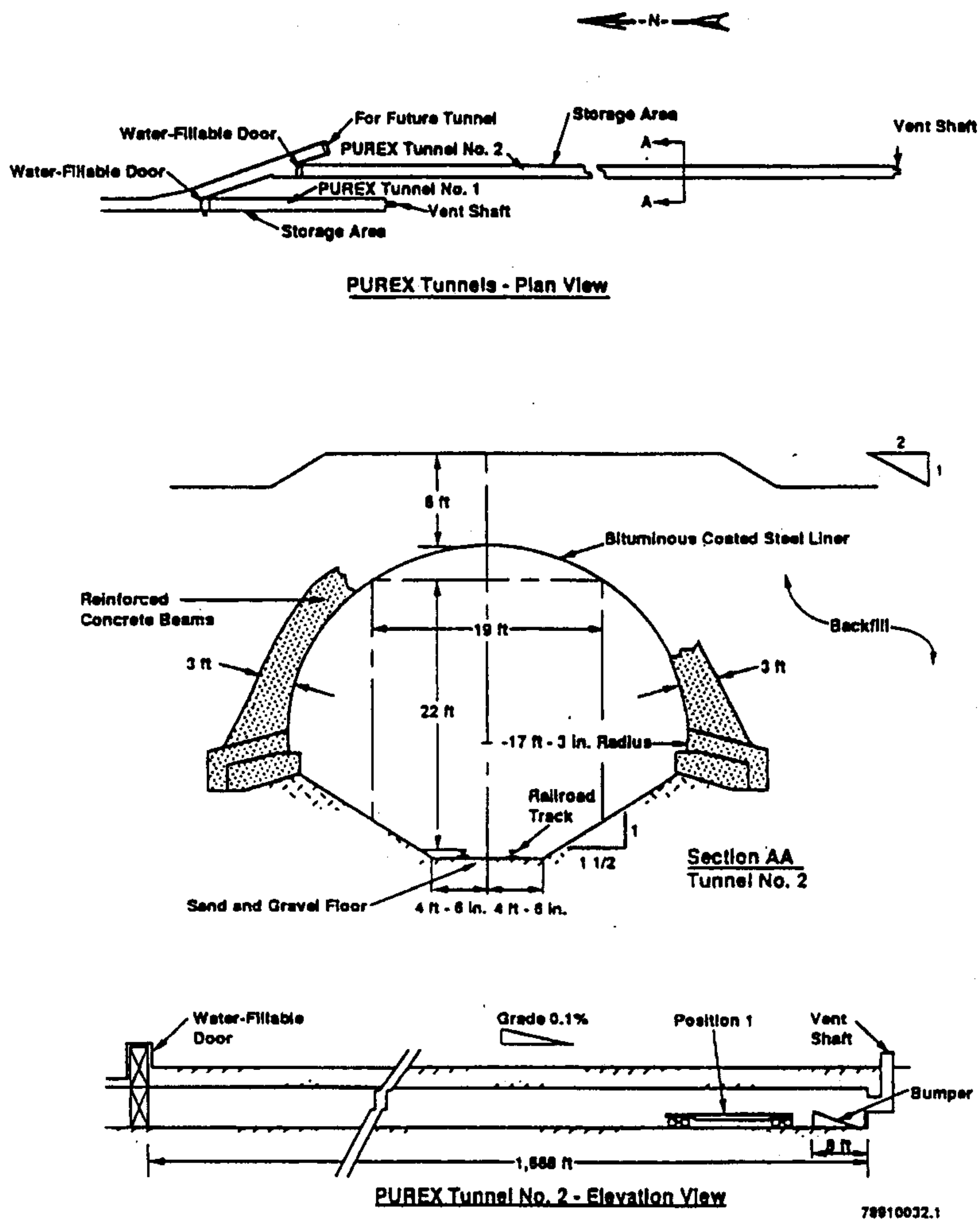

Figure 2-4. The PUREX Storage Tunnel Number 2

CONTENTS

TABLE

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GLOSSARY

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

METRIC CONVERSION CHART

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

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

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

3.0 WASTE ANALYSIS PLAN

This chapter provides information on the chemical, biological, and physical characteristics of the dangerous waste stored in the PUREX Storage Tunnels. Waste stored in the tunnels is mixed waste as a result of radioactive contamination. Because the dangerous waste is an integral part of radioactively contaminated material, this waste is managed as a mixed waste. The PUREX Storage Tunnels provide the necessary shielding for the protection of employees and the environment.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSES

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

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

In general, dangerous waste is either attached to, contained within, or actually is material removed from the PUREX Plant and other onsite sources. Changes in the amount of dangerous waste stored will be updated annually in the annual dangerous waste report submitted to Ecology. Future storage of barium and selenium may occur in Tunnel Number 2. The PUREX Storage Tunnels are permitted as a miscellaneous unit under WAC 173-303-680 because the tunnels are not a typical containerized storage unit. That is, the bulk of the material stored in the tunnels is not placed in a container; rather, this material is placed on a portable device (railcar) used as a storage platform. In general, the mixed waste stored in the PUREX Storage Tunnels is encased or contained within carbon or stainless steel plate, pipe or vessels that meets the WAC 173-303-040 definition of container. Therefore, the mixed waste normally is not exposed to the tunnel environment.

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

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

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

3.2 TRACKING SYSTEM

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

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

3.3 FACILITY DESCRIPTION

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

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

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

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

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

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

The storage area is that portion of the tunnel that extends southward from the water-fillable door. Inside dimensions of Tunnel Number 1 are 109.1 meters long, 6.7 meters high, and 5.9 meters wide. Ceiling and walls are 35.6-centimeters thick and constructed of 30.5- by 35.6-centimeter creosote pressure-treated Douglas fir timbers arranged side by side. The first 30.5 meters of the east wall are constructed of

0.9-meter-thick reinforced concrete. A 40.8-kilogram mineral-surface roofing material was used to cover the exterior surface of the timbers before placement of 2.4 meters of earth fill. The earth cover serves as protection from the elements and as radiation shielding. The timbers that form the walls rest on reinforced concrete footings 0.9 meter wide by 0.3 meter thick. The floor consists of a railroad track laid on a gravel bed. The space between the ties is filled to top-of-tie with gravel ballast. The tracks are on a 1.0 percent downward slope to the south to ensure that the railcars remain in their storage position. A railcar bumper is located 2.4 meters from the south end of the tracks to act as a stop. The capacity of the storage area is eight, 12.8-meter-long railcars.

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

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

- A combination of steel and reinforced concrete was used in the construction of the storage area for Tunnel Number 2 rather than wood timbers, as used in Tunnel Number 1.
- Tunnel Number 2 is longer, having a storage capacity of five times that of Tunnel Number 1.
- The floor of Tunnel Number 2, outboard of the railroad ties, slopes upward to a height of approximately 1.8 meters above the railroad bed, whereas the floor in Tunnel Number 1 remains flat all the way out to the sidewalls.
- The railroad tunnel approach to Tunnel Number 2 angles eastward then angles southward to parallel Tunnel Number 1. The approach to Tunnel Number 1 is a straight extension southward from the PUREX Plant. Center-line to center-line distance between the two tunnels is approximately 18.3 meters.

The physical structure of the water-fillable door at the north end of Tunnel Number 2 essentially is identical to the water-fillable door for Tunnel Number 1. The water-fillable door for Tunnel Number 2 is approximately 57.9 meters south and 18.3 meters east of the water-fillable door for Tunnel Number 1. As of March 1997, the door is empty and there is no plan to fill the door.

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

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

The first railcar was placed in storage in December 1967. Table 3-1 contains an approximate inventory of waste stored in the PUREX Storage Tunnels.

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

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

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

3.3.1 Process and Activities

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

3.3.2 Physical Characterization of Material to be Stored

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

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

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

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

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

Because dangerous waste is an integral part of radioactively contaminated material, the dangerous waste is managed as mixed waste. Table 3-1 contains an inventory of waste stored within the PUREX Storage Tunnels.

3.5 WASTE ANALYSIS PARAMETERS

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

3.5.1 Waste Identification

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

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

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

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

Because the dangerous waste is an integral part of radioactively contaminated material, this material is managed as a mixed waste. Table 3-1 provides an approximation of the total amount of waste contained in the PUREX Storage Tunnels.

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

3.5.1.1 Lead

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

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

Sampling and chemical analysis is not performed on lead associated with the material placed in the PUREX Storage Tunnels. Therefore, the accuracy of the estimate on the amount of lead presently stored in each tunnel is limited to the data available from process knowledge. Counterweights on equipment dunnage and lead used for shielding cannot be quantified by existing historical records and are not included in the amount of lead listed on Table 3-1. However, if removed from the tunnels, the material will be examined and any suspect attachments will be removed, evaluated, and disposed of in accordance with established methods.

3.5.1.2 Mercury

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

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

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

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

Sampling and chemical analysis is not performed on mercury associated with the dissolvers stored in Tunnel Number 2. The quantity of mercury present in each thermowell is documented on Table 3-1.

3.5.1.3 Silver

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

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

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

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

Provisions for taking samples of the packing were not provided in the design of the vessels. Therefore, sampling and chemical analysis are not performed for silver salts before placing a silver reactor in storage. However, for accountability, the total silver content (Table 3-1) is considered to be silver nitrate, the salt that exhibits the characteristics of both ignitability and toxicity.

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

3.5.1.4 Chromium

Presently, chromium stored in Tunnel Number 2 is contained within a failed concentrator removed from the PUREX Plant, and within stainless steel containers received from the 324 Building. The concentrator is a vertical tube structure that was used to concentrate aqueous streams from the final uranium cycle, final plutonium cycles, final neptunium cycles, and condensate from the acid recovery system for recycle. Following service, the concentrator was inspected and found to contain silicate solids with high levels of chromium from the corrosion of stainless steel. The existence of chromium within the 324 Building waste was determined through process knowledge. Chromium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D007 [WAC 173-303-090(8)]. The potential for the chromium stored in Tunnel Number 2 to become exposed to leachate is considered negligible. Tunnel Number 2 is designed and constructed to be weather-tight. Further, the chromium is encased within stainless steel vessels and containers that are stored on railcars above the floor level of the tunnel. Therefore, exposure of the chromium stored in the tunnel to leachate is not considered a credible occurrence.

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

3.5.1.5 Cadmium

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

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

Cadmium exhibits the characteristic of toxicity as determined by the toxicity characteristics leaching procedure and is designated D006 [WAC 173-303-090(8)]. If exposed to a leachate, the quantity of cadmium present could produce an extract having a concentration of greater than or equal to 1 milligram per liter, but less than 100 milligrams per liter; therefore, the mixed waste is managed as a WT02 [WAC 173-303-100(5)].

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

3.5.1.6 Barium

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

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

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

3.5.1.7 Mineral Oil

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

The material safety data sheet for the mineral oil lists a lethal dose (LD50) of 2 grams per kilogram (dermal rabbit). Therefore, the oil designates as a Toxic Category A WT02 [WAC 173-303-100(5)].

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

3.5.1.8 Identification of Incompatible Waste

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

3.5.1.9 Operational Considerations

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

3.5.2 Parameter and Rationale Selection Process

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

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

3.5.2.1 Discarded Chemical Products

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

3.5.2.2 Dangerous Waste Sources

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

3.5.2.3 Dangerous Waste Characteristics

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

- Characteristic of Ignitability – Although the solid silver nitrate has not been tested in accordance with Appendix F of 49 CFR 173, the waste is assumed to be an oxidizer as specified in 49 CFR 173.127(a). Therefore, the silver nitrate waste is assumed to exhibit the characteristic of ignitability under WAC 173-303-090(5) and is designated as D001.
- Characteristic of Corrosivity – Some of the material stored within the tunnels either has contained or has been in contact with corrosive liquids. The standard operating procedure has been to flush vessels with water to recover as much special nuclear material as practical. Also, flushing removes much of the radioactive contamination, minimizing the spread of contamination during handling. Currently, the final aqueous rinse is sampled and analyzed to confirm that the pH is greater than 2 and less than 12.5. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as corrosive waste.
- Characteristic of Reactivity – The waste stored in the tunnels does not meet any of the definitions of reactivity as defined in WAC 173-303-090(7). The waste material is not unstable, does not react violently with water, does not form explosive mixtures, or does not generate toxic gases. Therefore, the waste stored in the PUREX Storage Tunnels is not designated as reactive waste.
- Characteristic of Toxicity – Lead, mercury, silver, chromium, barium, and cadmium are identified on the Toxicity Characteristics list. The quantity of these materials stored in the tunnels is sufficient that, should the substances come in contact with a leachate (an event considered unlikely), the concentration of the extract could be above the limits identified in the list. Therefore, this waste is designated D005, D006, D007, D008, D009, and D011.

