduling, and coordinating maintenance activities is implemented as directed in BHI-FS-01, Procedure 2.1. It ensures prompt maintenance, improvement in maintenance efficiency; reduction in radiation exposure (as low as reasonably achievable [ALARA]).

3.7 CONTROL OF MAINTENANCE ACTIVITIES

Management-directed and -delegated control of maintenance activities ensures that maintenance practices result in safe and reliable facility operation. Control of maintenance activities is conducted per BHI-FS-01, Procedure 2.1.

3.8 POST-MAINTENANCE TESTING

When required, post-maintenance testing is performed per BHI-FS-01, Procedure 2.1, to verify that components fulfill their design function when returned to service after maintenance.

3.9 PROCUREMENT OF PARTS, MATERIALS, AND SERVICES

Any parts, materials, and services used for maintenance activities are of standard industrial practice and commercial quality and procured per BHI-PR-01, *ERC Procurement Procedures*.

3.10 MATERIAL RECEIPT, INSPECTION, HANDLING, STORAGE, RETRIEVAL, AND ISSUANCE

Procedures and policies for receiving, inspecting, handling, storing, retrieving, and issuing equipment, parts, and materials for maintenance are covered by BHI-FS-01, Section 5.0, Quality Control, BHI-PR-03, *ERC Warehouse Manual*, and BHI-SH-06, *Quality Services Procedures*, Section 6.0, Quality Site Services.

3.11 CONTROL AND CALIBRATION OF MEASURING AND TEST EQUIPMENT

The program for control and calibration measuring and testing equipment is BHI-FS-01, Procedure 3.15, "Control of Measuring and Test Equipment," which is consistent with the Quality Assurance requirements of DOE Order 5700.6C, *Quality Assurance*, and ensures the accurate performance of facility instrumentation and equipment for testing, calibration, and repairs.

3.12 MAINTENANCE TOOLS AND EQUIPMENT CONTROL

Implementation of BHI-FS-01, Procedures 5.2, "Material Control," and 5.3, "Control of Deficient Items," provides assurance for storage, issuance, and maintenance of an adequate and readily available supply of tools and equipment.

3.13 FACILITY CONDITION INSPECTION

Quarterly surveillances of the PUREX Facility identify and evaluate unfavorable condition or trends to promptly initiate appropriate actions to prevent equipment and structural degradation that may result in malfunctions of the remaining operating and monitoring systems.

3.14 MANAGEMENT INVOLVEMENT

BHI-MA-01, *ERC Policies, Organization, and Responsibilities*, BHI-SH-01, *Hanford ERC Environmental, Safety, and Health Program*, Section 4.0, "Management of Environmental, Safety, and Health Program," and BHI-00894 (BHI 1998), describe management involvement in ensuring the safety of DOE nuclear facility operations. RL, contractors, and facility managers are sufficiently informed concerning conditions at the PUREX Facility.

3.15 MAINTENANCE HISTORY

There are two maintenance work methods used by the ERC to maintain the equipment and facilities (reference BHI-FS-01, Procedure 2.1). They are as follows:

1. Demand Work: i.e. repairs, modification, installations, etc.
2. PM/Surveillance Work:, i.e. calibrations, adjustments, inspection, etc.

Both methods of performing work on equipment, facilities or structures are accomplished by the use of a work package. A work package identification number is assigned to each work package and is loaded into a software database for tracking, control, and cycling (PM/Surveillance) during the work process. After the work is completed in each package, the package is closed and the hard copy (original) is filed for retention with Document and Information Services (DIS). The completed work package is also electronically closed and is filed in a Demand History File or a PM/Surveillance History File, depending on the type of work performed.

The maintenance history of work performed on equipment, facilities or structures can then be retrieved from the History Data Files and the hard copies can be retrieved from DIS.

A maintenance and trending program is not necessary during S&M. Operating equipment and maintenance is limited to HVAC, lighting, electrical, and the SAMCONS I&C unit as described in the operating procedures. The quarterly surveillance data sheets permit documentation of

observations, findings, and corrective actions associated with the remaining operating equipment. These reports, compliance with operating procedures, the operating equipment list, and vendor information for operating units provide sufficient information for maintenance planning.

3.16 ANALYSIS OF MAINTENANCE PROBLEMS

Maintenance problems are analyzed as part of the work control process described in BHI-FS-01, Procedure 2.1. Other management systems for analyzing and resolving failures or deficiencies in equipment include BHI-FS-01, Procedure 5.3, and BHI-MA-02, Procedures 2.6, "Occurrence Investigation and Reporting," and 2.8, "Nonconformance Control."

3.17 MODIFICATION WORK

Facility modification work, including temporary modifications, is accomplished under the same basic administrative controls as those applied to facility maintenance activities. This minimizes risk to facility equipment, environment, and/or personnel. Facility modification work will be conducted per BHI-DE-01, *Design Engineering Procedures* and BHI-FS-01, Procedure 2.1.

3.17.1 Maintenance Program Interface with Modifications

Modifications are performed in accordance with requirements and limitations of applicable procedures, codes, standards, specifications, etc.

3.18 SEASONAL FACILITY PRESERVATION REQUIREMENTS

A program is in place to prevent equipment and building damage due to cold weather that may be at risk. This program, BHI-FS-01, Procedure 3.5, "Cold Weather Protection," includes properly approved procedures for the implementation and suspension of extreme weather protective actions. The program directs that all appropriate measures be taken to prevent damage or degradation to systems as a result of extreme weather conditions.

During cold weather, special attention should be given to the following:

- Vents for frost at inlet areas
- SAMCONS unit instrumentation temperature conditions
- Water effects on HEPA filters

4.0 QUALITY ASSURANCE

The ERC Quality Program as documented in BHI-QA-01, *ERC Quality Program*, satisfies the requirements of both DOE Order 5700.6C and 10 CFR 830.120, "Quality Assurance Requirements." For the S&M of the PUREX Facility, BHI-QA-01 is augmented by WHC-EP-0536-3, *Quality Assurance Program Plan for Radionuclide Airborne Emissions Monitoring* (WHC 1995), and BHI-QA-03, *ERC Quality Assurance Program Plan*, Plan No. 3.2, "Quality Assurance Program Plan for Surveillance and Maintenance of Nuclear Facilities."

5.0 TRAINING AND QUALIFICATION

Training requirements for ERC personnel performing and/or supporting activities in nuclear facilities are documented in the *Training Implementation Matrix for ERC Managed Nuclear Facilities*, Appendix 5, "PUREX Facility" (BHI 1998), contains the training requirements specific to PUREX.

6.0 ENVIRONMENTAL COMPLIANCE/PROTECTION

An Environmental Protection (EP) program assures environmental and DOE requirements. controls, and standards are complied with in the safe operation of a facility. During post-deactivation surveillance, EP is implemented in the PUREX Facility S&M activities identified in Section 2.0, "Facility Activities," as described below.

During the PUREX Deactivation Project, major radioactive sources and/or dangerous chemicals and wastes were removed, stabilized, excessed, or disposed to meet the criteria identified in WHC-SD-WM-TPP-053 (WHC 1995). This included flushing and removal of dangerous waste solutions from tanks and vessels identified as TSD units in the PUREX Plant *Resource Conservation and Recovery Act of 1976* (RCRA) Part A Permit Application. Non-dangerous heels were left in the chemical and process tanks. Remaining hazardous material within the facility is in the form of shielding or is part of remaining equipment. The list of the hazardous material remaining within the PUREX complex identifies and describes the material, location, and known quantity. This list can be found in the PUREX End Point files. Hazards associated with these materials are minimal due to their remote locations and existing form.

