BNFL Inc.

TANK WASTE REMEDIATION SYSTEM PRIVATIZATION PROJECT

DEACTIVATION PLAN

A-9

January 12, 1998

Prepared for:

U.S. Department of Energy
Richland Operations Office
Contract DE-AC06-RL13308

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FIGURES

ACRONYMS AND ABBREVIATIONS

CCR	Central Control Room
CCTV	closed circuit television systems
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	*Code of Federal Regulations*
CST	crystalline silico-titanate
DAR	Deativation Authorization Report
DOE	U. S. Department of Energy
DST	double-shell tank
ETF	Effluent Treatment Facility
FHA	fire hazard analysis
HEME	high-efficiency mist eliminators
HEMF	high-efficiency metal filter
HEPA	high-efficiency particulate air
HLW	high-level waste
HVAC	heating, ventilation, and air conditioning
ICS	Integrated Control System
IHLW	immobilized high-activity waste
ILAW	immobilized low-activity waste
JHA	Job Hazards Analysis
LAW	low-activity waste
NEPA	*National Environmental Policy Act of 1969*
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
OSHA	Occupational Safety and Health Administration
RCRA	*Resource Conservation and Recovery Act of 1976*
RFD	reverse flow diverter
SCR	selective catalytic reduction
Tri-Party Agreement	*Hanford Federal Facility Agreement & Consent Order*
TRU	transuranic
TSRs	technical safety requirements
TWRS-P	Tank Waste Remediation System-Privatization
UPS	uninterruptible power supply
USQ	Unreviewed safety question
vol %	volume percent

1.0 INTRODUCTION

1.1 SCOPE OF DOCUMENT

BNFL Inc. has entered into a contract with the U.S. Department of Energy (DOE) for the Hanford Tank Waste Remediation System-Privatization (TWRS-P) - Contract No. DE-AC06-RL13308 Part A. The contract requires BNFL Inc. to provide a Deactivation Plan for the proposed waste treatment facilities. This document is provided to fulfill that requirement. It describes a deactivation strategy to achieve a safe, stable, and passive facility, prepared for handover to the DOE with minimal cost for storage and minimal ongoing post-deactivation requirements. The TWRS-P contract requires that;

> **At the completion of waste operations, BNFL Inc. shall, with authorization from the DOE, deactivate the waste facilities and their contents. Deactivation when completed shall leave the facilities in a safe, stable, and passive state that can be monitored with minimal cost and minimal requirements for service support from either personnel or active equipment.**

At the completion of deactivation, BNFL Inc. will transfer ownership of the waste treatment facilities and equipment to the DOE for *Resource Conservation and Recovery Act of 1976* (RCRA) closure, decontamination, and decommissioning. BNFL Inc. will prepare and issue an initial RCRA closure plan for the TWRS-P Facility as required by the operator permit application. The DOE will assume ownership of this RCRA closure plan at the completion of BNFL Inc. deactivation and will revise the plan as necessary for DOE RCRA closure of the facility.

A central link in the BNFL Inc. deactivation strategy is the conclusion of an agreement with the DOE that will determine and define an overall facility deactivation end point. The establishment of this overall deactivation end point, and subsequent agreement on individual area/equipment end points before the commencement of deactivation will enable BNFL Inc. and the DOE to agree when a satisfactory completion of deactivation activities has been achieved. During the determination of the facility overall end point, DOE will identify to BNFL Inc. the post-deactivation safe storage and/or decommissioning/RCRA closure facility requirements. These requirements will be incorporated into the jointly agreed overall deactivation end point.

This issuance of the Deactivation Plan is an initial version only, as the plan will need to be updated and reissued at the completion of design and/or start of construction, and before completion of waste treatment operations, as updated and more detailed information becomes available. The *Integrated Master Plan* (BNFL Inc. 1998a) will contain target milestones for the issuance of updates to the Deactivation Plan.

It is assumed in the Deactivation Plan that a tailored set of standards will be applied to the deactivation of the TWRS-P waste treatment facilities to ensure adequate safety and the ability to meet the requirements of relevant laws and formal commitments. If it is decided at a later date that the TWRS-P waste treatment facilities will be regulated by the Nuclear Regulatory Commission (NRC), this plan will be modified and costs adjusted if needed.