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

3.5.2.4 Dangerous Waste Criteria

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

- Toxicity Criteria – Cadmium meets the toxicity criteria in WAC 173-303-100(5) when performing a book designation. Because of the concentrations present, the waste containing these constituents is designated as dangerous waste (DW) and is assigned the dangerous waste number of WT02.
- Persistence Criteria – Currently, no waste stored in the tunnels has been designated as persistent per WAC 173-303-100(6).

3.5.2.5 Waste Designation Summary

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

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

3.5.3 Rationale for Parameter Selection

Refer to Section 3.5.2.

3.5.4 Special Parameter Selection

Refer to Section 3.5.2.

3.5.5 Selection of Sampling Procedures

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

3.5.6 Sampling Strategies

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

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

3.5.6.1 Sampling Methods

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

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

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

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

3.5.6.2 Frequency of Analyses

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

3.5.7 Selection of Sampling Equipment

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

3.5.8 Maintaining and Decontaminating Field Equipment

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

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

3.5.9 Sample Preservation and Storage

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

3.5.10 Quality Assurance and Quality Control Procedures

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

Generally, quality assurance and quality control (QA/QC) requirements for sampling will be divided between paperwork requirements, such as chain-of-custody, and sampling and analysis activities. This section addresses sampling QA/QC requirements. Analytical QA/QC is discussed in Section 3.6.

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

3.5.11 Health and Safety Protocols

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

3.6 LABORATORY SELECTION AND TESTING AND ANALYTICAL METHODS

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

3.6.1 Laboratory Selection

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

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

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

3.6.2 Testing and Analytical Methods

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

3.7 WASTE RE-EVALUATION FREQUENCIES

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

3.8 SPECIAL PROCEDURAL REQUIREMENTS

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

3.8.1 Procedures for Receiving Wastes Generated Offsite

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

3.8.2 Procedures for Ignitable, Reactive, and Incompatible Waste

Presently, the only ignitable, reactive, or incompatible dangerous waste stored in the PUREX Storage Tunnels is the silver nitrate coating on the ceramic packing inside the silver reactors. This material is confined to the interior of a large stainless steel vessel (Section 3.5.1.1) that separates this material from all other waste material stored in the tunnel. The requirements in WAC 173-303-395(1)(a) require 'No Smoking' signs be conspicuously placed wherever there is a hazard present from ignitable or dangerous waste. 'No Smoking' signs are not considered appropriate at the PUREX Storage Tunnels because the tunnels are a designated radiation area. Smoking is not allowed in any radiation area on the Hanford Site and rules prohibiting smoking are strictly enforced. Because the posting of radiation area barriers serves to achieve the no smoking intent of WAC 173-303-395(1)(a), posting and maintaining 'No Smoking' signs are not considered appropriate.

Isolated areas within the PUREX Storage Tunnels have radiation levels in excess of 5 roentgen per hour. Personnel entry into such radiation areas to make periodic inspections [e.g., an annual fire inspection as required by WAC 173-303-395(1)(d) for storage areas containing ignitable waste] would be inconsistent with ALARA guidelines of the Atomic Energy Act of 1954. Therefore, such inspections are not performed.

3.8.3 Provisions for Complying with Land Disposal Restriction Requirements

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

3.8.4 Deviations from the Requirements of this Plan

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

3.9 RECORDKEEPING

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

3.10 REFERENCES

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

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

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

Table 3-1. PUREX Storage Tunnels Inventory.

(Sheet 1 of 4)

PUREX #1 Storage Tunnel (218-E-14)

Tunnel is at its Capacity as of 1/22/65

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

position	
1. & 2..	HA COLUMN AND MISC JUMPERS IN BOX PLACED IN TUNNEL #1 ON 6/60 HA 4,700 CU. FT., 400 CURIES, 5 rem/hr. @60', JUMPRS 2,190 CU. FT., 2,000 CURIES, Pb - ~115 Kg
3.	E-F11 #1 (1WW WASTE) CONCENTRATOR FAILED 7/24/60. PLACED IN TUNNEL #1 ON 7/29/60, 12.5 rem/hr. @100', 1,900 CU. FT., 40, 000 CURIES AFTER FIFTY-FIVE MONTHS SERVICE.
4.	G-E2 CENTRIFUGE. MISC JUMPERS IN BOX AND TWO TUBE BUNDLES. PLACED IN TUNNEL #1 ON 12/24/60 (FUG SER# 762) 2,465 CU. FT., 3,000 CURIES, Pb - ~115 Kg., 1.5 rem/hr. @150'.
5.	E-H4 (3WB) CONCENTRATOR FAILED 1/4/61. PLACED IN TUNNEL #1 ON 1/4/61, 150 mrem/hr. @50', 2,336 CU. FT., 1,000 CURIES. AFTER FIVE YEARS SERVICE.
6.	E-F6 (2\NW WASTE) ORIGINAL CONCENTRATOR FAILED 4/21/61. PLACED IN TUNNEL #1 ON 4/21/61, 5 rem/hr. @ 20', 2,336 CU. FT., 700 CURIES. AFTER FIVE YEARS FOUR MONTHS SERVICE.
7.	E-F11 (1WW WASTE) #2 CONCENTRATOR FAILED 2/1/62. PLACED IN TUNNEL #1 ON 2/8/62, 25 rem/hr. @ 150', 2,336 CU. FT., 40,000 CURIES. AFTER EIGHTEEN MONTHS SERVICE.
8.	E-F6 (2WW WASTE) #3 SPARE CONCENTRATOR FAILED 5/23/64. PLACED IN TUNNEL #1 ON 1/22/65 FLAT CAR 3621. 2400 CU. FT., 700 CURIES, 5 rem/hr. @ 20'

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

The storage area is approximately 514.5 meters long, 7.9 meters high and 10.4 meters wide. The tracks have a one percent downgrade toward the south end of the tunnel. The capacity of the Storage Tunnel is 38-40 modified railroad cars, 12.8 meters long. The Tunnel contains 21 cars as of 2/95.

position	
1.	E-F6 # (2WW WASTE) CONCENTRATOR, TK F 15-2, ONE TUBE BUNDLE AND AGITATOR MOTORS PLACED IN TUNNEL ON 12/12/67 ON CAR 61439 2,400 CU. FT., 700 CURIES, 1.3 rem/hr. @ 100'.
2.	E-F6 #5 (E-H4 3WB) CONCENTRATOR, TWO TUBE BUNDLES PLACED IN TUNNEL ON 3/26/69 ON CAR MILW 60883 2,400 CU. FT., 500 CURIES, 800 mrem/hr. @ 2'.
3.	E-F6 #6 (2WW WASTE) CONCENTRATOR, TWO TUBE BUNDLES FAILED PLACED IN TUNNEL ON 3/19/70 ON CAR 3612. 2,400 CU. FT., 700 CURIES, 500 rem/hr. @ 2'.
4.	L CELL PACKAGE IN A SEALED STEEL BOX (H2-66012) PLACED IN TUNNEL ON 12/30/70 ON CAR MILW 60033 2,400 CU. FT., 500 GRMS Pu, 200 mrem/hr. @ CONTACT.
5.	F2 SILVER REACTOR, F6 DEMISTER, VESSEL VENT LINE STEEL CATWALK AND GUARD RAILS. PLACED IN TUNNEL ON 2/26/71 ON GONDOLA CAR 4610. 2,400 CU. FT., 20 CURIES, Ag - ~625 Kg, 2 rem/hr. @ CONTACT.
6.	MODIFIED A3-1 TOWER, SCRUBBER, LID AND VAPOR LINE PLACED IN TUNNEL ON 12/12/71 ON GONDOLA CAR 4611. 2,400CU. FT., 10 CURIES, 1 rem/hr. @ CONTACT.
7.	A3 DISSOLVER PLACED IN TUNNEL ON 12/22/71 ON NINE FT. SHORTENED CAR B58 2,400 CU. FT., 50 CURIES, Hg - ~45 Kg, 5 rem/hr. @ 5'.
8.	A1W1 FUEL ENDS IN STEEL LINER BOX AND NPR FUEL HANDLING EQUIPT. USED WITH THE SUSPECTED CANISTERS, ON CAR 19808 PLACED IN TUNNEL ON 8/29/72. 800 CU. FT., 17,500 CURIES, 10 rem/hr. @ 150'.
9.	C3 DISSOLVER PLACED IN TUNNEL ON 9/30/72 ON CAR 19811 1590 CU. FT., 50 CURIES, Hg - ~45 Kg., 5 rem/hr. @ 5'.
10.	E-H4 (3WB) CONCENTRATOR, #61 TUBE BUNDLE, PROTOTYPE COOLING COIL AND A F-FI FILTER TANK. PLACED IN TUNNEL 8/30/83 ON CAR CDX-1. 2,400 CU. FT., 500 CURIES, 800 mrem/hr. @ 2'.
11.	A3 DISSOLVER (VESSEL #10 AND HEATER VESSEL #6) PLACED IN TUNNEL ON 1/18/86 ON CAR 3613 3960 CU. FT., 0.81 CURIES, Hg - ~40 Kg., Cd - ~43 Kg., 3 mrem/hr. @ 3'.
12.	WHITE BOX (H2-58456) CONTAINING EIGHT TUBE BUNDLES #S 57.

Table 1. PUREX Storage Tunnels Inventory

(Sheet 3 of 4)

J5 TANK (VESSEL #30). FI COND (VESSEL #13) AND F12-B CELL BLK. OLD FOUR-WAY DUMPER. DISS YOKE AND FLANGE PLATE, 3 rem/hr. @ 1' PLACED IN TUNNEL ON 1/21/86 ON CAR 19806. 2,500 CU. FT., 90 CURIES.
L-I PULSER, 2-COLUMN CARTRIDGES, 1-JUMPER CUTTER, 3-JUMPER ALIGNMENT TOOLS, 9-EXTERIOR DUMPING TRUNNIONS, 10-PUMPS, 3-AGITATORS, 4-TUBE BUNDLES, 2-VENT JUMPERS AND 7-YOKES. PLACED IN TUNNEL ON 11/18/87 ON CAR PX-10 (10A-19380) & RACK H2-96629.50. 50 TONS, 3,600 CU. FT., 33,740 CURIES (REF: LETTER 12110-88-074), Pb - ~2540 Kg., 5 rem/hr. @ 15'.
SILVER REACTOR, E-F2 STEAM HEATER AND STORAGE LINER (H2-65095) FULL OF CUT UP JUMPERS PLACED IN TUNNEL ON 5/13/88 ON CAR PX-9 (10A-19809) & S/R CRADLE SK-GLR-11-2-87. 20 TONS, 2,775 CU. FT., 240 CURIES (REF: LETTER 12110-88-074), Cd - ~13 Kg., Ag - ~115 Kg., Pb - ~230 Kg., 20 mrem/hr. @ 20'.
E-J8-1 UNITIZED CONCENTRATOR VESS #1 H2-52477, FAILED 3/11/89 PLACED ON STORAGE CAR H2-99608, PX-6 (10A-19028) AND INTO #2 TUNNEL 4/6/89 GRAVEYARDS. EST. 42 TONS, 6,000 CU. FT. 1.5 CURIES (REF: LETTER 12113-89-027), 0.5 mrem/hr. @ 10'.
NORTH STORAGE LINER H2-65095 CONTAINING SIX PUMPS, ONE AGITATOR AND CUT UP JUMPER (14 TONS). SOUTH STORAGE LINER H2-65095 CONTAINING ONE PUMP, ONE #15 YOKE AND CUT UP JUMPERS (11.5 TONS). PLACED ON STORAGE CAR PX-19 (10A-19030) AND INTO #2 TUNNEL 8/5/89 DAYS. EST 25.5 TONS, 2,574 CU. FT. 3.0 CURIES (REF: LETTER 12113-89-051), 80 mrem/hr. @ 1'.
T-F5 ACID ABSORBER, ID#1-T-F5/F-168713, H2-52535 AND H2-52487/488. PLACED ON STORAGE CAR PX-2 AND INTO #2 TUNNEL 4/8/94. EST 22 TONS, 835 CU. FT., 185 CURIES, 90 mrem/hr. @ CONTACT.
FOUR METAL LINER STORAGE BOXES H-2-65095-3/H-2-100187-0 CONTAINING FAILED JUMPERS AND MISCELLANEOUS OBSOLETE CANYON EQUIPMENT ITEMS. PLACED ON STORAGE CAR PX-23 AND INTO #2 TUNNEL 9/16/94. EST 60 TONS, 4032 CU. FT., 927 CURIES, 30 mrem/hr. @ 2'.
E-H4-1 UNITIZED CONCENTRATOR (H-2-52477/56213)/(E-H4-1) PLACED IN TUNNEL ON 1/27/95 ON CAR PX-28. EST 40 TONS, 5,760 CU. FT., 3,070 CURIES, Cr - ~8 Kg., 1000 mrem/hr. @ 5'.
TANK E-5 (H-2-52453)/(F-166955), LEAD STORAGE BOX ASSEMBLY (H-2-131629)/(H-2-131629-1), H4 CONCENTRATOR TOWER (H-2-58102)/ (F-223017-CBT-4), HOT SHOP COVER PLATE (H-2-52222)/("Q"), TUBE BUNDLE WASH CAPSULE (H-2-58647), DISSOLVER CHARGING INSERT (H-2-75875)/ (H-2-75875-1), LIFTING YOKE #7A (H-2-96837), LIFTING YOKE #9 (H-2-52458). PLACED IN TUNNEL ON 2/8/95 ON CAR PX-3609. EST 44 TONS, 3,457 CU. FT., 26,000 CURIES Pb., 1830 Kg., 1000 mrem/hr @ 4'.