The only hazardous wastes remaining within the facility are in the PUREX containment building and the storage tunnels 1 and 2 (see section 2.0). A description of the waste stored in these areas may be found in the PUREX Plant Dangerous Waste Part A Permit Application, Rev. 8, and the DOE/RL-90-24 (DOE-RL 1990).

Dangerous waste generation is not expected during S&M. However, waste generated from routine maintenance are handled in compliance with the applicable regulatory requirements, BHI-EE-02, *Environmental Requirements*, and BHI-EE-10, *Waste Management Plan.* Compliance with the RCRA requirements found in WAC 173-303 and the Hanford Facility Dangerous Waste Permit Application during the S&M phase are addressed in Table 6-1.

6.1 THE PUREX PLANT STORAGE TUNNELS 1 AND 2

The PUREX Plant Storage Tunnels (owned and operated by BWHC) are permitted as a miscellaneous unit under WAC 173-303-680 to store mixed waste from the PUREX plant and other selected onsite facilities. The Hanford Facility Dangerous Waste Permit Application for the PUREX Storage Tunnels, DOE/RL-90-24, and the Hanford Site RCRA Permit Application, DOE/RL-91-28, Rev. 2 describe waste characteristics and requirements for management, storage, and/or retrieval of waste into or from tunnel 2.

During the S&M program, the storage tunnels 1 and 2 are managed as a RCRA storage unit. Compliance with RCRA requirements are ensured as described in Table 6-2. Future waste storage into tunnel 2 is not expected. However, should a need arise to store additional waste, it will be conducted in accordance with the permits identified above.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance (sheet 1 of 4)

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Introductory Regulations WAC 173-303-010 to WAC 173-303-060	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.
Dangerous Waste Designation WAC 173-303-070 to WAC 173-303-110	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.
General Recycling Requirements WAC 173-303-120	N/A: No recycling, reclaimed, or recovered waste exists during the PUREX S&M phase.
Prohibitions and Restrictions WAC 173-303-140 to WAC 173-303-141/40 CFR 268	N/A: No land disposal occurs during the PUREX S&M phase. However, the Annual Report on Hanford Site Land Disposal Restrictions for Mixed Waste is updated as necessary annually.
Spills & Discharge Into the Environment WAC 173-303-145 and 40CFR 302	Notifications and responses for spills and discharges of dangerous waste or hazardous substances into the environment during the PUREX S&M phase are addressed in BHI-EE-02.
Division, Dilution, and Accumulation WAC 173-303-150	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.
Containers WAC 173-303-160 to WAC 173-303-161	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, containers used as a result of waste generated from routine maintenance activities are handled in compliance with BHI-EE-02 and BHI-EE-10.
Generator Requirements WAC 173-303-170 to WAC 173-303-230	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance (sheet 2 of 4)

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Transporter Requirements WAC 173-303-240 to WAC 173-303-280	Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.
Notice of Intent WAC 173-303-281 Siting Criteria WAC 173-303-282	Not applicable during the PUREX S&M phase.
Performance Standards WAC 173-303-283	This section requires identification of performance standards for maintaining dangerous waste facilities to the maximum extent practical given the limits of technology to prevent endangerment to people and the environment, as specified. Compliance is met through adherence to this S&M plan.
Required Notices WAC 173-303-290	N/A: No waste sources outside the Hanford site are received by the PUREX facility.
General Waste Analysis WAC 173-303-300	The purpose of this section is to confirm knowledge about dangerous waste before treatment, storage, and/or disposal. Appendix A lists the hazardous material remaining at the facility. Dangerous waste generation and disposal is not expected during the PUREX S&M phase. However, waste generated from routine maintenance activities is handled in compliance with BHI-EE-02 and BHI-EE-10.
Security WAC 173-303-310	Addressed in the Safeguards & Security section of this S&M plan.
General Inspection WAC 173-303-320	Quarterly surveillances are performed as identified in this S&M plan
Personnel Training WAC 173-303-330	Appropriate training is provided as identified in Section 5.0 of this S&M plan.
Construction Quality Assurance Program WAC 173-303-335	Not applicable during S&M.
Preparedness and Prevention WAC 173-303-340	Addressed in Section 8.0, Emergency Management, of this S&M plan.
Contingency Plan/Emergency Procedures WAC 173-303-350	Addressed in Section 8.0, Emergency Management, of this S&M plan.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance (sheet 3 of 4)

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Manifest System WAC 173-303-370	Dangerous waste will not be received from off-site sources during S&M.
Facility Record keeping WAC 173-303-380	Dangerous waste generation is not expected during S&M. However, operating records for waste generated or managed at the facility are compliant with BHI-EE-02 and BHI-EE-10.
Facility Reporting WAC 173-303-390	Dangerous waste from an off-site source is not expected during S&M. Therefore, unmanifested waste reports will not be applicable. Supporting information for the Hanford Site Annual Dangerous Waste, Hanford Site Land Disposal Restrictions for Mixed Waste Report, and any applicable reports are prepared and submitted as required to the department.
Other General Requirements WAC 173-303-395	Generation and disposal of ignitable, reactive, or incompatible waste during S&M is not expected. However, waste generated will be handled in compliance with BHI-EE-02 and BHI-EE-10.
Interim Status TSDF Standards WAC 173-303-400/ 40 CFR 265.1101(c)(4)/40 CFR 265 Subpart J	<u>Tank Systems</u> During the PUREX Deactivation Project, TSD tanks and vessels identified in the PUREX Plant Part A Permit Application were flushed until the solutions no longer designated as dangerous waste. These solutions were removed leaving a non-dangerous heel per the Data Quality Objectives for PUREX Deactivation Flushing, WHC-SD-EN-TI-283, Rev. 0. Removal of the dangerous waste solutions ensured that the vessels were left in a state for minimum surveillance and maintenance until subsequent closure. Therefore, per the TPA M-80-94-01 agreement, no surveillances of the dangerous waste units or ancillary equipment are performed. <u>Containment Building</u> The PUREX Containment Building, the 202-A canyon, continues to store dangerous waste in accordance with the PUREX Plant Part A Permit Application. Monitoring the differential pressure of the canyon satisfies the 40 CFR 265.1101(c)(4) requirement to maintain the containment building's integrity.

Table 6-1. PUREX Regulatory Compliance during Surveillance and Maintenance (sheet 4 of 4)

DANGEROUS WASTE REGULATIONS	S&M COMPLIANCE APPLICABILITY
Permits WAC 173-303-800 to WAC 173-303-840	The PUREX facility containment building and tank systems are currently and will remain under interim status until closure. No further permitting will be pursued.
Polychlorinated Biphenyls (PCBs) 40 CFR 761 Subparts D and G	PCBs may exist in transformers, ballasts, and lubricants/gear oil once used in the plant. PCB waste generation is not expected. However, waste generated from routine maintenance activities will be handled in compliance with the applicable requirements.
Asbestos 40 CFR 61.150	Undetermined quantities of asbestos exist throughout the plant as a solid component. Asbestos waste generation is not expected. However, waste generated from routine maintenance activities will be handled in compliance with applicable requirements.