1.2 BACKGROUND TO THE TWRS PROJECT

The DOE, through its contractors, manage 177 underground radioactive waste storage tanks at the Hanford Site in Washington State. The tanks contain approximately 210 million L of radioactive waste, comprised of sludges (53 million L), saltcake (91 million L), and liquids (66 million L). BNFL Inc. has entered into a privatization contract with the DOE to provide Phase I services for treatment of the tank waste. Part A of this contract consists, which is over a
20-month period, of demonstrating waste treatment technologies, preparing preliminary designs and draft safety and regulatory licensing documents, and establishing a financial plan for the waste treatment facilities.

At the end of Part A, the DOE will evaluate BNFL Inc.'s performance and elect whether to proceed with the BNFL Inc. provision of privatized facilities in Part B. During Part B, the selected private contractor(s) is to complete the design, construction, and licensing activities for a waste treatment facility. In this facility, 6 to 13 vol% (i.e., approximately 24 million L) of radioactive liquid waste is to be treated and immobilized as glass. The remaining tank waste is intended to be retrieved, treated, and immobilized by private contractors during a separately awarded Phase II privatization.

1.3 DEACTIVATION PROCESS OVERVIEW

BNFL Inc. will deactivate the waste treatment facilities in a manner consistent with the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et. al 1990) Section 8, “Facility Decommissioning Process”. This order defines the approach by which the DOE, with the involvement of the lead regulatory agencies, will take a facility from operational status to its end-state condition (final disposition) at the Hanford Site. The Order specifies that this process may be accomplished in three phases: facility transition (deactivation), safe storage, and final disposition. At the completion of waste treatment operations, BNFL Inc. will, with the agreement of the DOE, complete the deactivation phase for the waste treatment facilities. At the conclusion of deactivation, the DOE will assume ownership of the waste treatment facilities and complete all remaining tasks through final facility disposition.

BNFL Inc. will perform deactivation in compliance with all applicable environmental regulations and will complete the transition of the facilities from operational status to facilities ready for safe storage and/or decommissioning/RCRA closure. This transition is to be achieved in an expeditious and cost-effective manner. BNFL Inc. will ensure that the deactivated facilities pose no significant threat for the release of hazardous substances into the environment and no significant risk to human health and the environment.

A formal project management approach will be used by BNFL Inc. to plan and expedite deactivation using the source documents authorized by the DOE Office of Nuclear Material and Facility Stabilization (EM-60) and as stated in the *DOE Project Policies and Supplementary Information* (DOE 1995). The standardized BNFL Inc. approach also will be drawn from the methods and practices recommended in the *Facility Deactivation Guide Methods and Practices Handbook* (DOE 1996).

To address the problem of identifying when deactivation is complete and satisfactory, the condition of the facility at the completion of deactivation will be agreed with the DOE before deactivation. This agreed overall facility end-point condition shall be used to establish end-point criteria, which shall be used to determine a series of defined facility deactivation end points. Each of these end points will cover a specific deactivation task, which may be the deactivation of a piece of equipment, a building structure, or the preparation of deactivation documentation. Appendix A details end-point work package specifications and end points that BNFL Inc. anticipates will form the core activities of deactivation.

At the completion of deactivation, the facilities and contents will be in a safe, stable, and largely passive state that can be monitored at minimal cost. The requirements for service support, personnel visits, heating, ventilation, and air conditioning, fire systems, and monitoring equipment will be minimized. Radioactive contamination and hazardous materials may remain in the facility, but only under immobilized or controlled conditions. Deactivation shall be considered complete when the following have occurred.

- All end points have been verified as completed.
- The regulatory status of remaining radioactive and hazardous materials and health and safety requirements is documented.
- The facilities, structures, support systems, and surveillance systems are suitable to contain and monitor the remaining contamination, radiation, and any other potential hazards. The conditions and inventories are documented, and the facility is appropriately posted and secured.
- Packaged special nuclear materials and other packaged radiological and chemical waste have been removed. Bulk hazardous and radioactive wastes materials have been removed to the degree practicable.
- Security systems and procedures are in place and are adequate to prevent unauthorized entry.
- The equipment and facilities left in place and operational after decommissioning will be sufficient for safe storage and/or decommissioning and RCRA closure.