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

PUREX #2 Storage Tunnel (218-E-15)

Position	
22.	METAL UNER BOX (H-2-65096) CONTAINING JUMPERS AND FAILED/ OBSOLETE CANYON EQUIPMENT. F7 NEUTRON MONITOR (H-2-75825), LEAD STORAGE BOX (H-2-131629) CONTAINING JUMPER COUNTERWEIGHTS AND MISCELLANEOUS LEAD ITEMS, SCRAP HOPPER (H-2-57347) CONTAINING MISCELLANEOUS CANYON EQUIPMENT, CANISTER CAPPING STATION (H-2-821831), TEST CANISTER CONTAINING VARIOUS LENGTHS OF CARBON STEEL PIPE. PLACED IN TUNNEL 3-11-06 ON CAR #3616. ESTIMATED WEIGHT 22 TONS, 1,712 CU. FT., 15 CURIES, Pb - ~3232 Kg., Cd - ~2 Kg., 100 mrem/hr. @ 1'.
23.	TWO BURIAL BOXES (H-2-100187) CONTAINING JUMPERS AND FAILED/ OBSOLETE CANYON EQUIPMENT, LIFTING YOKE (H-2-99652). PLACED IN TUNNEL 3-11-96 ON CAR #PX-31. ESTIMATED WEIGHT 21 TONS, 2,116 CU. FT., 2 CURIES, 10 mrem/hr. @ 1'.
24.	CONCRETE BURIAL BOX (H-1-44980) STORING 8 CONTAINERS OF 324 BUILDING, B-CELL WASTE. FOR ADDITIONAL DETAILS, SEE PUREX WORK PLAN WP-P-95-60. PLACED IN TUNNEL ON CAR #PX-29, ON APRIL 26, 1996. ESTIMATED WEIGHT 36 TONS, 1,890 CU. FT., < 244,000 CURIES, ~15 mrem/hr. @ 150'. Pb - ~1,802 kg., Cd - ~10.5 kg., absorbed oil - ~8.5 kg., Cr - ~1 kg., Ba - ~ 3 kg, ~24 g Pu.
25.	CONCRETE BURIAL BOX (H-1-44980) STORING 9 CONTAINERS OF 324 AND 325 BUILDING WASTE. FOR ADDITIONAL DETAILS, SEE PUREX WORK PLAN WP-P-96-015. PLACED IN TUNNEL ON CAR #10A-3619, ON JUNE 12, 1996. ESTIMATED WEIGHT 46.5 TONS, 1,890 CU. FT., < 1.75 M CURIES, ~ 200 mrem/hr. @ 150'. Ba - ~4g., Cd - <1g., Cr- ~2g., Pb - <1g, 43g Pu.
26.	20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18580, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 5 CURIES, 100 rem/hr. @ 3', ~53 g Pu.
27.	20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18579, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 9 CURIES, 300 mrem/hr. @ 3', ~131 g Pu.
28.	20,000 GALLON LIQUID WASTE TANK CAR HO-10H-18582, EMPTY PER RCRA, PLACED IN TUNNEL ON JUNE 19, 1996, APPROXIMATELY 30 TONS, 23 CURIES, 650 mrem/hr. @ 3', ~11 g Pu.

CONTENTS

FIGURE

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4.0 PROCESS INFORMATION

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

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

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

4.1 OPERATION OF THE PUREX STORAGE TUNNELS

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

4.1.1 Preparation for Tunnel Activities

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

4.1.1.1 Storage/Removal Equipment Preparation

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

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

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

4.1.1.2 Water-Fillable Door Preparation

Each PUREX Storage Tunnel has a water-fillable door that isolates the storage area from the PUREX railroad tunnel.

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

4.1.1.3 Other Preparation Tasks

Before material storage, the following preparatory tasks are completed.

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

4.1.2 Tunnel Storage Activities

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

4.1.2.1 Physical Characterization of Material to be Stored

Physical characterization includes an evaluation of the following physical properties:

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

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

Specific material known to contain constituents that would cause the equipment to be designated as mixed waste is discussed in the waste analysis plan (Attachment 28, Chapter 3.0). The material includes but is not limited to dissolvers that contain elemental mercury; silver reactors that contain silver salts; jumpers and other equipment that have elemental lead counterweights; a concentrator that contains chromium; neutron absorbing equipment containing cadmium. Characteristics of these materials when stored as mixed waste are described in Attachment 28, Chapter 3.0. Waste transferred to the PUREX Storage Tunnels from other than PUREX Plant also would be physically characterized.

4.1.2.2 Material Flushing

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

4.1.2.3 Railcar Preparation

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

4.1.2.4 Placement of Material into Storage Position

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

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

4.1.3 Removal of Stored Material

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

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

- The equipment that will be used to remove material is positioned in the PUREX railroad tunnel.
- Verification is made that the PUREX railroad tunnel is configured properly to proceed with entrance into the PUREX Storage Tunnels (i.e., tunnel ventilation system is operating, the overhead door is closed and the health physics technician has performed a radiation survey of the area.
- The water-fillable door is opened.
- The equipment that will be used to remove material is moved into the storage tunnel and connected to the railcar.
- Verification is made that the railcar is connected to the removal equipment and the railcar is extracted from the storage tunnel and positioned within the PUREX railroad tunnel.
- The water-fillable door is closed.

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

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

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

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

4.1.5 Poststorage Activities

The following poststorage activities would conclude the tunnel storage task.

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

4.1.6 Operation of the Tunnel Ventilation System

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

4.1.6.1 Tunnel Number 1 Ventilation

Active ventilation of Tunnel Number 1 presently is not provided. After placement of the last railcar into Tunnel Number 1, the tunnel was sealed (Attachment 28, Chapter 2.0). As part of the sealing activities, the ventilation fan was deactivated electrically and the exhaust stack and filter were isolated from the system by installing blanks upstream and downstream of both the exhaust fan and filter and the stack was removed. In the event railcar removal activities are initiated, it is planned that the ventilation system would be reactivated. Operation of the ventilation system would be similar to that for Tunnel Number 2.

4.1.6.2 Tunnel Number 2 Ventilation

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

4.2 CONTAINERS

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

4.2.1 Containers with Free Liquids

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

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

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

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

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

Most lead is fully contained in all-welded encasements of either carbon steel or 304L stainless steel (refer to Attachment 28, Chapter 3.0, Table 1). The encasement serves as support, protection against mechanical damage, and protection of the lead from exposure to the environment. Also, lead has been placed in burial boxes of appropriate size. The boxes provide secondary containment for the lead in the unlikely event the primary encasement should fail. Although boxes may be open on the top, the PUREX Storage Tunnels are enclosed; therefore, the containers are protected from the elements.

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

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

4.2.3 Protection of Extremely Hazardous Waste in Containers

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

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

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

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

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

Although ignitable waste storage units are required by WAC 173-303-395(1)(d) to have inspections conducted at least yearly by a fire marshall or professional fire inspector familiar with the requirements of the uniform fire code, the radiation levels within the PUREX Storage Tunnels make such inspections impractical. These inspections are not considered appropriate or necessary for the safe operation of the unit because of the nature of the ignitable waste, the means of storage, and ALARA concerns (Attachment 28, Chapter 6.0, Section 6.2).

4.3 ENGINEERING DRAWINGS

As-built drawings for the PUREX Storage Tunnels:

H-2-55587	218-E-14 Structural Floor Plan and Section
H-2-55588	Structural Sections and Details: Disposal Facility for Failed Equipment
H-2-55589	Structural Sections and Details: Disposal Facility for Failed Equipment
H-2-55590	Door and Hoist Details
H-2-55591	Door and Hoist Details
H-2-55592	Door and Hoist Details
H-2-55593	Electrical Details
H-2-55594	Shielding Door Fill and Drain Lines Arrangement: Disposal Facility for Failed Equipment
H-2-55599	Electrical Door Control Plan, Elementary Diagram and Miscellaneous Details: Disposal Facility for Failed PUREX Equipment
H-2-58134	Ventilation Details; Sheet 1, Sheet 2, Sheet 3, Sheet 4
H-2-58175	PUREX Tunnel
H-2-58193	Sump Details
H-2-58194	Sump Details
H-2-58195	Structural Sections and Details: Equipment Disposal - PUREX
H-2-58206	Sump Details
H-2-58208	Fan Details; Sheet 1, Sheet 2, Sheet 3
H-2-94756	Filter Details; Sheet 1, Sheet 2

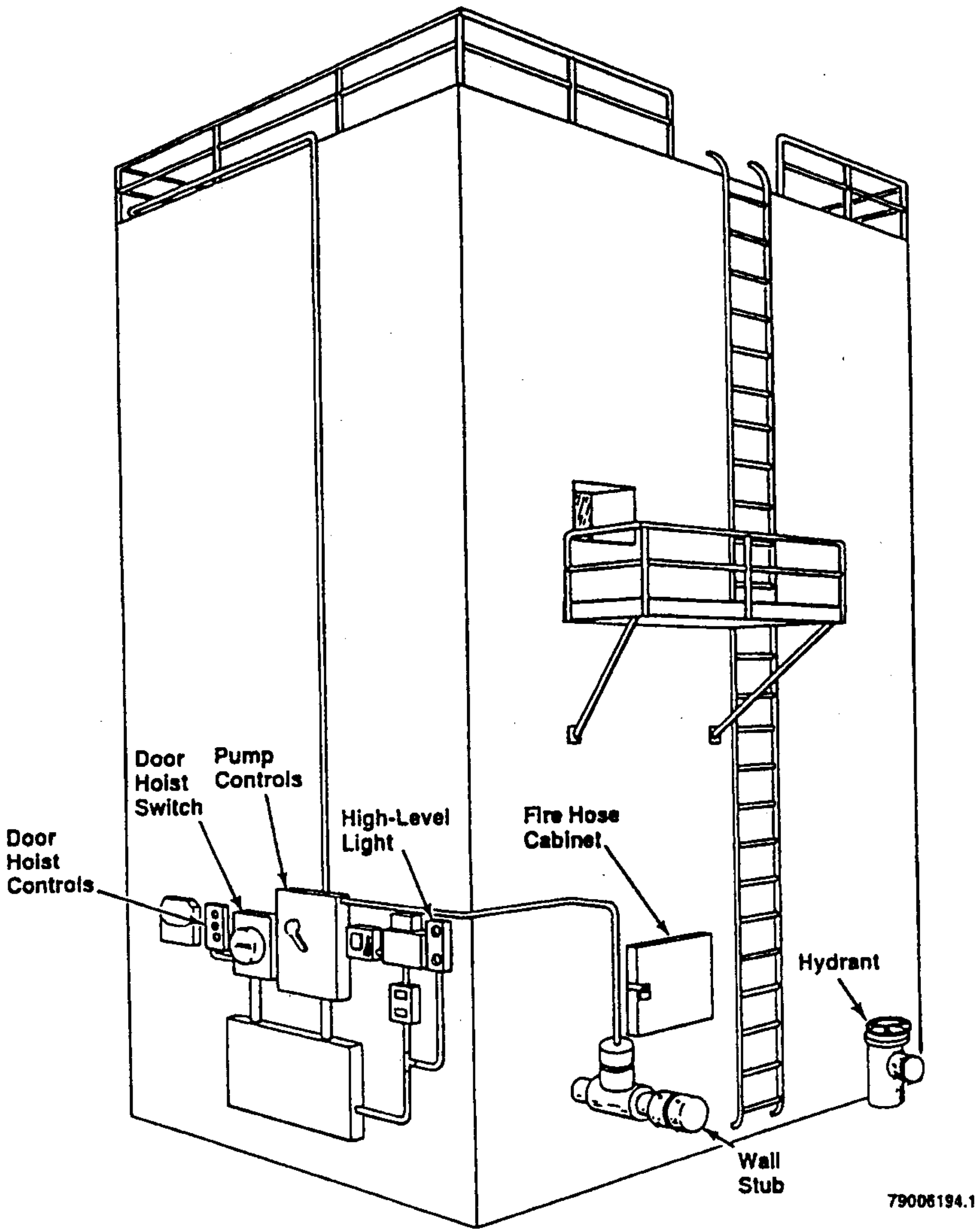

Figure 4-1. Water-Fillable Door Exterior (Tunnel Number 2)

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6.0 PROCEDURES TO PREVENT HAZARDS

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

6.1 SECURITY

The following sections describe the security measures, equipment, and warning signs used to control entry into the PUREX Storage Tunnels. Hanford Facility security measures are discussed in the Attachment 33, General Information Portion (DOE/RL-91-28).