Table 6-2. PUREX Storage Tunnels Surveillance and Maintenance Regulatory Compliance Actions

Action Description	Frequency
Update Annual Dangerous Waste Report for the PUREX Facility	Annually
Perform external inspections for evidence of structural deterioration, tunnel subsidence, erosion of the earth cover, vent stack damage, and proper placement of "warning signs" at access points as specified in the appropriate work package.	Annually
Evaluate and update the unit-specific contingency plan	Annually
Evaluate and update the Training Plan	Quarterly
Place a completed certification form in the operating record specifying that the PUREX Storage Tunnels have a waste minimization/pollution prevention program.	Annually

Abnormal conditions are reported, documented, and corrective actions initiated as necessary. Inspection records are maintained at the Hanford facility for a minimum of five years.

6.2 PUREX FACILITY AIR PERMITTING

Under the State of Washington Department of Health (WDOH) Radioactive Air Emissions Permit FF-01, the Hanford Site is permitted for airborne radioactive emissions. Consequently, under FF-01, the PUREX Facility is also permitted for airborne radioactive emissions. Any changes or updates to this permit are not necessary during S&M, unless modifications with a potential impact to the conditions and limitations set forth in the permit are deemed necessary.

The PUREX Facility is currently permitted by the Prevention of Significant Deterioration for NOx emissions. NOx emissions are not expected during S&M, therefore, updates to this permit are not necessary.

6.3 REGULATORY FILES/DOCUMENTATION

The identification and location of regulatory documentation generated during the PUREX Facility's operation are listed on the PUREX Regulatory File Checklist. All other historical records and documents are retained at the Records Holding Area. Access to any of these files is possible by contacting the current Records Holding Organization.

Documentation assembled as a means of documenting completion of endpoints are located in the end point files at the 271-U Building. These records include the following:

- Canyon cell arrangement drawings
- Certified vendor information of operating and mothballed systems
- PUREX Facility Hazardous Material Remaining after Deactivation List
- Pre-Closure Work Plan
- Description of conditions or limitations applicable to criticality prevention
- Deactivation work plans
- Descriptions/photos of Case 2 spaces, internal spaces/no access expected
- Electrical distribution drawings of new operational electrical system

- Index identifying drawing numbers and corresponding titles of essential and downgraded facility drawings
- Final radiological surveys and maps
- Fire Hazard Analysis (FHA)
- Radiological control surveillances and data of current postings
- Identified industrial space hazards
- Confined space program
- Resolution of remaining outstanding Tri-Party Agreement and regulatory commitments
- S&M safety evaluations documentation
- S&M phase updated Facility Environmental Monitoring Plan
- S&M phase updated Building Emergency Plan
- S&M phase updated Safety Equipment List
- S&M phase updated Final Safety Analysis Report/Safety Authorization Basis documentation
- Special nuclear material inventory
- Structural and roof evaluations
- S&M procedures
- Unusual occurrence reports considered relevant and informative for S&M
- PUREX Plant Dangerous Waste Part A Permit Application
- Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels, DOE/RL-90-24, Rev. 2
- Prevention of Significant Deterioration for NOx Emissions Permit
- WDOH Radioactive Air Emissions Permit, FF-01
- Waste characterization data for egress waste Historical radiation survey data and other radiological records

- An administrative record was established for the PUREX Facility as described on Table 9-3 of the Tri-Party Agreement (Ecology, et al. 1996). The administrative record for PUREX contains the following documents:

- RCRA Analytical Data for PUREX TSDs
- PUREX Preclosure Work Plan
- PUREX Plant Dangerous Waste Part A Permit Application
- Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels, DOE/RL-90-24, Rev. 2

Operating records and regulatory documentation generated during this S&M program, concerning dangerous waste management, are managed in accordance with the WAC 173-303-210/220 and are maintained in a regulatory file. Operating records will be managed in accordance with the Hanford RCRA Permit section II.I.

6.4 HAZARDOUS MATERIAL PROTECTION

During the S&M program, the PUREX facility complies with the applicable requirements and ALARA considerations for control of potential personnel exposures to hazardous materials.

Compliance with hazardous material protection requirements are ensured as described in BHI-SH-01, BHI-SH-02, Vol. 1 and 4, *Safety and Health Procedures*, and BHI-SH-05, *Industrial Hygiene Work Instructions*.

7.0 RADIOLOGICAL CONTROLS

Radiological conditions for facilities within Surveillance/Maintenance and Transition Projects have been assessed to ensure adequate radiological controls have been implemented to perform S&M activities safely. The radiological control activities implemented for the facilities to demonstrate compliance with DOE Order 5480.1, *Radiation Protection for Occupational Workers*, are described in the following:

- 10 CFR 835, *Occupational Radiation Protection; Final Rule*
- HSRCM-1 *Hanford Site Radiological Control Manual*,
- BHI-SH-01, *ERC Environmental Safety and Health Program*, Section 10.2, "Radiological Controls,"
- BHI-SH-02, Volume 1, *General Procedures*,
- BHI-SH-02, Volume 2, *Safety and Health Procedures*, and
- BHI-SH-04, *Radiological Control Work Instructions.*

Prior to the performance of surveillance or maintenance activities, the proposed activity is discussed with the Radiological Controls organization to determine the scope of the activity and radiological survey requirements needed. Technical assessment documentation may be issued by the Radiological Control organization to provide direction concerning the isotopes of concern, any specific survey and/or air sampling requirements. Additionally, dependent upon work scope and expected radiological conditions, an ALARA review may be performed. Radiological Control Technicians (RCT) assess radiological conditions of the work/surveillance area in accordance with Bechtel Hanford, Inc. (BHI) procedures and issued technical assessments, document survey results, and ensure correct radiological postings/boundaries of the area.

Based upon the results of the radiological survey, a RWP is issued describing the appropriate personnel protective clothing, dosimeter requirements, respiratory protection and RCT coverage requirements.

Current conditions for some specific areas are outlined below. If conditions change, the appropriate radiological controls and postings will be implemented in accordance with approved BHI procedures. The PUREX Facility contains a variety of radiological areas. The areas include the following:

- Radiological Buffer Areas (RBA),
- Fixed Contamination Areas (FCA),
- Contamination Areas (CA),

- High Contamination Areas (HCA),
- Radiation Areas,
- High Radiation Areas (HRA), and
- Airborne Radioactivity Areas (ARA).

The areas of the building most frequently entered for S&M activities consist of FCAs, RBAs, and CAs. These areas are surveyed and controlled in accordance with BHI procedures and the Radiation Protection Program.

The canyon area of the U Plant Facility is posted an ARA, HCA, and HRA. Entry into this area requires at a minimum a RWP, Level 1 ALARA review, technical assessments for air sampling and survey requirements, a HRA Access Plan, and a current survey of the area. Efforts are in progress to reduce the area posted as a HRA and controls will be modified as appropriate to meet program requirements.

8.0 EMERGNECY MANAGEMENT

Administration (preparedness and planning) of the emergency management program for the PUREX Facility is found in BHI-SH-03, *Emergency Management Program*. BHI-SH-03 meets the requirements of DOE/RL-94-02, *Hanford Emergency Response Plan*, and the applicable emergency management DOE Orders and state and federal regulations.

If an emergency occurs at the PUREX Facility, the response to mitigate would not be part of the S&M, rather would fall under the ERC Emergency Management Program as outlined in BHI-SH-03, which implements the applicable DOE procedures.

The following documents the Emergency Management measures taken at the PUREX Facility during Post-Deactivation Surveillance (S&M):

8.1 EMERGENCY PREPAREDNESS (Training of Personnel)

The PUREX Facility is locked and unoccupied. Entries into the compound are made by surveillance personnel during monthly routine and quarterly surveillances. Therefore, no permanent emergency equipment, communications equipment, warning systems, personal protective equipment, and spill control, and containment supplies are located within the facility.