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2.0 SITE AND FACILITY OVERVIEW

The Tank Waste Remediation System Privatization (TWRS-P) Facility will receive waste from the Hanford waste storage tanks via a dedicated double-shell tank (DST), 241-AP-106. Waste will be transferred from this tank for treatment in the TWRS-P Facility where it will be processed into a glass form to immobilize the radionuclide inventory for long-term storage. Two processing options are being considered: (1) the low-activity waste (LAW)-Only option, and (2) the high-level waste (HLW)/LAW option.

Both options process the LAW specified in the TWRS-P contract as Envelopes A, B, and C waste resulting in the same immobilized low-active waste (ILAW) product. In addition, the LAW/HLW option processes HLW, specified in the contract as Envelope D waste. Certain waste streams and products that would be returned to the U.S. Department of Energy (DOE) under the terms of the LAW-Only option instead are blended with Envelope D waste feed and incorporated into the immobilized high-level waste (IHLW) product.

The following Sections 2.1, 2.2 and 2.3 contain brief descriptions of the TWRS-P site, facilities and waste treatment processes to assist the reader in gaining an understanding of the scope of the deactivation requirements. A complete description of both facilities and process is contained in the TWRS-P Technical Report (BNFL-TR-01, Rev. 0). Should there be a discrepancy between the content of the Technical Report and this plan the Technical Report shall be assumed to be correct.

2.1 SITE DESCRIPTION

In 1943, the U.S. Army Corps of Engineers selected the Hanford Site for construction of nuclear reactors and chemical processing facilities in support of the war effort. The current mission is environmental management of radioactive and hazardous waste, restoration of Hanford Site land, and conversion of useable facilities for future missions. The DOE nuclear facilities currently occupy approximately 6% of the total available Hanford Site land area. The TWRS-P Facility site is located in the 200 East Area near the center of the Hanford Site on a relatively flat terrace known as the 200 Areas Plateau. Figure 2-1 shows the Hanford Site and the proposed position of the TWRS-P facilities in the 200 East Area.

2.2 FACILITY DESCRIPTION

The TWRS-P Facility for treating both the LAW-Only option and the LAW/HLW option includes the following major structures:

- Process building
- Wet chemical store
- Glass formers store
- Melter assembly building
- Empty canister store
- Services buildings
- Administration building.

Figure 2-1. Location of the TWRS-P Facilities on the Hanford Site

Structures associated with the operation of tank 241-AP-106 include the following:

- 241-AP-106 service building
- Central pump pit/transfer pump pit enclosure building
- Transfer pump pit.

Figure 2-2 shows the locations of the buildings and the facility fence. A minimum setback of 15 m (50 ft) from the fence is provided for all structures.

2.2.1 Process Building

The process building for the LAW-Only option contains processes for conditioning (i.e., pretreatment) and immobilizing the LAW feeds into glass. For the LAW/HLW option, the processes for conditioning and immobilizing HLW also are included. Additionally, for the LAW-Only option, the process building includes an area for producing an intermediate waste form from the cesium separated from the LAW feeds. Figures 2-3 through 2-8 show the general arrangement of the process building for the LAW/HLW option.

The ILAW and the IHLW (or the cesium intermediate waste for the LAW-Only option) form are sealed in containers and placed in an interim storage area or process cells within the process building. Secondary waste streams (i.e., radioactive solid waste; nonradioactive, non-dangerous liquid effluents; and radioactive, dangerous liquid effluents) are collected, sampled, analyzed, and returned to the DOE for treatment and disposal.

Gaseous effluents generated from treating the waste feeds are treated, sampled, analyzed, and discharged to the atmosphere through an 88-m (289-ft) above-grade stack.