6.1.1 Security Procedures and Equipment

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

6.1.1.1 24-Hour Surveillance System

The entire Hanford Facility is a controlled access area. For surveillance information refer to the Attachment 33, General Information Portion (DOE/RL-91-28).

6.1.1.2 Barrier and Means to Control Entry

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

6.1.1.3 Warning Signs

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

6.1.2 Waiver

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

6.2 INSPECTION PLAN

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

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

- External surfaces of the PUREX Storage Tunnels are observed for evidence of structural deterioration. Tunnel subsidence, erosion of the earth cover, and vent stack damage are of primary concern. Abnormal conditions are recorded, evaluated, and corrective action initiated as necessary.
- The points of access to the PUREX Storage Tunnels are inspected to ensure warning signs (Section 6.1.1.3) are in place, visible, and legible. Abnormal conditions are recorded, evaluated, and corrective action will be initiated as necessary.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS

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

6.3.1 Equipment Requirements

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

6.3.1.1 Internal Communications

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

6.3.1.2 External Communications

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

6.3.1.3 Emergency Equipment

Equipment included in the emergency plan for the PUREX Storage Tunnels is provided in Attachment 28, Chapter 7.0.

6.3.1.4 Water for Fire Control

The fire hazard associated with the operation of the PUREX Storage Tunnels is considered to be very low because of the minimal amount of combustibles stored within the tunnels and the lack of an ignition source (Rambosek and Foster 1972). In the event it is determined there is a fire in the storage area of the tunnels, the contingency plan will be activated. Because of the potential of the mixed waste stored within the tunnels to leach, the use of water for fire control will be avoided if possible. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system, if operating, should permit the fire to self-extinguish. Should the fire continue to propagate, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. Heavy equipment and cranes are readily available on the Hanford Facility at all times and generally are available for deployment to the scene of an emergency within 1 hour. In the event that a fire resulted in the collapse of the tunnels, a recovery plan will be developed in accordance with emergency response procedures included in Attachment 28, Chapter 7.0. The recovery plan will take into consideration plans, if any, for retrieval of the waste stored within the tunnel(s).

6.3.2 Aisle Space Requirement

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

6.4 PREVENTIVE PROCEDURES, STRUCTURES, AND EQUIPMENT

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

6.4.1 Unloading Operations

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

6.4.2 Run-Off

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

The soil overburden covering the PUREX Storage Tunnels also is contoured to provide a sideslope of 2 (horizontal) to 1 (vertical). This construction serves to divert any seasonal or unanticipated run-on away from the storage area of the PUREX Storage Tunnels. For potential situations where a natural catastrophic event occurs, inspections of the tunnel sideslopes are conducted to ensure the contours remain in a condition that ensures proper run-off and continues to divert run-on away from the tunnel storage areas. Further discussion of the design of the PUREX Storage Tunnels is provided in Attachment 28, Chapter 2.0.

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

6.4.3 Water Supplies

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

6.4.4 Equipment and Power Failures

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

6.4.4.1 Mitigation of the Effects of Equipment Failure

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

6.4.4.2 Mitigation of the Effects of Power Failure

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

6.4.5 Personnel Protection Equipment

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

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTE

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

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

CONTENTS

FIGURE

TABLE

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7.0 CONTINGENCY PLAN

The WAC 173-303 requirements for contingency plans are satisfied in the following documents: the *Unit-Specific Contingency Plan for the 218-E-14 and 218-E-15 Storage Tunnels* (Attachment 28, Chapter 7.0) and Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02).

7.1 GENERAL INFORMATION

The Plutonium-Uranium Extraction 218-E-14 and 218-E-15 (PUREX Storage Tunnels) are located in the 200 East Area of the 1,450-square kilometer U.S. Department of Energy, Richland Operations Office (DOE-RL) operated Hanford Site in southeastern Washington State. The Hanford Site Emergency Preparedness Program is based upon the incident command system, which allows a graded approach for responses to emergency events. This plan contains a description of facility specific planning and response. It is used in conjunction with Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02). Response to events is performed using facility specific and/or Site level emergency procedures.

7.1.1 Facility Name

U.S. Department of Energy Hanford Site PUREX Storage Tunnels.

7.1.2 Facility Location

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

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

7.1.3 Owner

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

7.1.4 Facility Manager

Fluor Hanford
P.O. Box 1000
Richland, Washington 99352-1000

7.1.5 Description of Facility and Operations

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

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

7.1.6 Building Evacuation Route

The PUREX Storage Tunnels evacuation route is shown in Figure 7-1. During an emergency, personnel that enter the storage tunnels during material placement operations will evacuate via the north end of the railroad tunnel.

7.2 EMERGENCY COORDINATORS/BUILDING EMERGENCY DIRECTOR

Table 7-1. Emergency Coordinator/Building Emergency Director [a]

Designation	Job title	Work location	Work phone
Primary	Accelerated Deactivation Project Director	MO-414	373-4999
Alternate	Manager	MO-414	373-4160
Alternate	Manager	MO-414	373-4134
Alternate	Manager	3770	373-8105

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

Emergency response will be directed by the EC/BED until the Incident Commander arrives. The incident command structure and staff with supporting on-call personnel fulfill the responsibilities of the EC/BED as discussed in WAC 173-303-360.

During events, facility personnel perform response duties under the direction of the EC/BED. The Incident Command Post (ICP) is managed by either the senior Hanford Fire Department member present on the scene or senior Hanford Patrol member present on the scene (security events only). These individuals are designated as the Incident Commander (IC) and as such have the authority to request and obtain any resources necessary for protecting people and the environment. The EC/BED becomes a member of the ICP and functions under the direction of the IC. In this role, the EC/BED continues to manage and direct facility operations.

A listing of the primary and alternate EC/BEDs by title, work location and work telephone numbers is identified in the table above. The EC/BED is on the premises or is available through an "on-call" list 24 hours a day.

7.3 IMPLEMENTATION OF THE PLAN

The BED ensures that trained personnel identify the character, source, amount, and areal extent of the release, fire, or explosion to the extent possible. Identification of waste can be made by activities that can include, but are not limited to, visual inspection of involved containers, sampling activities in the field, reference to inventory records, or by consulting with facility personnel. Samples of materials involved in an emergency might be taken by qualified personnel and analyzed as appropriate. These activities must be performed with a sense of immediacy and shall include available information.

The BED shall use the following guidelines to determine if an event has met the requirements of WAC 173-303-360(2)(d):

1. The event involved an unplanned spill, release, fire, or explosion,

AND

2.a The unplanned spill or release involved a dangerous waste, or the material involved became a dangerous waste as a result of the event (e.g., product that is not recoverable.), or

2.b The unplanned fire or explosion occurred at the 200 ADP Facilities or transportation activity subject to RCRA contingency planning requirements,

AND

3. Time-urgent response from an emergency services organization was required to mitigate the event, or a threat to human health or the environment exists.

As soon as possible, after stabilizing event conditions, the BED shall determine, in consultation with the FH Site contractor environmental single-point-of-contact, if notification to Ecology is needed to meet WAC-173-303-360 (2)(d) reporting requirements. If all of the conditions under 1, 2, and 3 are met, notifications are to be made to Ecology. Additional information is found in Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 4.2 .

If review of all available information does not yield a definitive assessment of the danger posed by the incident, a worst-case condition will be presumed and appropriate protective actions and notifications will be initiated. The BED is responsible for initiating any protective actions based on their best judgment of the incident.

The BED must assess each incident to determine the response necessary to protect the personnel, facility, and the environment. If assistance from HP, HFD, or ambulance units is required, the Hanford Emergency Response Number (911) must be used to contact the POC and request the desired assistance. To request other resources or assistance from outside the 200 ADP facilities, the POC business number is used (373-3800).

7.3.1 Dangerous and/or Mixed Waste

A seismic event, explosion, tornado, or an aircraft crash could cause damage to the storage tunnels and could involve environmental exposure to mixed waste. These events are considered the only credible sources of a release as the PUREX Storage Tunnels are unoccupied structures and there are no continuous processes associated with waste storage.

Emergency responses for credible dangerous and/or mixed waste releases can be found in the following sections.

7.3.2 Fire or Explosion

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

Because of the potential for mixed waste to leach, water is not the preferred choice for fire control. Reduction of the air supply to the storage area by isolation of the tunnel exhaust system, if operating, should permit a fire to self-extinguish. Should the fire continue to spread, heavy equipment and cranes will be called to the scene to cover areas of the tunnels that might collapse. In addition, the following actions are taken in the event of a fire or explosion:

- If present in the Tunnels, personnel leave by the nearest safe exit and proceed to the designated staging area for accounting
- The single point-of-contact (911) is notified immediately, who in turn initiates notifications to the EC/BED (or alternate) if necessary
- The EC/BED proceeds directly to the scene (if not already there)
- The EC/BED obtains all necessary information pertaining to the incident
- Depending on the severity of the event, the EC/BED or his/her designee may be required to provide notifications to the site contractor environmental single point of contact, which in turn notifies offsite agencies and/or the occurrence notification center informing them as to the extent of the emergency (including estimates of mixed waste quantities released to the environment) and any actions necessary to protect nearby buildings and/or structures
- Depending on the severity, the EC/BED requests activation of the affected area ICP to establish organizations to provide assistance from DOE-RL, other Hanford site contractors, and outside agencies (if 911 is called, the ICP will automatically be activated)
- The Hanford Patrol establishes roadblocks within the area to route traffic away from the emergency scene
- If necessary, Hanford Fire Department medical personnel remove injured personnel to a safe location, apply first aid, and prepare the injured for transport to medical aid stations or to local hospitals.

Depending on the magnitude of a natural phenomena event, fire, or an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. In the event of such an occurrence, a recovery plan will be developed. The recovery plan will take into consideration methods, if any, for retrieval of the waste stored within the tunnels.

7.3.3 Seismic Event/Tornado

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

Emergency responses for seismic events and tornadoes would be the same as those for a fire or explosion. Refer to Section 3.2 of this plan.

7.3.4 Aircraft Crash

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

Refer to Section 7.3.2 of this plan for emergency responses for fires and explosions.

7.3.5 Bomb Threat/Explosive Device

Depending on the magnitude of an explosion, damage to the storage tunnels is possible. The hazards could involve personnel and environmental exposure to mixed waste. For emergency responses, refer to Section 7.3.2 of this plan for explosions.

7.3.6 Damaged Dangerous and/or Mixed Waste Shipment

The PUREX Storage Tunnels do not accept shipments from offsite; therefore, the following response procedures only apply to the receipt of a damaged mixed waste shipment from onsite.

If the damaged shipment of hazardous substance, or dangerous waste/mixed waste arrives at the PUREX Storage Tunnels and the shipment is unacceptable for receipt, the damaged shipment should not be moved. The TSD unit personnel instead need to determine if there has been a release. If there has been a release, TSD unit personnel perform the following actions.