Prior to routine and quarterly entries, personnel will review appropriate procedures and attend pre-job safety meetings. The procedures, emergency plan, and meetings dictate the appropriate emergency equipment to be taken into the work area(s) and will identify the facility specific hazards and the appropriate evacuation routes and notifications if an incident occurs.

8.2 EMERGENCY PLANNING (Development of the Emergency Action Plan)

Emergency Plans (emergency action plan) have been written to ensure proper response(s) of employees if an emergency occurs. Facility-specific hazards have been outlined in the hazards identification document (Egge 1997) or equivalent. Primary and Alternate Building Emergency Directors (BED), and appropriate evacuation routes have been identified.

8.3 EMERGENCY RESPONSE (Evacuation)

If an emergency or abnormal incident occurs during S&M activities, personnel will evacuate the facility and communicate the abnormal condition information to the Patrol Operations Center on 911 (if using a cellular phone, 373-3800), their supervisor, and the BED.

8.4 EMERGENCY PREVENTION

Performance of post-deactivation S&M activities and personnel training mitigates contamination migration and/or minimizes the potential for unplanned sudden radiological or hazardous releases.

8.5 INCIDENT RESPONSE

The initial response to any emergency is to immediately protect the health and safety of individuals in the immediate area and to initiate a request for emergency response.

9.0 HEALTH AND SAFETY

9.1 FIRE HAZARD ANALYSIS

A PUREX FHA, HNF-SD-WM-FHA-013 (Zinsli 1997), was completed per DOE Order 5480.7A, *Fire Protection*, to assess the fire risks envisioned to remain at the facility and confirmed there are no undue fire hazards to site personnel and the public.

In addition, the FHA is intended to meet the objectives outlined in DOE Order 5480.7A, DOE-RL Implementing Directive 5480.7, and DOE Order 6430.1A, *General Design Criteria*, pursuant to the DOE's Guidance on Performance of Fire Hazards Analysis for a high level waste facility undergoing a significant modification.

9.2 OCCUPATIONAL SAFETY AND HEALTH

The Occupational Safety and Health Administration (OSHA) regulations in 29 CFR 1910 and 1926 apply contractually at all Hanford Government-Owned, Contractor-Operated facilities and DOE contractor and subcontractor employees. These OSHA requirements are mandated by DOE Order 440.1 and DOE 5480.4 and are considered the minimum acceptable standards for implementation.

The OSHA standards pertinent to post-deactivation facility surveillance and maintenance are 29 CFR 1910, "Occupational Safety and Health Standards," and 29 CFR 1926, "Safety and Health Regulations for Construction." The requirements of 29 CFR 1910 are applicable to the routine S&M activities conducted by PUREX personnel, while 29 CFR 1926 requirements are applied to work that is subject to the Davis-Bacon Act.

Prior to routine and quarterly entries, personnel review appropriate procedures and attend pre-job safety meetings. The procedures and meetings note any potential hazards or precautions to be taken at the work area(s).

Compliance with occupational safety and health standards and statutory requirements are conducted in accordance with the following:

- DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards*
- DOE Order 5483.1A, *Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities*
- DOE Order 5480.1B, *Environment, Safety, and Health Program for DOE Operations*.

10.0 SAFEGUARDS AND SECURITY

Currently, the PUREX Facility is classified as a Hazard Category 2 nuclear facility. A letter requesting writing off the remaining Special Nuclear Material inventory as normal operating loss has been approved by RL. The following is a summary of the residual radionuclides estimates for the PUREX Facility.

Table 10-1. PUREX Facility Residual Nuclides Summary

LOCATION	MEASURABLE PLUTONIUM (grams)	ESTIMATED PLUTONIUM (grams)	ESTIMATED FISSION PRODUCTS (Curies)
Canyon (includes L Cell)	4,296	930 – 4,800	200 – 500 Ci
White Room	N/A	50 – 500	0
N Cell	1,643	N/A	0
Product Removal Room	1,199	N/A	0
Deep Bed Filters	N/A	200 – 400	40 – 400 Ci
Railroad Tunnels[+]	N/A	200 – 1,000	2.7 Mci
TOTALS	7,138	1,380 – 6,700	

[+] Owned and operated by B&W Hanford Company

If during post-deactivation surveillance of the PUREX Facility, any item or container is found that may be suspected of containing special nuclear material, notification shall be made immediately to the manager of B&W Protec Safeguards and appropriate BHI management.

10.1 SECURITY

During the post-deactivation surveillance, the 202-A Building, ancillary buildings, the badge house, and the vehicle gate are unoccupied, locked, and/or sealed. Physical access is deterred by a chain-linked perimeter fence. Entry into the PUREX Facility fenced areas and buildings is limited to personnel with proper training or individual accompanied by trained personnel. Signs are posted accordingly throughout the facility identifying restricted access. The facility is entered only for quarterly and routine surveillances, as described in Section 2.0, "Facility Activities." Access control for the PUREX Facility and other surplus facilities, is described in BHI-FS-01, Procedure 1.1, "Access Control and Administration for ERC Facilities."

There are no intrusion alarms or routine security patrols within the perimeter fence of the PUREX Facility. Hanford Patrol continues to provide routine security patrols in the vicinity as part of their patrols throughout the 200 East Area.

11.0 COST AND SCHEDULE

A cost estimate for performance of the PUREX Facility's S&M program is outlined below.

Table 11-1. Surveillance and Maintenance Cost Estimate

Description	Total
FY 1997 TOTAL COST (Write Procedures)	$ 197,346
FY 1998 TOTAL COST (Extra hrs. for initial surveillance)	600,000
FY 1999 TOTAL COST	600,000
FY 2000 TOTAL COST	620,000
FY 2001 TOTAL COST	640,000
FY 2002 TOTAL COST	640,000
TOTAL	3,297,346

AVERAGE COST FOR FY 97/98/99/00	504,336
AVERAGE COST FOR FY 97/98/99/00/01/02	550,000

11.1 SCHEDULE

At a minimum, four surveillance entries are made each year on a quarterly basis commencing the winter of 1997. The frequency of routine surveillances as identified in Section 3.4 of this plan are identified in the appropriate work packages.

12.0 REFERENCES

10 CFR 830.120, "Quality Assurance Requirements," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

29 CFR 1910, "Occupational Safety and Health Standards," *Code of Federal Regulations*, as amended.

29 CFR 1926, "Occupational Safety and Health Standards for the Construction Industry," *Code of Federal Regulations*, as amended.

40 CFR 61, "National Emissions Standards in Hazardous Air Pollutants," Subpart H, 'National Emission Standards for Emissions of Radionuclide Other Than Radon from Department of Energy Facilities,' *Code of Federal Regulations*, as amended.

40 CFR 265, "Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restriction," *Code of Federal Regulations*, as amended.

40 CFR 302, "Designation Reportable Quantities, and Notifications," *Code of Federal Regulations*, as amended.

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibition," *Code of Federal Regulations*, as amended.

Bhatia, R. K., 1995, *Data Quality Objectives for PUREX Deactivation Flushing*, WHC-SD-EN-TI-283, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

BHI, 1997a, *ERC Maintenance Implementation Plan for Nuclear Facilities*, BHI-01044, Rev. X, Bechtel Hanford, Inc., Richland, Washington.

BHI, 1998a, *D&D Project Manager's Implementing Instructions (PMII)*, BHI-00894, Rev. 1, Bechtel Hanford, Inc., Richland, Washington.