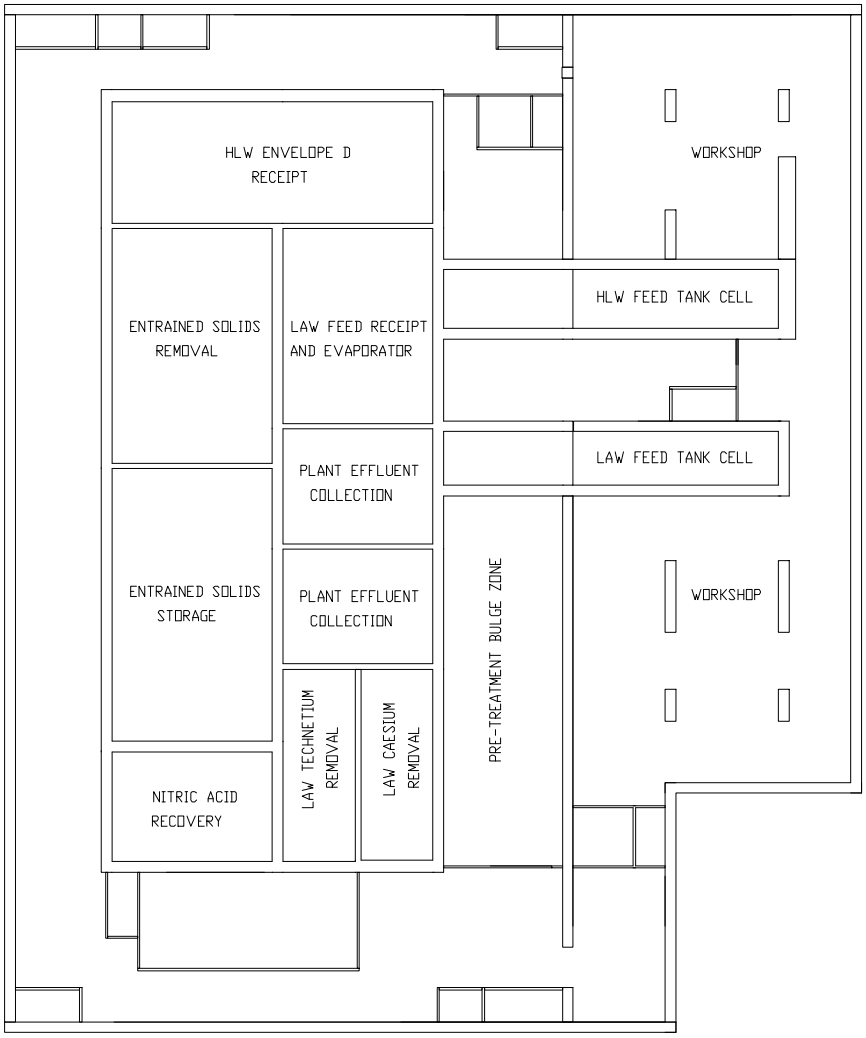
The overall dimensions of the LAW/HLW process building are approximately 250 m (820 ft) long, 105 m (345 ft) wide, and 30 m (100 ft) above grade. The overall dimensions of the LAW-Only option process building are approximately 250 m (820 ft) long, 91 m (299 ft) wide, and 35 m (115 ft) above grade. The immobilization area extends below grade approximately 7 m (23 ft). The pretreatment area extends below grade approximately 14 m (46 ft).

The immobilization area includes remotely-operated vitrification systems contained in stainless-steel-lined concrete cells. The vitrification systems comprise feed makeup vessels, joule-heated melters, offgas treatment equipment, and waste-container handling, welding, and decontamination equipment. Glass-forming chemicals are stored in feedhoppers situated above the vitrification process cells at 21 m (69 ft) above grade. The glass-forming chemicals are transferred through piping that penetrates the vitrification cells into the feed makeup vessels where they are blended with the waste stream. After vitrifying the waste, the waste containers are sealed, decontaminated, and transferred to an interim storage area within the process building.

The waste container interim storage area is located adjacent to the immobilization area. Waste containers are transferred through one of two underground tunnels (7 m [23 ft] elevation) from the immobilization area into the interim storage area. Waste containers are stored in the interim storage area until the DOE accepts the immobilized waste. On acceptance of the waste,

Figure 2-2. Location of Buildings and Facility Fence

Figure 2-3. Process Building, -14 m Elevation



PLAN SECTION ON -14 M LEVEL
BUILDING LAYOUT-HLW/LAW OPTION .