- Notify the supervisor or manager to advise of the situation. The supervisor or manager contacts the Emergency Coordinator in order to respond and assist in the evaluation of, and response to, the release (response to spills or releases may result in implementation of the contingency plan if the Emergency Coordinator makes this determination).
- Notify the shipper or generating unit of the damaged shipment and request that they provide any chemical information necessary to assist in responding to the release.
- Actions are taken to contain and/or to stop the spill if all of the following are true:
  - The identity of the substance(s) involved is known
  - Appropriate protective equipment and control/cleanup supplies are readily available
  - Personnel present have received the appropriate training and can safely perform the action(s) without assistance, or assistance is readily available from other trained TSD unit personnel.

If any of the above conditions are not met, or there is any doubt, personnel evacuate the area and remain outside, upwind of the TSD unit, pending the arrival of the Emergency Coordinator. Personnel remain available for consultation with the Emergency Coordinator, Hanford Fire Department, or other emergency response personnel, as appropriate.

7.4 UNIT/BUILDING EMERGENCY RESPONSE PROCEDURES

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

Emergency action levels associated with event classifications applicable to the PUREX Storage Tunnels include the following. A Site Area Emergency can be declared for a radioactive material release resulting from an explosion, natural hazards (i.e., seismic event and/or tornado), and aircraft crash. An Alert Emergency can be declared for a fire, explosion, or high winds. Additional detail concerning emergency action levels is identified in *Emergency Plan Implementing Procedures*, DOE-0223, Appendix 1-2.G. The preceding sections describe the process for implementing basic protective actions as well as descriptions of response actions for events.

7.4.1 Notification

Notification will be made in accordance with the requirements of WAC 173-303-145 and WAC 173-303-360.

7.4.2 Identification of Released/Spilled Materials

Methods for identifying the character, source, amount, and areal extent of any materials when there has been a release or spill to the environment, a fire, or an explosion are outlined in, Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 4.2.

7.4.3 Prevention of Recurrence or Spread of Fires, Explosions, Releases

The EC/BED, as part of the incident command structure, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The following actions are taken:

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

7.4.4 Termination of Event

For events where the Hanford Emergency Operations Center (Hanford-EOC) is activated, the RL Emergency Manager has the authority to declare event termination. This decision is based on input from the EC/BED, Incident Commander, and other emergency response organization members. For events where the Hanford-EOC is not activated, the Incident Command structure and staff will declare event termination.

7.4.5 Incident Recovery and Restart of Operations

A recovery plan is developed when necessary. A recovery plan is needed following an event where further risk could be introduced to personnel, the facility, or the environment through recovery action and/or to maximize the preservation of evidence. Depending on the magnitude of the event and the effort required to recover from it, recovery planning may involve personnel from RL and other contractors. If a recovery plan is required, it is reviewed by appropriate personnel and approved by a Recovery Manager before restart. Restart of operations is performed in accordance with the approved plan.

If this plan was implemented for a WAC emergency (refer to Section 7.3 of this plan), the Washington State Department of Ecology must be notified before operations can resume. Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.1, discusses different reports to outside agencies. This notification is in addition to other required reports and must include information documenting the following conditions:

1. There are no incompatibility issues with the waste and released materials from the incident.
2. All the equipment has been clean, fit for its intended use, and placed back into service.

Additional information that Ecology requests regarding these restart conditions may be included in the required 15-day report identified in WAC 173-303-360(2)(k).

For emergencies not involving activation of the Hanford-EOC, the EC/BED ensures that conditions are restored to normal before operations are resumed. An onsite Recovery Manager could be appointed at the discretion of RL to restore conditions to normal. This process is detailed in Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 9.0. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization will be appointed by the appropriate contractor's management.

7.4.6 Incompatible Waste

After an event, the EC/BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by facility personnel or other assigned personnel. Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 9.2.3, describes actions to be taken.

Waste from cleanup activities is designated and managed as newly generated waste. A field check for compatibility before storage is performed, as necessary. Incompatible wastes are not placed in the same container. Containers of waste are placed in storage areas appropriate for their compatibility class.

If incompatibility of waste was a factor in the incident, the EC/BED or the onsite recovery organization ensures that the cause is corrected. Examples include modification of an incompatibility chart of increased scrutiny of waste from a generating unit when incorrectly designated waste caused or contributed to an incident.

7.4.7 Post Emergency Equipment Maintenance and Decontamination

All equipment used during an incident is decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment is checked for proper operation before storage for subsequent use. Consumables and disposed materials are restocked. Fire extinguishers are recharged or replaced.

The EC/BED ensures that all equipment is cleaned and fit for its intended use before operations are resumed. Depleted stocks of neutralizing and absorbing materials are replenished, self-contained breathing apparatus are cleaned and refilled, protective clothing is cleaned or disposed of and restocked, etc.

7.5 EMERGENCY EQUIPMENT

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

During storage tunnel operations or an emergency response event, personnel use portable emergency equipment, which could include heavy equipment and cranes (Section 7.3.2). Also, for such operations, work plans are followed and pre-job safety meetings take place.

7.6 COORDINATION AGREEMENTS

The DOE-RL has established a number of coordination agreements, or memoranda of understanding (MOU) with various agencies to ensure proper response resource availability for incidents involving the Hanford Site. A description of the agreements is contained in Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Table 3-1.

7.7 REQUIRED REPORTS

Post incident written reports are required for certain incidents on the Hanford Site in accordance with Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.1.

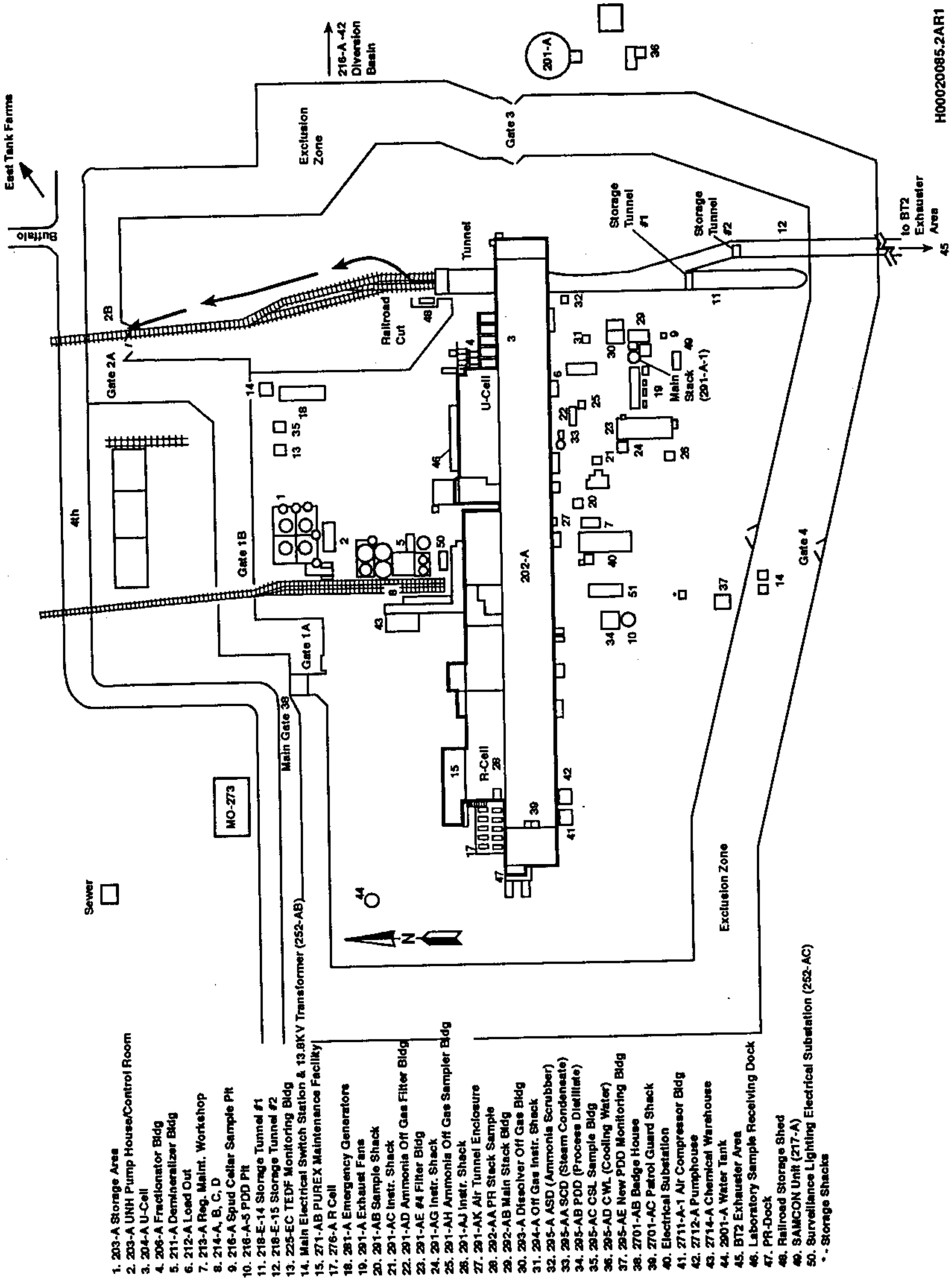
7.8 REFERENCES

DOE/RL-94-02, *Hanford Emergency Management Plan*, as amended.

Hanford Facility RCRA Permit, Dangerous Waste Portion, Washington State Department of Ecology, Olympia, Washington, as amended.

DOE-0223, *Emergency Plan Implementing Procedures*, as amended.

Figure 7-1. PUREX Storage Tunnels Evacuation Route



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8.0 PERSONNEL TRAINING

This chapter discusses personnel training requirements based on WAC 173-303 and the HF RCRA Permit (DW Portion). In accordance with WAC 173-303-806(4)(a)(xii), the *Hanford Facility Dangerous Waste Part B Permit Application* must contain two items: (1) "an outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330" and (2) "a brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)." The HF RCRA Permit, (DW portion) Condition II.C (Personnel Training) contains training requirements applicable to Hanford Facility personnel and non-Facility personnel.

Compliance with these requirements at the PUREX Storage Tunnels is demonstrated by information contained both in Attachment 33, General Information Portion, Chapter 8.0 (DOE/RL-91-28) and this chapter. This chapter supplements Attachment 33, General Information Portion, Chapter 8.0 (DOE/RL-91-28).

8.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

The introductory and continuing training programs are designed to prepare personnel to manage and maintain the TSD unit in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain TSD units under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in Attachment 28, Chapter 7.0, Contingency Plan. The introductory and continuing training programs contain the following objectives:

- Teach Hanford Facility personnel to perform their duties in a way that ensures the Hanford Facility's compliance with WAC 173-303

- Teach Hanford Facility personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles/positions in which they are employed, and

- Ensure Hanford Facility personnel can respond effectively to emergencies.

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and TSD unit-specific training. General Hanford Facility training is described in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28), and is provided in accordance with the HF RCRA Permit (DW Portion), Condition II.C.2. TSD unit-specific training is provided to Hanford Facility personnel allowing those personnel to work unescorted, and in some cases is required for escorted access. Hanford Facility personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. Hanford Facility personnel must be trained within 6 months after their employment at or assignment to the Hanford Facility, or to a new job title/position at the Hanford Facility, whichever is later

General Hanford Facility training: Refer to description in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28).

Contingency Plan training: Hanford Facility personnel receive training on applicable portions of Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) in general Hanford Facility training. In addition, Hanford Facility personnel receive training on content of the description of actions contained in contingency plan documentation in Attachment 28, Chapter 7.0 to be able to effectively respond to emergencies.

Emergency Coordinator training: Hanford Facility personnel who perform emergency coordinator duties in WAC 173-303-360 (e.g., Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the contingency plan and fulfilling the position within the Hanford Incident Command System. These Hanford Facility personnel must also become thoroughly familiar with applicable contingency plan documentation, operations, activities, location, and properties of all waste handled, location of all records, and the unit/building layout.

Operations training: Dangerous waste management operations training (e.g., waste designation training, shippers training) is determined on a unit-by-unit basis and considers the type of waste management unit (e.g., container management unit) and the type of activities performed at the waste management unit (e.g., sampling). For example, training provided for management of dangerous waste in containers is different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training and supplemented at the TSD unit. Training provided for TSD unit-specific operations is identified in the training plan documentation based on: (1) whether a general training course exists, (2) the training needs to ensure waste management unit compliance with WAC 173-303, and (3) training commitments agreed to with Ecology.

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes general Hanford Facility training and TSD unit-specific training.

General Hanford Facility training: Annual refresher training is provided for general Hanford Facility training. Refer to description in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28).