BHI, 1998b, *Training Implementation Matrix*, as amended, CCN 0-55895, letter, M. C. Hughes, BHI, to L. K. Bauer, RL, dated February 9, 1998, Bechtel Hanford, Inc., Richland, Washington.

BHI-DE-01, *Design Engineering Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-EE-02, *Environmental Requirements*, Bechtel Hanford, Inc., Richland, Washington.

BHI-EE-10, *Waste Management Plan*, Bechtel Hanford, Inc., Richland, Washington.

BHI-FS-01, *Field Support Administration*, Bechtel Hanford, Inc., Richland, Washington.

BHI-HR-01, *Human Resources Policies and Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-MA-01, *ERC Policies, Organization, and Responsibilities*, Bechtel Hanford, Inc., Richland, Washington.

BHI-MA-02, *ERC Project Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-PR-01, *ERC Procurement Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BHI-PR-03, *ERC Warehouse Manual*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-01, *ERC Quality Program*, Bechtel Hanford, Inc., Richland, Washington.

BHI-QA-03, *ERC Quality Assurance Program Plan*, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-01, *Hanford ERC Environmental, Safety, and Health Program*, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-02, *Safety and Health Procedures*, Volumes 1, 2, and 4, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-03, *Emergency Management Program*, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-04, *Radiological Control Work Instructions*, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-05, *Industrial Hygiene Desk Instructions*, Bechtel Hanford, Inc., Richland, Washington.

BHI-SH-06, *Quality Services Procedures*, Bechtel Hanford, Inc., Richland, Washington.

BWHC, 1997, *Request for Review and Approval: Second Revised Double-Shell Tank (DST) Waste Profile Sheet and Parameters for Operational Decisions Sheet for PUREX Tanks V11-1 and 216-A-TK-2*, BWHC-9753209 (CCN 058188), letter, S. M. Eiholzer, BWHC, to T. M. Blaak, LHMC, and C. H. Mulkey, LHMC, dated April 10, 1997, B&W Hanford Company, Richland, Washington.

DOE, 1995, *Decommissioning Resource Manual*, DOE/EM-0246, U.S. Department of Energy, Washington, D.C.

DOE Order 440.1, *Worker Protection Management for DOE Federal and Contractor Employees*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.1, *Radiation Protection for Occupational Workers*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.1B, *Environmental, Safety and Health Program for DOE Operations*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.4, *Environmental Protection, Safety, and Health Protection Standards*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.7A, *Fire Protection*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5480.19, *Conduct of Operations Requirements for DOE Facilities*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5483.1A, *Occupational Safety and Health Program for DOE Contractor Employees at Government-Owned Contractor-Operated Facilities*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 5700.6C, *Quality Assurance*, as amended, U.S. Department of Energy, Washington, D.C.

DOE Order 6430.1A, *General Design Criteria*, as amended, U.S. Department of Energy, Washington, D.C.

DOE-RL, 1990, *PUREX Storage Tunnels Dangerous Waste Permit Application*, DOE/RL-90-24, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1996, *Hanford Emergency Response Plan*, DOE/RL-94-02, Release 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE-RL, 1997, *Hanford Facility Dangerous Waste Permit Application, General Information Portion*, DOE/RL-91-28, Rev. 3, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE RLID 5480.7, *Fire Protection*, as amended, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, EPA, and DOE, 1996, *Hanford Federal Facility Agreement and Consent Order*, 6th Amendment, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

Egge, R. G., 1997, *Hanford Surplus Facilities Hazards Identification Document*, BHI-00066, Rev. 4, Bechtel Hanford, Inc., Richland, Washington.

HSRCM-1, *Hanford Site Radiological Control Manual*, as amended, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq., as amended.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Codes*, as amended.

WHC, 1993, *A Brief History of the PUREX #1 Ventilation Filter Flooding Problem with Analyses of the Liquids Taken from the Sump*, 17530-93-074 (CCN 058189), Memo-to-File, R. L. Hobart, Westinghouse Hanford Company, Richland, Washington.

WHC, 1995a, *PUREX Deactivation End Points*, WHC-SD-WM-TPP-053, Westinghouse Hanford Company, Richland, Washington.

WHC, 1995b, *Quality Assurance Program Plan for Radionuclide Airborne Emission Monitoring*, Westinghouse Hanford Company, Richland, Washington.

Zinsli, L. C., 1997, *Fire Hazards Analysis for Plutonium Uranium Extraction Plant*, HNF-SD-WM-FHA-013, Rev. 1, Fluor Daniel Hanford Inc., Richland, Washington.