Figure 2-4. Process Building, -7 m Elevation

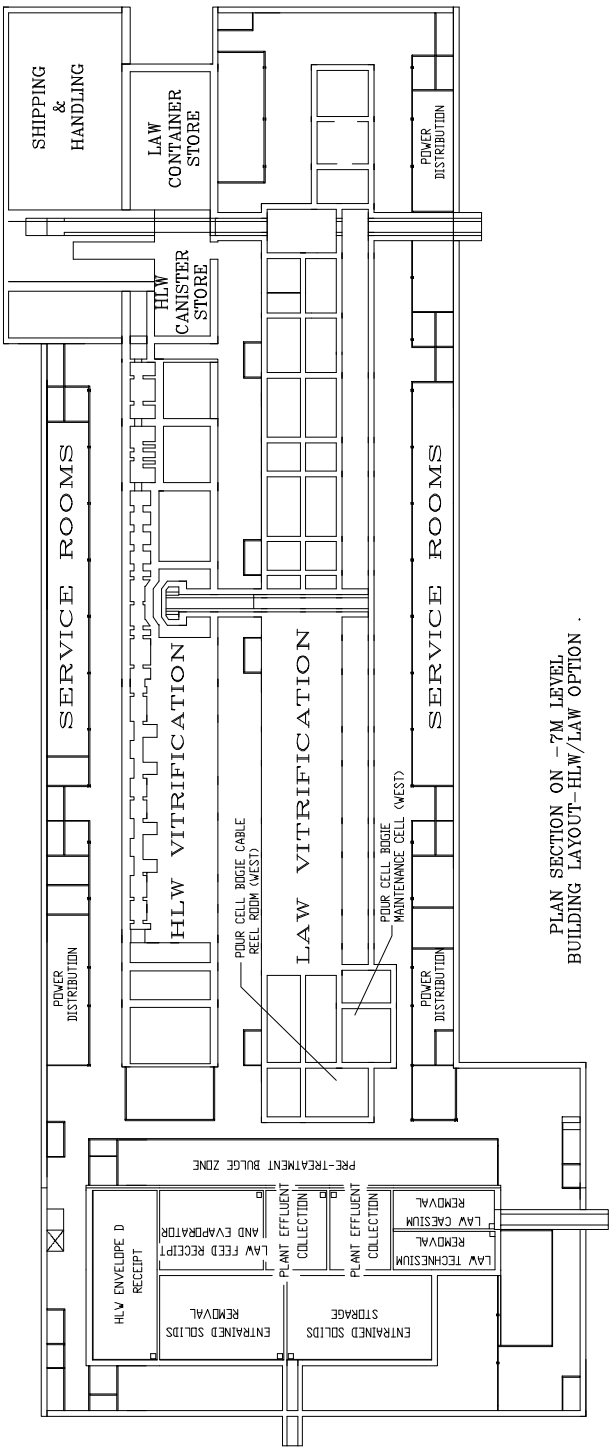


Figure 2-5. Process Building, Grade Level

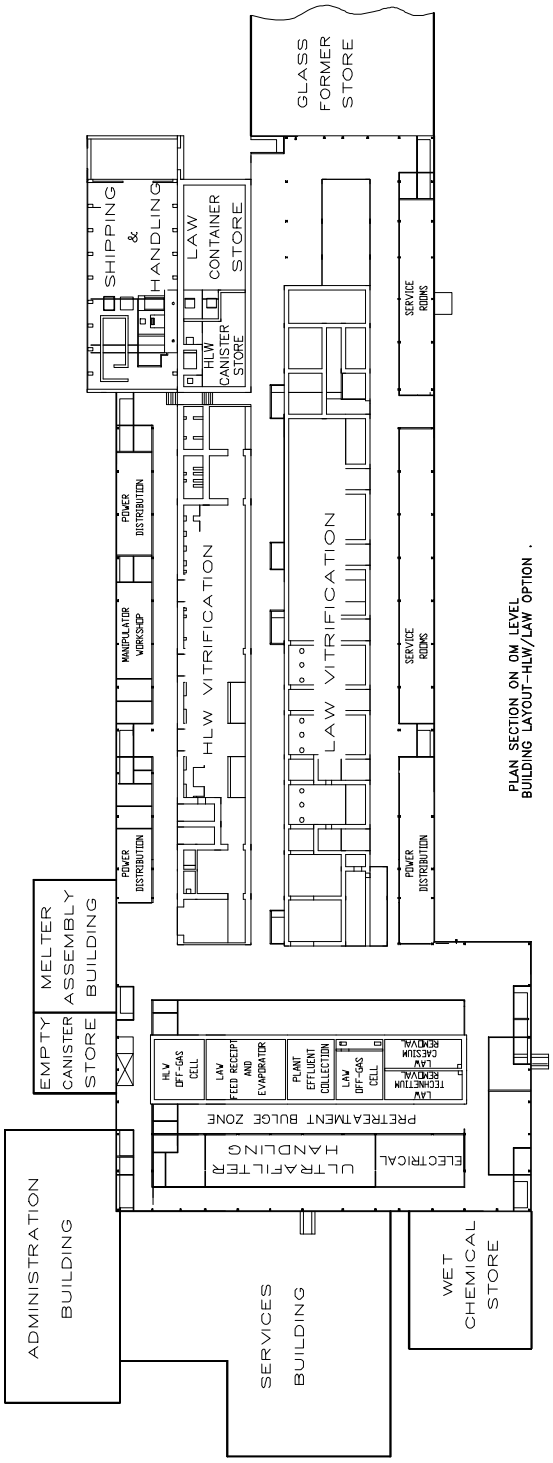