Contingency plan training: Annual refresher training is provided for contingency plan training. Refer to description above in Section 8.1.1.

Emergency coordinator training: Annual refresher training is provided for emergency coordinator training. Refer to description above in Section 8.1.1.

Operations training: Refresher training occurs on many frequencies (i.e., annual, every other year, every three years) for operations training. When justified, some training will not contain a refresher course and will be identified as a one-time only training course. The TSD unit-specific training plan documentation will specify the frequency for each training course. Refer to description above in Section 8.1.1.

8.2 DESCRIPTION OF TRAINING DESIGN

Proper design of a training program ensures personnel who perform duties on the Hanford Facility related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173-303. Actual job tasks, referred to as duties, are used to determine training requirements. The first step taken to ensure Hanford Facility personnel have received the proper training is to determine and document the waste management duties by job title/position. The second step compares waste management duties to general waste management unit training curriculum. If general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided. The third step summarizes the content of a training course necessary to ensure that the training provided to each job title/position addresses associated waste management duties. The last step is to assign training curriculum to Hanford Facility personnel based on the previous evaluation. The training plan documentation contains this process.

Waste management duties include those specified in Section 8.1 as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to the PUREX Storage Tunnels operations include the following:

- Communications or alarm systems
- Response to fires or explosions

Hanford Facility personnel who perform these duties receive training pertaining to their duties. The training plan documentation described in Section 8.3 contains specific information regarding the types of training Hanford Facility personnel receive based on the outline in Section 8.1.

8.3 DESCRIPTION OF TRAINING PLAN

In accordance with HF RCRA Permit (DW Portion), Condition II.C.3, the unit-specific portion of the *Hanford Facility Dangerous Waste Permit Application* must contain a description of the training plan. Training plan documentation is maintained outside of the *Hanford Facility Dangerous Waste Part B Permit Application* and the HF RCRA Permit. Therefore, changes made to the training plan documentation are not subject to the HF RCRA Permit modification process. However, the training plan documentation is prepared to comply with WAC 173-303-330(2).

Documentation prepared to meet the training plan consists of hard copy and/or electronic media as provided by HF RCRA Permit (DW Portion), Condition II.C.1. The training plan documentation consists of one or more documents and/or a training database with all the components identified in the core document.

A description of how training plan documentation meets the three items in WAC 173-303-330(2) is as follows:

1. -330(2)(a): "The job title, job description, and name of the employee filling each job. The job description must include requisite skills, education, other qualifications, and duties for each position."

   Description: The specific Hanford Facility personnel job title/position is correlated to the waste management duties. Waste management duties relating to WAC 173-303 are correlated to training courses to ensure training properly is assigned.

   Only names of Hanford Facility personnel who carry out job duties relating to TSD unit waste management operations at the PUREX Storage Tunnels are maintained. Names are maintained within the training plan documentation. A list of Hanford Facility personnel assigned to the PUREX Storage Tunnels is available upon request.

   Information on requisite skills, education, and other qualifications for job titles/positions are addressed by providing a reference where this information is maintained (e.g., human resources). Specific information concerning job title, requisite skills, education, and other qualifications for personnel can be provided upon request.

2. -330(2)(b): "A written description of the type and amount of both introductory and continuing training required for each position."

   Description: In addition to the outline provided in Section 8.1, training courses developed to comply with the introductory and continuing training programs are identified and described in the training plan documentation. The type and amount of training is specified in the training plan documentation.

3. -330(2)(c): "Records documenting that personnel have received and completed the training required by this section. The Department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received."

   Description: Training records are maintained consistent with Attachment 33, General Information Portion, Section 8.4 (DOE/RL-91-28)

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10.0 WASTE MINIMIZATION

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

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11.0 CLOSURE AND FINANCIAL ASSURANCE

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

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

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

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

11.1 IN SITU DISPOSAL OPTIONS

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

11.1.1 Backfilling the PUREX Storage Tunnels with Gravel

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

11.1.2 Injecting the PUREX Storage Tunnels with Grout

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

11.1.3 Combination of Grout Injection and Backfilling

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

11.2 RETRIEVAL/CLEAN CLOSURE OPTIONS

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

11.2.1 Retrieval and Disposal in the PUREX Plant

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

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

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

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

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

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12.0 REPORTING AND RECORDKEEPING

Reporting and recordkeeping requirements that could be applicable to the Hanford Facility are described in Attachment 33, General Information Portion, Chapter 12.0 (DOE/RL-91-28). Not all of these requirements and associated reports and records identified in Attachment 33, General Information Portion, Chapter 12.0 are applicable to the PUREX Storage Tunnels. Those reporting and recordkeeping requirements determined to be applicable to the PUREX Storage Tunnels are summarized as follows:

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

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

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

Annual reports updating projections of anticipated costs for closure and postclosure will be submitted when the PUREX Storage Tunnels closure plan is submitted with the PUREX Plant closure plan for Ecology approval (Attachment 28, Chapter 11.0).

The PUREX Tunnels Operating Record 'records contact' is kept on file in the General Information file of the Hanford Facility Operating Record (refer to Attachment 33, General Information Portion, Chapter 12.0 [DOE/RL-91-28]).

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13.0 OTHER FEDERAL AND STATE LAWS

Other federal and state laws and local requirements applicable to the PUREX Storage Tunnels (*Atomic Energy Act of 1954*, *Clean Air Act Amendments of 1990*, *Toxic Substances Control Act of 1976*, *State Environmental Policy Act of 1971*, *Federal Facilities Compliance Act of 1992*, and the *Federal Insecticide, Fungicide, and Rodenticide Act of 1975*) are discussed in Attachment 33, General Information Portion, Chapter 13.0 (DOE/RL-91-28).

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Hanford Facility RCRA Permit Modification Notification Form	
Unit:	**Permit Part & Chapter:**
303-K Storage Facility	**Part V, Chapter 14 and Attachment 32**

Description of Modification:

Hanford Facility RCRA Permit, V.14:

CHAPTER 14

303-K Storage Facility

The 303-K Storage Facility (303-K) was used ~~primarily~~ for storage~~, and some treatment~~ of ~~dangerous~~ mixed wastes produced during the fuel fabrication process. These wastes consisted of beryllium/zircalloy-2 chips which were concreted at the 304 Concretion Facility, and other process wastes.

This unit was Clean Closed on July 22, 2002, in accordance with the approved Closure Plan contained in Attachment 32, that was retired during Revision 6 of this Permit.

~~V.14.A COMPLIANCE WITH THE APPROVED CLOSURE PLAN~~

~~The Permittees shall comply with all the requirements set forth in Attachment 32, including the Amendments specified in Condition V.14.B. Enforceable portions of the Plan are listed below; all subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:~~

~~Part A, Form 3, Permit Application, Revision 5, October 1996~~

~~Section 2.1 Description of the 303-K Storage Facility~~

~~Section 2.2 Security~~

~~Chapter 4.0 Waste Characteristics~~

~~Chapter 6.0 Closure Strategy and Performance Standards~~

~~Chapter 7.0 Closure Activities~~

~~Chapter 8.0 Post-Closure~~

~~Appendix B Random Sampling Locations~~

~~Appendix E Personnel Training~~

~~Appendix F Quality Assurance Project Plan for Sampling and Analysis for the 304 Concretion Facility Closure Activities~~

Modification Class: [1 2 3]	Class 1	Class [1]1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
[signature]	9/18/02	[signature]	9/23/02				
L. J. Olguin	Date	D. T. Evans	Date	R. Bond	Date	L. E. Ruud	Date

[1]Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
303-K Storage Facility	Part V, Chapter 14 and Attachment 32

Description of Modification:

Hanford Facility RCRA Permit, V.14.B:

~~V.14.B AMENDMENTS TO THE APPROVED CLOSURE PLAN~~

~~V.14.B.a. If closure activities have not begun and/or will not be conducted in accordance with the Plan, including these unit-specific Conditions to the Plan, a written notification shall be submitted to Ecology within thirty (30) days after the Plan is approved.~~

~~V.14.B.b. The results of all sampling required by the Plan shall be provided to Ecology. This submittal shall include raw analytical data, a summary of analytical results, a data validation package, and a narrative summary of conclusions.~~

~~V.14.B.c. Ecology shall be provided, for review and approval, a SAP and date of sampling for any sampling event not addressed in the Plan, which provides data used to support the 303-K cleanup activities, at least thirty (30) days prior to initiating actual sampling activities. The results of this sampling shall be submitted to Ecology. These submittals shall include the raw analytical data, a summary of analytical results, a data validation package, and a narrative summary of conclusions.~~

~~V.14.B.d. The Permittees shall notify Ecology, in writing, if action levels cited in Section 6.1 of the Plan are exceeded. The notification shall include a request for Ecology's approval of alternative action levels, or identify interim measures to be taken in the 303-K until closure activities are performed in conjunction with the 300-FF-3 Operable Unit. The interim measures must be approved by Ecology.~~

~~V.14.B.e. The Permittees and the independent, registered, professional engineer's certifications of closure shall be prepared and submitted to Ecology by registered mail within sixty (60) days of closure as described in Section 7.8 of the Plan. The Permittees shall continue to address the 303-K as a dangerous waste management unit until receipt of Ecology's written notification that the 303-K is accepted as clean closed.~~

~~V.14.B.f. Due to lack of federal funding in 1998, the allowed time for closure of 303-K is hereby extended in accordance with WAC 173-303-610(4)(b)(i) and 173-303-815(3). The Permittees shall submit a certification of closure for 303-K no later than November 29, 2001. In addition, the Permittees shall submit to Ecology at least two (2) reports of progress toward completion of closure (i.e., budgeting for building demolition, obtaining sufficient funding, scheduling the physical work). The first report shall be submitted no later than September 30, 1999, and the second shall be submitted no later than September 30, 2000.~~

~~V.14.B.g. Compliance with the approved Sampling and Analysis Plan.~~
~~The Permittees shall comply with all the requirements set forth in the "303-K Storage Facility Sampling and Analysis Plan" (as found in Attachment 38) and the "Errata Sheet for the 303-K Storage Facility Sampling and Analysis Plan" (as found in Attachment 39) including the Amendments specified below. All subsections, figures, and tables included in the Sampling and Analysis Plan also are enforceable, unless otherwise stated.~~

~~V. 14.B.g.1. Section 5.1 Cleanup Performance Standards for Soils.~~
~~Insert the following after line 25 on page 5: "Using the Ecology publication, Model Toxics Control Act (MTCA) Cleanup Levels and Risk Calculations (CLARC II) Update, February 1996 (Publication #94-145, as updated January 1996), cleanup levels shall be identified for all constituents of concern. In addition, when a MTCA Method B value does not exist for a constituent, the cleanup level shall be obtained from the appropriate Method A table in WAC 173-340."~~
~~Delete Table 1 on page 6.~~

~~V.14.B.g.2. Section 7.4 Support for Ecology during Sampling.~~
~~Delete lines 29 through 32 on page 16 ("Split samples of concrete and soil may be collected, if requested, for Ecology. If split samples for Ecology are collected as part of this sampling effort, then the...") and replace with the following: "Split samples of concrete and soil will be collected for Ecology from each sampling location. The..."~~

~~V.14.B.g.3. Field analytical quality control will include analytical duplicate(s) and verification of the method detection limit. Each field screening analytical duplicate sample will be collected from the same volume of sample material as the original field screening analytical sample. The frequency for these duplicates will be one (1) per twenty (20) samples, or one (1) per day of analysis, whichever is more stringent. The procedure used for the verification of the method detection limit is subject to approval by Ecology.~~

~~V.14.B.g.4. The laboratory quality control will be performed as described in the respective method, but will include the following: The frequency for analytical quality control will be one (1) in twenty (20) samples, or one (1) per analytical batch, whichever is more stringent, for duplicate and spike (or matrix spike) samples. Samples from this project must be chosen for the duplicate and spike (or matrix spike) samples. At least one (1) method blank, and one (1) quality control check sample, will be performed for each analytical batch.~~

~~V.14.B.g.5. Samples shall be placed upon ice immediately, or refrigerated to 4+ 2 degrees Celsius after sampling, and held at that temperature prior to and during shipping to the analytical laboratory.~~

~~V.14.B.g.6. Loss of any sample due to any cause may require resampling and/or reanalysis, at the discretion of Ecology.~~

~~V.14.B.g.7 The results of all analyses required by the SAP as revised by these Conditions shall be provided to Ecology as stated in V.14.B.c. In addition to the items listed, these submittals shall include calibration and quality control data. A data evaluation report shall be submitted to Ecology comparing the analytical results to the cleanup levels for the 303-K, derived as described in Condition V.14.B.g.1. For data to be useable for this comparison, the method quantification limit for the constituent must be equal to, or less than, the cleanup level, or the method detection limit must be at least ten (10) times below the cleanup level, and the data package must be complete.~~

~~V.14.B.h. If any analytical result, except for arsenic and beryllium, for any sample location specified in the SAP exceeds the MTCA Method B cleanup level, then characterization of the lateral and vertical extent of the contamination shall be required and Ecology shall pursue corrective action for this TSD unit. If arsenic or beryllium exceed the established Hanford Sitewide Background values, then characterization of the lateral and vertical extent of the contamination shall be required and Ecology shall pursue corrective action for this TSD unit.~~

Modification Class: [1 2 3]	Class 1	Class [1]1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
(signature)	9/18/02	*(signature)*	9/23/02				
L. J. Olguin	Date	D. T. Evans	Date	R. Bond	Date	L. E. Ruud	Date

[1]Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: 303-K Storage Facility	**Permit Part & Chapter:** Part V, Chapter 14 and Attachment 32

Description of Modification:

Attachment 32, Part A, Form 3, Comment Block:

Closed as of 7/22/2002.