APPENDIX A

Hazardous Material Remaining at the Plutonium Uranium Extraction Facility

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
GENERAL	Lead as a solid component, such as paint, light bulb contacts, washers affixing transite, sanitary water line joints packed with lead mesh; steam, air, and water safety relief valve seals; components of control panels -- all abandoned in place and stable during surveillance and maintenance (S&M). Zinc used in galvanized piping; zinc, silver, and lead contacts are used in the electrical system. Lead and zinc were used as soldering in the electrical and plumbing systems. All stable during S&M. Mercury in thermostats and in electronic switches (i.e., electronic switches) throughout 202-A. Mercury vapor lights were also used for exterior lighting. Asbestos abandoned throughout the plant as a solid component such as in transite siding, utility line insulation, and gasket material. Asbestos is especially notable in 206-A and 293-A. Refer to Asbestos Assessment for additional descriptions of asbestos remaining at the Plutonium Uranium Extraction (PUREX) Facility. Unknown organic in liquid films, greases, and solid residues in bearings and gearboxes throughout the plant. Stable during S&M period. Undetermined quantities of polychlorinated biphenyls (PCB) exist in transformers, ballasts, and lubricants/gear oil once used throughout the plant.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
151 DIVERSION BOX	Per the Tank Waste Remediation System (TWRS) Part B Permit Application, the diversion box is permitted to provide containment for leaks in transfer lines. Leaks have potential for containing hazardous waste constituents. See TWRS Part B for additional information. The diversion box's final operational and regulatory status may change at TWRS discretion.	
151 DIVERSION BOX EQUIPMENT ▪ 241-A-151 Diversion Box Equipment (Transfer Lines)	Per TWRS Part B Permit Application, the diversion box is permitted to provide containment for leaks in transfer lines. Leaks have potential for containing hazardous waste constituents. See TWRS Part B for additional information. The diversion box's final operational and regulatory status may change at TWRS discretion.	
151 DIVERSION BOX EQUIPMENT ▪ 241-A-151 Diversion Box Equipment ▪ (241-A-302A Catch Tank)	Per the TWRS Part B Permit Application, the catch tank is permitted for hazardous waste storage. See TWRS Part B for additional information. The tank's final operational and regulatory status may change at TWRS discretion.	Heel Volume: 330 gallons Final solution analysis: pH: 11.432 Cd: 1.02 ppm Cr: 0.245 ppm
202-A FACILITY EXTERIOR ▪ 291-AK	See "General" Section on this list for description of remaining material.	
202-A FACILITY EXTERIOR ▪ West PRV	See "General" Section on this list for description of remaining material.	
202-A FACILITY EXTERIOR	See "General" Section on this list for description of remaining material.	
202-A PUMP/TRAP PITS	See "General" Section on this list for description of remaining material.	
202-A PUMP/TRAP PITS EQUIPMENT	See "General" Section on this list for description of remaining material.	
203-A CONTROL ROOM AND PUMPHOUSE	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
203-A CONTROL ROOM AND PUMPHOUSE EQUIPMENT	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas.	Trace amounts to none.
203-A DIKED AREA	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas.	Trace amounts to none.
203-A TRUCK PAD	See "General" Section on this list for description of remaining material.	
203-A TRUCK PAD PIPING	All tanks in the 203-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid in these areas.	Trace amounts to none.
206-A FRACTIONATOR	Asbestos	Large amount of friable inside fractionator building.
FRACTIONATOR EQUIPMENT	See "General" Section on this list for description of remaining material.	
FRACTIONATOR INSTRUMENT SHACKS 1 & 2	See "General" Section on this list for description of remaining material.	
FRACTIONATOR EXTERIOR	See "General" Section on this list for description of remaining material.	
211-A	All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in these areas.	
211-A EXTERIOR	See "General" Section on this list for description of remaining material.	
211-A EXTERIOR PIPING	All tanks in the 211-A area have been flushed and emptied to a minimum heel and their associated piping drained. However, there may exist the potential for residual nitric acid, sulfuric acid, KOH, NOH, TBP, NPH, AFAN and ANN in these areas.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
212-A	Fission Product Load Out Station Lead Shielding around piping	Quantity unknown
212-A EXTERIOR	See "General" Section on this list for description of remaining material.	
213-A	See "General" Section on this list for description of remaining material.	
213-A EXTERIOR	See "General" Section on this list for description of remaining material.	
214-A/B/C/D	See "General" Section on this list for description of remaining material.	
216-A SPUD CELLAR	Lead Shielding Wrapped around pipe (18"x 24"x 1/8")	~10 kg (22 lb)/Solid
216-A-42 DIVERSION BASIN	See "General" Section on this list for description of remaining material.	
216-A-42A PUMP STATION	See "General" Section on this list for description of remaining material.	
216-A-42B VALVE BOX	See "General" Section on this list for description of remaining material.	
216-A-42C VALVE BOX	See "General" Section on this list for description of remaining material.	
216-A-42D DIVERSION BOX	See "General" Section on this list for description of remaining material.	
216-A-42E DIVERSION BOX	See "General" Section on this list for description of remaining material.	
291-A STEAM TURBINE	See "General" Section on this list for description of remaining material.	
291-A ▪ STEAM TURBINE	See "General" Section on this list for description of remaining material.	
291-A EXHAUST FAN PAD	See "General" Section on this list for description of remaining material.	
291-AD	See "General" Section on this list for description of remaining material.	
291-AD MONITORING EQUIPMENT	See "General" Section on this list for description of remaining material.	
291-AE	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
291-AE FILTERS	See "General" Section on this list for description of remaining material.	
291-AE EXTERIOR	See "General" Section on this list for description of remaining material.	
291-AH	See "General" Section on this list for description of remaining material.	
291-AH MONITORING EQUIPMENT	See "General" Section on this list for description of remaining material.	
292-AB	<u>Lead Shielding</u> PING Monitor MFRAM Monitor	 ~113.7 kg (250 lb)/Solid ~102.4 kg (225 lb)/Solid
292-AB EXTERIOR	See "General" Section on this list for description of remaining material.	
293-A	<u>Dissolver Off-Gas Station</u> Asbestos Lead: 2 (350 lb) lead shielding pigs <u>Basement</u> (2) 300 lb lead shielding pigs encased by one layer of stainless steel (1) 100 lb lead beta cam	 Large amount of friable inside building 318.2 kg (700 lb)/Solid 273 kg (600 lb)/Solid 45.5 kg (100 lb)/Solid
293-A EQUIPMENT	See "General" Section on this list for description of remaining material.	
294-A	See "General" Section on this list for description of remaining material.	
294-A SYSTEMS	See "General" Section on this list for description of remaining material.	
2701-AB BADGEHOUSE	See "General" Section on this list for description of remaining material.	
2701-AB BADGEHOUSE EXTERIOR	See "General" Section on this list for description of remaining material.	
2709-A	Building has been removed from compound.	
2711-A and 2712-A	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
2711-A and 2712-A EQUIPMENT	See "General" Section on this list for description of remaining material.	
2714-A	See "General" Section on this list for description of remaining material.	
2714-U SHED	See "General" Section on this list for description of remaining material.	
2714-U EXTERIOR	See "General" Section on this list for description of remaining material.	
AQUEOUS MAKEUP ROOMS (AMU) AND ANNEX EXTERIOR	Lead washers affixing transite	Throughout building exterior
AMU	See "General" Section on this list for description of remaining material.	
AMU ELEVATOR	See "General" Section on this list for description of remaining material.	
AMU 4TH FLOOR	See "General" Section on this list for description of remaining material.	
295-A ASD SHACK	See "General" Section on this list for description of remaining material.	
ASD SYSTEM	See "General" Section on this list for description of remaining material.	
ASD CAISSON	See "General" Section on this list for description of remaining material.	
ASD VALVE PIT	See "General" Section on this list for description of remaining material.	
CANYON EAST CRANE	See "General" Section on this list for description of remaining material.	
CANYON SLAVE CRANE	See "General" Section on this list for description of remaining material.	
CANYON WEST CRANE	See "General" Section on this list for description of remaining material.	
CANYON POOL CELL AND SLUG STORAGE BASIN	Lead counterweights, wrapped in a bundle, are on the south end of a lifting yolk located on a rack in the slug storage basin.	401 kg (~885 lb)/Solid Approximately 30 lead counterweights (2"x3"x12")
CANYON C CELL DECK ACCESS AIRLOCK	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
CANYON F CELL DECK VIEWING WINDOW	Lead *in* viewing window.	Unknown quantity
CANYON/A-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver moderator lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (~83.6 lb)/Liquid
	Lead counterweights	89 kg (195.9 lb)/Solid
CANYON/B-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver moderator lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (~83.6 lb)/Liquid
	Lead counterweights	167 kg (367.3 lb)/Solid
CANYON/C-CELL	Ag in Silver Reactor	Unknown quantity: Full charge is 250 lb $AgNO_3$ (670 g-mol Ag)
	Dissolver lining: cadmium	~43 kg (~94.6 lb)
	Dissolver thermowells: mercury	~38 kg (83.6 lb)/Liquid
	Lead counterweights	111.9 kg (246.2 lb)/Solid
CANYON/D-CELL	Lead counterweights	24.1 kg (53 lb)/Solid
CANYON/E-CELL	Lead: counterweight jumpers	254.3 kg (559.5 lb)/Solid 410.1 kg (902.2 lb)/Solid
CANYON/F-CELL	Lead: counterweights shielding	1133.6 kg (2494 lb)/Solid 536.4 kg (1180 lb)/Solid
	Chromium in floor debris: concrete solids contaminated with solutions from E Cell process.	Trace amounts throughout E-Cell floor
CANYON/G-CELL	Lead: counterweights jumpers	531.8 kg (1170 lb)/Solid 90.9 kg (200 lb)/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/H-CELL	Lead counterweights	303.2 kg (664.9 lb)/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
CANYON/J-CELL	Lead: counterweights jumpers	779 kg (1713.7 lb)/Solid 259.3 kg (570.5 lb)/Solid
	Cadmium: 4 Neutron monitor pigs (1 from J4, 3 from J6)	23.6 kg (52 lb) total/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/K-CELL	Lead: counterweights shielding jumpers	254.3 kg (559.5 lb)/Solid 32.1 kg (70.6 lb)/Solid 45.5 kg (100 lb)/Solid
	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
CANYON/L-CELL	Lead counterweights	310.1 kg (682.3 lb)/Solid
CANYON DECK	Lead sheets on deck: (2) 2'x4'x$^{1}/_{16}$"	13.7 kg (30 lb)/Solid
CANYON LOBBY	See "General" Section on this list for description of remaining material.	
CHANGE ROOMS	See "General" Section on this list for description of remaining material.	
COMPRESSOR ROOM	See "General" Section on this list for description of remaining material.	
COMPRESSOR ROOM ▪ PROCESS AND INSTRUMENT AIR	See "General" Section on this list for description of remaining material.	
CONTROL ROOMS, OFFICES AND MAINTENANCE SHOPS	See "General" Section on this list for description of remaining material.	
HEAD END, CENTRAL, POWER CONTROL ROOMS AND OFFICES	See "General" Section on this list for description of remaining material.	
HEAD END, CENTRAL, POWER CONTROL ROOMS AND OFFICE LIGHTING	See "General" Section on this list for description of remaining material.	
271-AB	See "General" Section on this list for description of remaining material.	
271-AB LIGHTING	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
MAINTENANCE SHOPS	See "General" Section on this list for description of remaining material	
SWP LOBBY	See "General" Section on this list for description of remaining material.	
295-AC CSL SHACK	See "General" Section on this list for description of remaining material.	
CSL SYSTEM	See "General" Section on this list for description of remaining material.	
CSL CAISSON	See "General" Section on this list for description of remaining material.	
295-AD CWL SHACK	See "General" Section on this list for description of remaining material.	
CWL SYSTEM	See "General" Section on this list for description of remaining material.	
CWL CAISSON	See "General" Section on this list for description of remaining material.	
CWL PIT	Lead counterweight.	2.3 kg (5 lb)/Solid
EAST MEZZANINE AND CANYON SUPPORT ROOMS	Residual hydraulic oil in pneumatic system lines.	Quantity unknown.
EAST SWITCH GEAR ROOM	See "General" Section on this list for description of remaining material.	
HOT SHOP	See "General" Section on this list for description of remaining material.	
LAB CENTER CORRIDOR AND CHANGE/LUNCH ROOMS	See "General" Section on this list for description of remaining material.	
LAB HVAC ROOM	*Lead Shielding:* *6 lead sheets (6"x18"x1/8")*	*2.5 kg (5.5 lb)/Solid*
LAB HVAC EQUIPMENT	See "General" Section on this list for description of remaining material.	
LAB ICP FILTER	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
LABS	Decon Room (under hood 31): 7 lead bricks (25 lb each) 2 lead sheets (12"x12"x1/4") Outside Lab 5 in Corridor in Door 4: 2 lead sheets (12"x12"x1/8") 2 lead sheets (6"x14"x1/8") Outside Lab 5 in Corridor in Door 6: 4 lead sheets (12"x12"x1/8") Outside Lab 5 in Corridor in Door 10: 1 lead sheet (1"x8"x30")	 79.5 kg (175 lb)/solid 13.4 kg (29.4 lb)/solid 7.4 kg (14.7 lb)/solid 3.9 kg (8.6 lb)/solid 13.4 kg (29.4 lb)/solid 44.6 kg (98.2 lb)/solid
LAB COUNTING ROOM EQUIPMENT	See "General" Section on this list for description of remaining material.	
LAB HOODS	See "General" Section on this list for description of remaining material.	
LAB DOCK	See "General" Section on this list for description of remaining material.	
LOADING DOCKS	See "General" Section on this list for description of remaining material.	
M-CELL	See "General" Section on this list for description of remaining material.	
MOBILE OFFICES	See "General" Section on this list for description of remaining material.	
N-CELL	Lead shielding: 8 Leaded glass panels for Upper and Lower Control Room. 2 Lead-filled vault doors to Lower Control Room.	 3869.1 kg (8512 lb)/Solid 3 Upper and 3 Lower at 568.2 kg (1250 lb) each 2 Upper at 230 kg (506 lb) each ~1818.2 kg (~4000 lb) total/Solid

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
N-CELL GLOVEBOXES	Bagging Box, Conveyor Housing, and Secondary Canning Glovebox with stainless steel and lead sides.	340.9 kg (750 lb) total/Solid 113.6 kg (250 lb) each
	Lead glass and packing on Secondary Canning Glovebox	77.3 kg (170 lb)/Solid
	Lead Acryl window on Vessel Glovebox	8.2 kg (18 lb)/Solid
	Powder Load Out and Maintenance Glovebox with stainless steel and lead sides.	527.3 kg (1160 lb)/Solid
	Lead Acryl, both attached and detached on Calciner Glovebox.	Quantity unknown
	Lead packing as needed to fill window installation cavities.	Quantity unknown
N-CELL ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
PAINT SHOP	See "General" Section on this list for description of remaining material.	
295-AB PDD SHACK	See "General" Section on this list for description of remaining material.	
PDD SYSTEM	See "General" Section on this list for description of remaining material.	
PDD CAISSON	Aerosol cans (contents unknown)	2 buckets with miscellaneous tools and aerosol cans
PDD SAMPLE PIT	See "General" Section on this list for description of remaining material.	
NEW PDD SHACK	See "General" Section on this list for description of remaining material.	
PIPE AND OPERATING GALLERY	See "General" Section on this list for description of remaining material.	
PIPE AND OPERATING GALLERY SYSTEMS	See "General" Section on this list for description of remaining material.	
PIV ROOM	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
PR ROOM	Lead shielding: Q-Cell piping (Q686 and Q619)	Quantity unknown (piping runs along PR Rm.)
PR ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
PR ROOM GLOVEBOXES	Lead shielding: L14 Loadout Glovebox	294.5 kg (648 lb)/Solid
Q-CELL	Lead-filled door to Process Cell used as shielding. <u>Q-Cell Outer Lobby</u> (18) 86.75" x 35.5" x 2" doors with lead plexiglass viewing windows stored at the bottom of the Q Cell stairwell near Column 9.	1818.2 kg (4000 lb)/Solid 18 leaded plexiglass viewing windows. (percentage of lead unknown)
Q CELL CONTROL ROOM	See "General" Section on this list for description of remaining material.	
Q CELL LOADOUT ROOM	See "General" Section on this list for description of remaining material.	
Q CELL GLOVEBOXES	Leaded glass in 31 portholes on hood face used as shielding.	140.9 kg (310 lb) total weight (percentage lead content unknown)/Solid
Q CELL AMU	See "General" Section on this list for description of remaining material.	
Q CELL MAINTENANCE HOOD ROOM	See "General" Section on this list for description of remaining material.	
Q CELL VAULT ROOM	See "General" Section on this list for description of remaining material.	
R-CELL	Potential PCBs in pulsar lubricant	Unknown quantity: once used for lubrication
R CELL EQUIPMENT	See "General" Section on this list for description of remaining material.	
R CELL EXTERIOR	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
SAMPLE GALLERY	<u>Six In Line Monitors</u> (approx. 100 lb of lead clad in stainless steel in each monitor) ▪ 1 on G5 w/no lead counterweights. ▪ 2 on H3 w/(8) lead 25-lb counterweights. ▪ 1 on J4 w/(4) lead 25 lb counterweights. ▪ 1 on K4 w/(4) lead 25 lb counterweights. ▪ 1 on L2 w/(4) lead 25 lb counterweights. Lead Shielding on E3 and F15 Jet Air Valves. Lead Shielding on F26 Pipe Chase. Lead Shielding on Drip Tray left of J1 sampler. <u>Manipulator Room</u> ▪ 2 manipulators w/(4) 10 lb counterweights each. ▪ 1 portable lead shielding board approx. (4'x4'x1/2") <u>Portable Lead Shielding Board</u> ▪ 1 in front of Sampler U3 ▪ 1 against column 13 Lead construction on ventilation containment located across of L4 sampler.	273 kg (600 lb)/Solid plus ▪ 0 kg ▪ 91 kg (200 lb)/Solid ▪ 45 kg (100 lb)/Solid ▪ 45 kg (100 lb)/Solid ▪ 45 kg (100 lb)/Solid 2.3 kg (5 lb)/Solid Unknown Quantity/Solid approximately 25 lb/Solid ▪ 36 kg (80 lb)/Solid ▪ 213 kg (469 lb)/Solid ▪ 213 kg (469 lb)/Solid ▪ 213 kg (469 lb)/Solid Unknown Quantity/Solid
SAMPLE GALLERY CHEMICAL HEADERS	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY DECON HOOD	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY HOOD HVAC	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY HOOD HVAC STATION	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
SAMPLE GALLERY IODINE MONITORS	<u>DOG Iodine Monitor</u> ▪ Lead cap ▪ Lead siding and a lead board underneath monitor. <u>F1 Iodine Monitor</u> ▪ Lead glass	▪ Unknown Quantity/Solid ▪ Unknown Quantity/Solid ▪ Unknown Quantity/Solid
SAMPLE GALLERY LOADIN HOODS	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY N-CELL HALON FIRE SYSTEM	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY N-CELL VACUUM PUMP	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY PDD NEUTRALIZATION	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY ROOM EXHAUST	See "General" Section on this list for description of remaining material.	
SAMPLE GALLERY SAMPLERS	<u>Samplers</u> ▪ Lead glass on sampler faces ▪ Lead doors part of original A-Type samplers' construction. (A3, B3, C3, D3, D4, D5 HOOD, E1, E6, F8, F10, F13, F15, F16, F18, F26, G2, G8, H1, H2, H3, J1, J-23-1, J-23-2, J21, and J22) Lead shielding (3'x6"x1/2") on E6 sampler counter. <u>D1 Cave</u> ▪ Covered and painted lead bricks: walls of D1 cave ▪ Lead glass of *D*1 cave <u>D5 Cave</u> ▪ 50 25-lb bricks on pipe chase above D5 cave ▪ Lead glass of D5 cave ▪ Two glove manipulators: (7)10 lb + (1) 25 lb lead counterweights per manipulator	Unknown Quantity/Solid 20 kg (44 lb)/Solid Unknown Quantity/Solid Unknown Quantity/Solid 568 kg (1250 lb)/Solid Unknown Quantity/Solid 86 kg (190 lb)/Solid