Modification Class: [1 2 3]	Class 1	Class [1]1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
[signature]	9/18/02	[signature]	9/23/02				
L. J. Olguin	Date	D. T. Evans	Date	R. Bond	Date	L. E. Ruud	Date

[1]Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form	
Unit: 303-K Storage Facility	Permit Part & Chapter: Part V, Chapter 14 and Attachment 32

Description of Modification:

Attachment 32, Part A, Form 3, III.C:

S01

The 303-K Storage Facility (303-K), which began waste management operation in January 1972, was used for the storage of mixed waste in U.S. Department of Transportation-specified containers. Both liquid and solid waste was stored at the 303-K. The liquid waste was stored on a 57-square meter (610-square foot) pad within the building. The building provided secondary containment for the contents of the containers. The solid waste was stored outside the building on a 426-square meter (4,590-square foot) asphalt, concrete, and gravel pad. The storage area was ~~is~~ surrounded by a chain link fence. The 303-K no longer stores mixed waste and ~~will be closed~~ was closed as of July 22, 2002.

The maximum process design capacity for container storage at the 303-K was 41,640 liters (11,000 gallons).

Modification Class: [1 2 3] Please check one of the Classes:	Class 1	Class [1]1	Class 2	Class 3
	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and informational changes

Submitted by Co-Operator:		Reviewed by RL Program Office:		Reviewed by Ecology:		Reviewed by Ecology:	
L. J. Olguin	9/18/02	D. T. Evans	9/23/02	R. Bond		L. E. Ruud	
	Date		Date		Date		Date

[1]Class 1 modifications requiring prior Agency approval.

[2] This is only an advanced notification of an intended Class [1]1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

[3] If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to [1]1, if appropriate.

Hanford Facility RCRA Permit Modifications

Part V, Chapter 14 and Attachment 32

303-K Storage Facility

Replacement Section

Index

Part A, Form 3

FORM 3	DANGEROUS WASTE PERMIT APPLICATION	I. EPA/State I.D. No.
		W A 7 8 9 0 0 0 8 9 6 7

FOR OFFICIAL USE ONLY

Application Approved	Date Received (month/ day / year)	Comments
		Closed as of 7/22/2002.

II. FIRST OR REVISED APPLICATION

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

A. First Application (place an "X" below and provide the appropriate date)

☒ 1. **Existing Facility** (See instructions for definition of "existing" facility. Complete item below.)

MO	DAY	YEAR
03	22	1943

*For existing facilities, provide the date (mo/day/yr) operation began or the date construction commenced. (use the boxes to the left)

*The date construction of the Hanford Facility commenced

☐ 2. **New Facility** (Complete item below.)

MO	DAY	YEAR

For new facilities, provide the date (mo/day/yr) operation began or is expected to begin

B. Revised Application (Place an "X" below and complete Section I above)

☒ 1. **Facility has an Interim Status Permit**

☒ 2. **Facility has a Final Permit**

III. PROCESSES – CODES AND DESIGN CAPACITIES

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

B. **Process Design Capacity** – For each code entered in column A enter the capacity of the process.

1. Amount – Enter the amount.
2. Unit of Measure – For each amount entered in column B(1), enter the code from the list of unit measure codes below that describes the unit of measure used. Only the units of measure that are listed below should be used.

PROCESS	PROCESS CODE	APPROPRIATE UNITS OF MEASURE FOR PROCESS DESIGN CAPACITY
STORAGE:		
Container (barrel, drum, etc.)	S01	Gallons or liters
Tank	S02	Gallons or liters
Waste pile	S03	Cubic yards or cubic meters
Surface impoundment	S04	Gallons or liters
	S06	Cubic yards or cubic meters*
DISPOSAL:		
Injection well	D80	Gallons or liters
Landfill	D81	Acre-feet (the volume that would cover one acre to a Depth of one foot) or hectare-meter
Land application	D82	Acres or hectares
Ocean disposal	D83	Gallons per day or liters per day
Surface impoundment	D84	Gallons or liters
TREATMENT:		
Tank	T01	Gallons per day or liters per day
Surface impoundment	T02	Gallons per day or liters per day
Incinerator	T03	Tons per hour or metric tons per hour, gallons per hour or liters per hour
Other (use for physical, chemical, thermal or biological treatment processes not occurring in tanks, surface impoundments or incinerators. Describe the processes in the space provided; Section III-C.)	T04	Gallons per day or liters per day

Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code	Unit of Measure	Unit of Measure Code
Gallons	G	Liters Per Day	V	Acre-Feet	A
Liters	L	Tons Per Hour	D	Hectare-Meter	F
Cubic Yards	Y	Metric Tons Per Hour	W	Acres	B
Cubic Meters	C	Gallons Per Hour	E	Hectares	Q
Gallons Per Day	U	Liters Per Hour	H		

*Add per request of Washington State Department of Ecology (01/2001)

III. PROCESS – CODES AND DESIGN CAPACITIES (continued)

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

Line No.	A. Process Code *(from list above)*			B. Process Design Capacity				For Official Use Only			
				1. Amount *(Specify)*	2. Unit of Measure *(enter code)*						
X-1	S	0	2	600		G					
X-2	T	0	3	20		E					
1	S	0	1	41,640		L					
2											
3											
4											
5											
6											
7											
8											
9											
10											

C. Space for additional process codes or for describing other process (code "T04"). For each process entered here include design capacity.

S01

The 303-K Storage Facility (303-K), which began waste management operation in January 1972, was used for the storage of mixed waste in U.S. Department of Transportation-specified containers. Both liquid and solid waste was stored at the 303-K. The liquid waste was stored on a 57-square meter (610-square foot) pad within the building. The building provided secondary containment for the contents of the containers. The solid waste was stored outside the building on a 426-square meter (4,590-square foot) asphalt, concrete, and gravel pad. The storage area was surrounded by a chain link fence. The 303-K no longer stores mixed waste and was closed as of July 22, 2002.

The maximum process design capacity for container storage at the 303-K was 41,640 liters (11,000 gallons).

IV. DESCRIPTION OF DANGEROUS WASTES

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

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

C. Unit of Measure - For each quantity entered in column B enter the unit of measure code. Units of measure which must be used and the appropriate odes are:

ENGLISH UNIT OF MEASURE	CODE	METRIC UNIT OF MEASURE	CODE
Pounds	P	Kilograms	K
Tons	T	Metric Tons	M

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

D. Processes

1. Process Codes:

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

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

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

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

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

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

Example for completing Section IV (shown in line numbers X-1, X-2, X-3, and X-4 below) - A facility will treat and dispose of an estimated 900 pounds per year of chrome shavings from leather tanning and finishing operation. In addition, the facility will treat and dispose of three non-listed wastes. Two wastes are corrosive only and there will be an estimated 200 pounds per year of each waste.

Line No.	A. Dangerous Waste No. *(enter code)*	B. Estimated Annual Quantity of Waste	C. Unit of Measure *(enter code)*	D. Processes: 1. Process Codes *(enter)*	D. Processes: 2. Process Description *(if a code is not entered in D(1))*
X-1	K 0 5 4	900	P	T03 D80	
X-2	D 0 0 2	400	P	T03 D80	
X-3	D 0 0 [illegible]	100	P	T03 D80	
X-4	D 0 0 2			T03 D80	[illegible]

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

I.D. Number *(enter from page 1)*

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

IV. DESCRIPTION OF DANGEROUS WASTES *(continued)*

Line No.	A. Dangerous Waste No. *(enter code)*				B. Estimated Annual Quantity of Waste	C. Unit of Measure *(enter code)*			D. Processes				
									1. Process Codes *(enter)*				2. Process Description *(if a code is not entered in D(1))*
1	D	0	0	1	6,804		K		S01				Storage-Container (Refer to IV.E.1)
2	D	0	0	2			K		S01				Storage-Container (Refer to IV.E.1)
3	D	0	0	6			K		S01				Storage-Container (Refer to IV.E.1)
4	D	0	2	9			K		S01				Storage-Container (Refer to IV.E.1)
5	D	0	3	5			K		S01				Storage-Container (Refer to IV.E.1)
6	D	0	3	9			K		S01				Storage-Container (Refer to IV.E.1)
7	D	0	4	0			K		S01				Storage-Container (Refer to IV.E.1)
8	F	0	0	1			K		S01				Storage-Container (Refer to IV.E.1)
9	F	0	0	2			K		S01				Storage-Container (Refer to IV.E.1)
10	F	0	0	3			K		S01				Storage-Container (Refer to IV.E.1)
11	F	0	0	-5			K		S01				Storage-Container (Refer to IV.E.1)
12	W	P	0	1			K		S01				Storage-Container (Refer to IV.E.1)
13	W	T	0	1			K		S01				Storage-Container (Refer to IV.E.1)
14	W	T	0	2			K		S01				Storage-Container (Refer to IV.E.1)
15	D	0	0	7	18,144		K		S01				Storage-Container (Refer to IV.E.2)
16	W	T	0	2			K		S01				Storage-Container (Refer to IV.E.2)
17	D	0	0	1	18,144		K		S01				Storage-Container (Refer to I\
18	D	0	0	5			K		S01				Storage-Container (Refer to IV.E.2)
19	D	0	0	6			K		S01				Storage-Container (Refer to IV.E.2)
20	W	T	0	1			K		S01				Storage-Container (Refer to IV.E.2)
21	D	0	0	2	771		K		S01				Storage-Container (Refer to IV.E.3)
22	D	0	0	1	2,313		K		S01				Storage-Container (Refer to IV.E.4)
23	D	0	0	8	2,494		K		S01				Storage-Container (Refer to IV.E.5)
24	D	0	0	1	136,078		K		S01				Storage-Container (Refer to IV.E.6)
25	D	0	0	4			K		S01				Storage-Container (Refer to IV.E.6)
26	D	0	0	5			K		S01				Storage-Container (Refer to IV.E.6)
27	D	0	0	6			K		S01				Storage-Container (Refer to IV.E.6)
28	D	0	0	7			K		S01				Storage-Container (Refer to IV.E.6)
29	D	0	0	9			K		S01				Storage-Container (Refer to IV.E.6)
30	D	0	1	1			K		S01				Storage-Container (Refer to IV.E.6)
31	W	T	0	2			K		S01				Storage-Container (Refer to IV.E.6)
32	D	0	0	2	680		K		S01				Storage-Container (Refer to IV.E.7)
33	D	0	0	7			K		S01				Storage-Container (Refer to IV.E.7)
34	D	0	0	2	27		K		S01				Storage-Container (Refer to IV.E.8)
35	D	0	0	4			K		S01				Storage-Container (Refer to IV.E.8)
36	D	0	0	7			K		S01				Storage-Container (Refer to IV.E.8)
37	D	0	1	1			K		S01				Storage-Container (Refer to IV.E.8)
38	W	P	0	2	91		K		S01				Storage-Container (Refer to IV.E.9)
39	D	0	3	7	20		K		S01				Storage-Container (Refer to IV
40													
41													
42													

IV. DESCRIPTION OF DANGEROUS WASTE (continued)

E. Use this space to list additional process codes from Section D(1) on page 3.

The following provides information concerning the types of waste that were stored at the 303-K:

1. Approximately 6,804 kilograms (15,000 pounds) per year of spent solvents – [This included spent degreasing solvents (F001, WP01, and WT01) that were occasionally mixed with ethyl acetate (D001, F003, and WT02). This also included spent halogenated and nonhalogenated solvents (F002 and F005). Waste solvents were corrosive (D002) and contained cadmium (D006), 1,1-dichloroethylene (D039), and trichloroethylene (D040)].
2. Approximately 36,288 kilograms (80,000 pounds) per year of heat treated salts contaminated with naturally occurring radioactive potassium-40 – [The heat treated salts were generated from both beta bath (8,165 kilograms (18,000 pounds) per year) and quench bath – (8,165 kilograms (18,000 pounds) per year). The beta bath salts consisted of potassium nitrate, sodium nitrate, sodium nitrite, potassium chloride, and sodium chloride. The quench bath salts were considered toxic, extremely hazardous waste (WT01) and were considered ignitable (D001) because of the presence of oxidizers (solid nitrates and nitrites). The quench bath salts also contained barium (D005), cadmium (D006), chromium (D007), and could have been considered toxic, dangerous waste (WT02).
3. Approximately 771 kilograms (1,700 pounds) of corrosive (D002) copper fluoroziriconate acid crystals from the bottom of the waste acid tanks in the 334-A Building.
4. Approximately 2,313 kilograms (5,100 pounds) per year of Zircaloy–2 and beryllium/Zircaloy–2 chips and fines before and after concreting the waste in the 304 Building – [This material designated as ignitable (D001) because of the pyrophoric properties.].
5. Approximately 2,494 kilograms (5,500 pounds) per year of metallic lead (D008).
6. Approximately 136,078 kilograms (300,000 pounds) per year of centrifuge and filter press sludge designated as a toxic, dangerous waste (WT02) by the mixture rule and ignitable (D001) because of the presence of solid nitrates – [The waste also could have contained the following chemical constituents introduced into the 300 Area Waste Acid Treatment System: arsenic (D004), barium (D005), cadmium (D006), chromium (D007), mercury (D009), and silver (D011)].
7. Approximately 680 kilograms (1,500 pounds) per year of corrosive (D002) waste acid absorbed by sedimentary opal clay – [This waste also contained chromium (D007)].
8. Approximately 27 kilograms (60 pounds) per year of waste acids contaminated with oil – [The waste acids were designated as corrosive (D002) and contained arsenic (D004), chromium (D007), and silver (D011)].
9. Approximately 91 kilograms (200 pounds) per year of waste hydraulic oil that contained halogenated hydrocarbons (WP02).
10. Approximately 20 kilograms (44 pounds) of a mixed waste that contained pentachlorophenol (D037).

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

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

VI. PHOTOGRAPHS Refer to attached photograph(s).

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

VII. FACILITY GEOGRAPHIC LOCATION

This information is provided on the attached drawings and photos.

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

VIII. FACILITY OWNER

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

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

1. Name of Facility's Legal Owner	2. Phone Number *(area code & no.)*

3. Street or P.O. Box	4. City or Town	5. St.	6. Zip Code

IX. OWNER CERTIFICATION

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

Name *(print or type)*	Signature	Date Signed
John D. Wagoner, Manager U.S. Department of Energy Richland Operations Office	John D. Wagoner	Revision 5 signed 9/26/96

X. OPERATOR CERTIFICATION

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

Name *(Print Or Type)*	Signature	Date Signed
See attachment		

X. OPERATOR CERTIFICATION

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

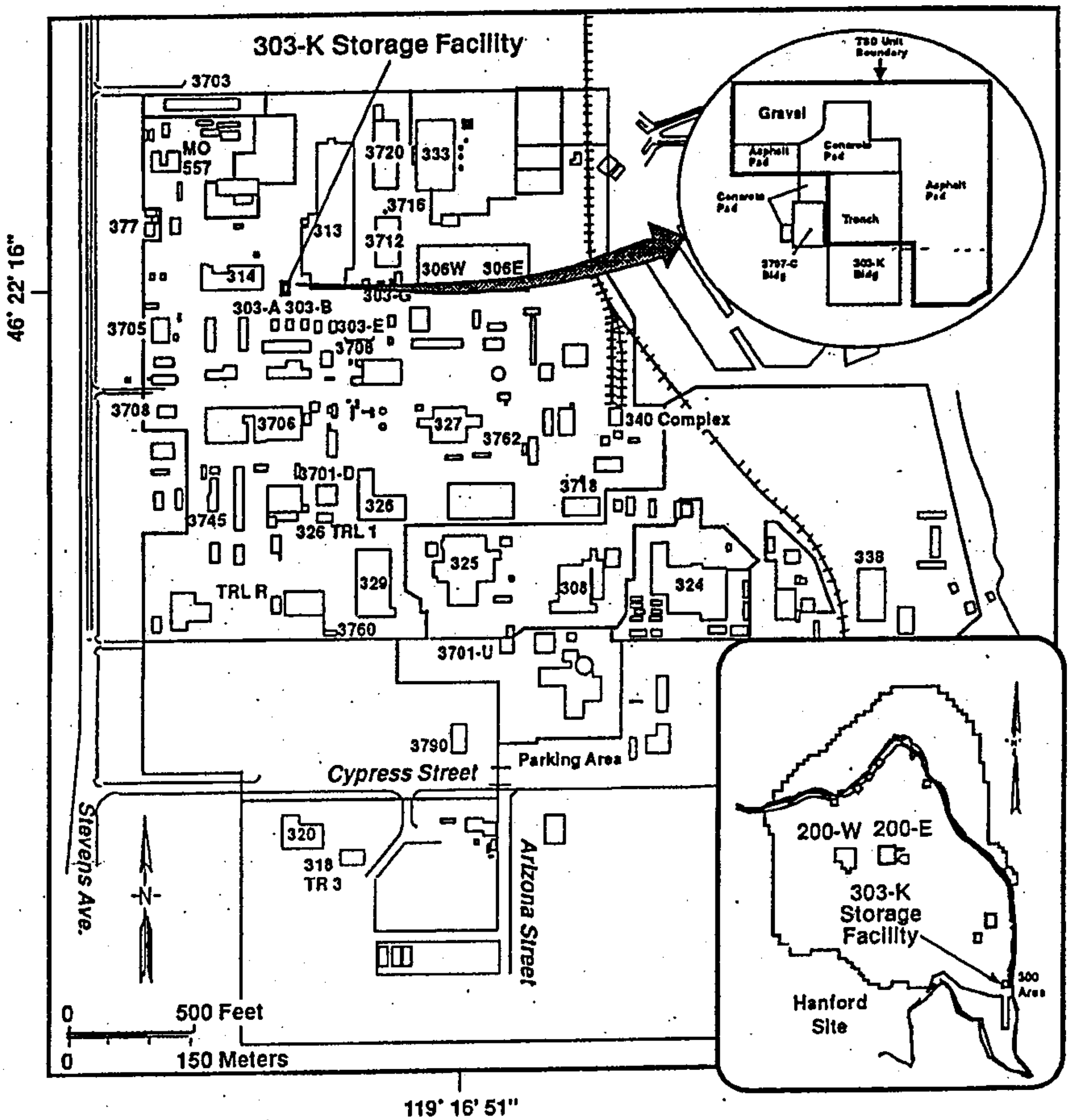
John D. Wagoner
Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

9/26/96
Date Revision 5 Signed

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

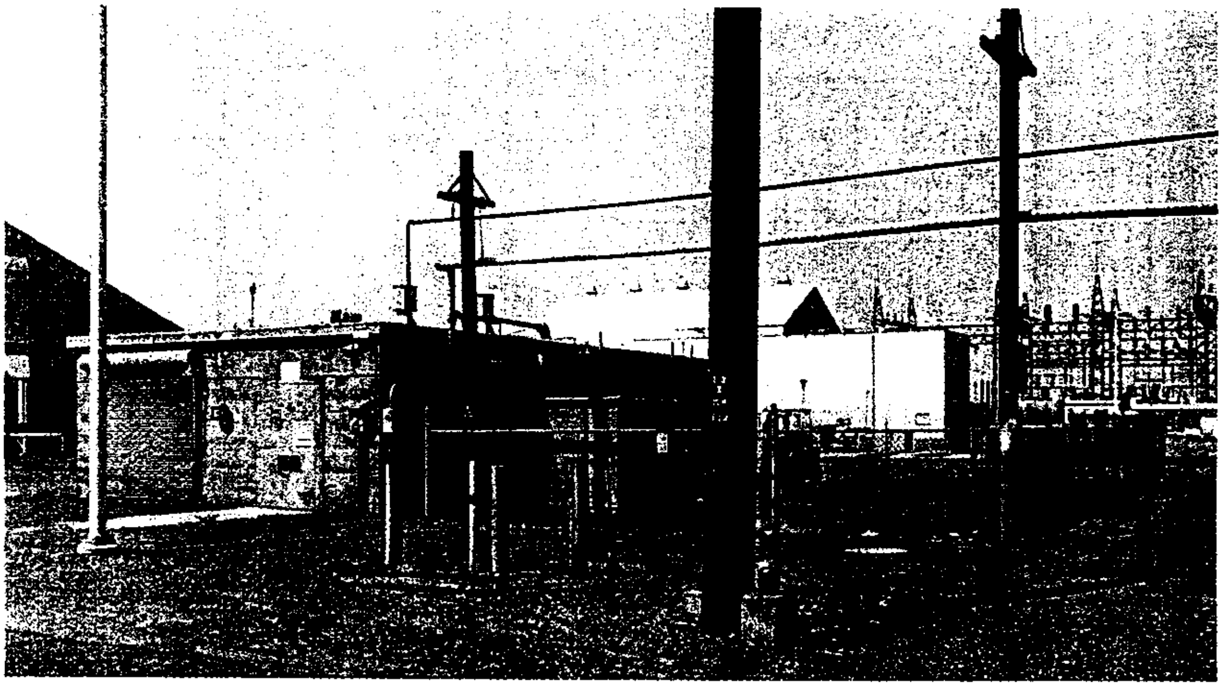
9/13/96
Date Revision 5 Signed

303-K Storage Facility Site Plan



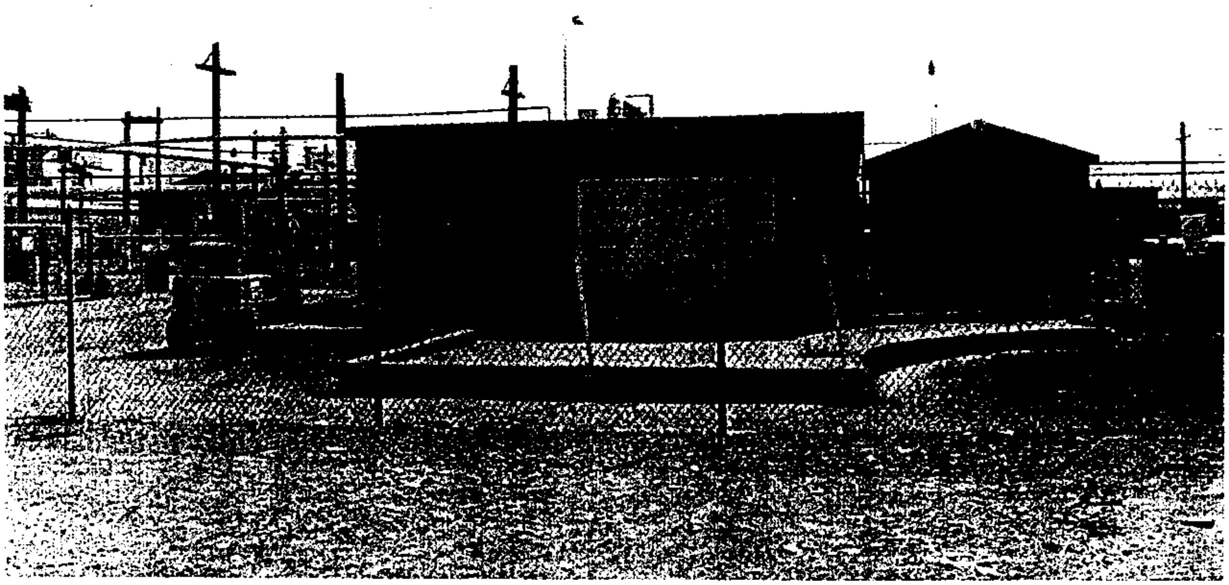
H96070161.21

303-K Storage Facility



46°22'16"
119°16'51"

96080657-6CN
(PHOTO TAKEN 1996)



46°22'16"
119°16'51"

96080657-8CN
(PHOTO TAKEN 1996)