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
SAMPLE GALLERY WASTE COMPACTOR	See "General" Section on this list for description of remaining material.	
295-AA SCD SHACK	See "General" Section on this list for description of remaining material.	
SCD SYSTEM	See "General" Section on this list for description of remaining material.	
SCD CAISSON	See "General" Section on this list for description of remaining material.	
STORAGE GALLERY	Lead: shielding on floor at Column 32 (18" x 30" x 1/2") shielding blanket on northeast floor across from glovebox (24" x 12" x 1/4")	 227.3 kg (~500 lb)/Solid ~13.3 kg (~30 lb)/Solid
STORAGE GALLERY SYSTEMS	See "General" Section on this list for description of remaining material.	
U-CELL	Asbestos	Large amount of friable inside fractionator building.
U-CELL EQUIPMENT	See "General" Section on this list for description of remaining material.	
VENTILATION SUPPLY ROOMS	See "General" Section on this list for description of remaining material.	
PROCESS BLOWER ROOM	See "General" Section on this list for description of remaining material.	
SERVICE BLOWER ROOM	See "General" Section on this list for description of remaining material.	
HVAC AIR SUPPLY	See "General" Section on this list for description of remaining material.	
WEST SWITCH GEAR ROOM	See "General" Section on this list for description of remaining material.	
WHITE ROOM	See "General" Section on this list for description of remaining material.	
WHITE ROOM SYSTEMS	See "General" Section on this list for description of remaining material.	
YARD	See "General" Section on this list for description of remaining material.	
281-A DIESEL GENERATORS	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
DIESEL GENERATORS	See "General" Section on this list for description of remaining material.	
CASE 4 ▪ 202-A VENTILATION	See "General" Section on this list for description of remaining material.	
CASE 4 ▪ ELECTRICAL	See "General" Section on this list for description of remaining material.	
CASE 4 ▪ FACILITY OFF-GAS CONDENSATE CATCH TANKS	Various chemical residue as a result of PUREX operations including corrosion by-products. Verified via TK-V11-1 sample results, process knowledge and correspondence BWHC-9753209 (BWHC 1997).	
CASE 5 ▪ PR ELEVATOR	See "General" Section on this list for description of remaining material.	
CASE 6 ▪ ELECTRICAL	See "General" Section on this list for description of remaining material.	
CASE 6 ▪ FH-V11-1 (#1 FILTER)	Ammonium Nitrate salts from gas phase reactions during PUREX operation and corrosion by-products. Identified via correspondence 17530-93-074 (WHC 1993).	
CASE 6 ▪ FH-V11-2 (#2 FILTER)	Various chemical residue as a result of PUREX operations including corrosion by-products and Ammonium Nitrate salts. Verified present via TK-V11-1 sample results and correspondence BWHC-9753209	
CASE 6 ▪ HP STEAM	See "General" Section on this list for description of remaining material.	
CASE 6 ▪ SANITARY SEWER	See "General" Section on this list for description of remaining material.	
CASE 6 ▪ SANITARY WATER	See "General" Section on this list for description of remaining material.	

LOCATION(*)	MATERIAL DESCRIPTION	QUANTITY/STATE
CASE 6 ▪ UTILITY RAW WATER	See "General" Section on this list for description of remaining material.	
RAILROAD CUT**	See "General" Section on this list for description of remaining material.	
RAILROAD STORAGE TUNNEL #1 AND #2 EXHAUST FANS**	See "General" Section on this list for description of remaining material.	
RAILROAD TUNNEL (BETWEEN VERTICAL DOOR AND WATER DOORS)**	Lead bricks covering "HIGH RADIOACTIVE WASTE TRANSFER LINES" 9.14 m (30 ft), north of door B20 Lead blankets cover radioactive waste transfer lines encasement, 7.62 m (25 ft.) south of door B20 Lead blankets covering excavated concrete at entry to storage tunnel 2 (218-E-15) spur	287 lead bricks with a total weight of 7354.28 kg (16,301.6 lb) 20 lead blankets with a total weight of 1322.86 kg (2,546 lb) 2 lead blankets with a total weight of 83.48 kg (184 lb)
RAILROAD STORAGE TUNNELS 218-E-14 AND 218-E-15 **	A description and inventory of the hazardous waste stored in the tunnel may be found in DOE/RL-90-24, Rev. 2, *Hanford Facility Dangerous Waste Permit Application, PUREX Storage Tunnels Part A and B* (DOE-RL 1990)	
WATER FILLED DOORS**	See "General" Section on this list for description of remaining material.	
WEST CRANE MAINTENANCE PLATFORM (WCMP)	Lead lined camera assembly on WCMP	Quantity unknown
ELECTRICAL POWER	See "General" Section on this list for description of remaining material.	

* See "General" section, for areas that do not contain specifically identifiable materials. This list is updated to reflect any additional findings during the PUREX facility deactivation activities.

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