Figure 2-6. Process Building, +7 m Elevation

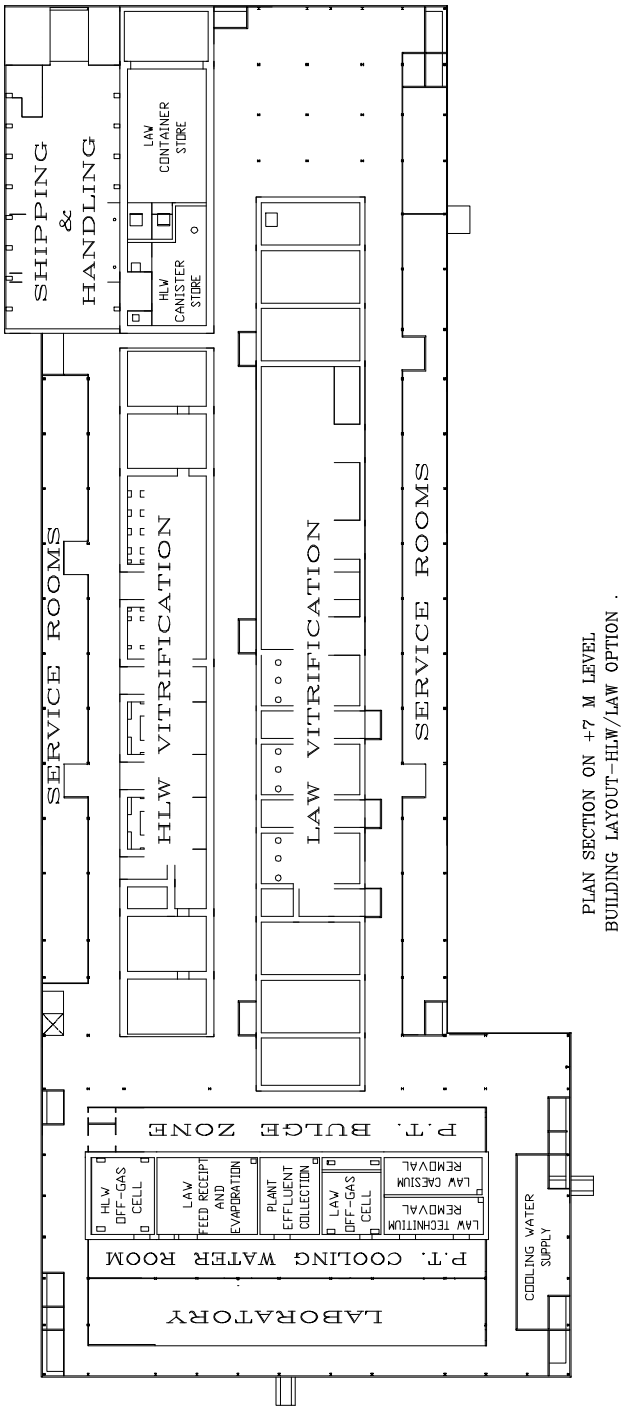


Figure 2-7. Process Building, +14 m Elevation

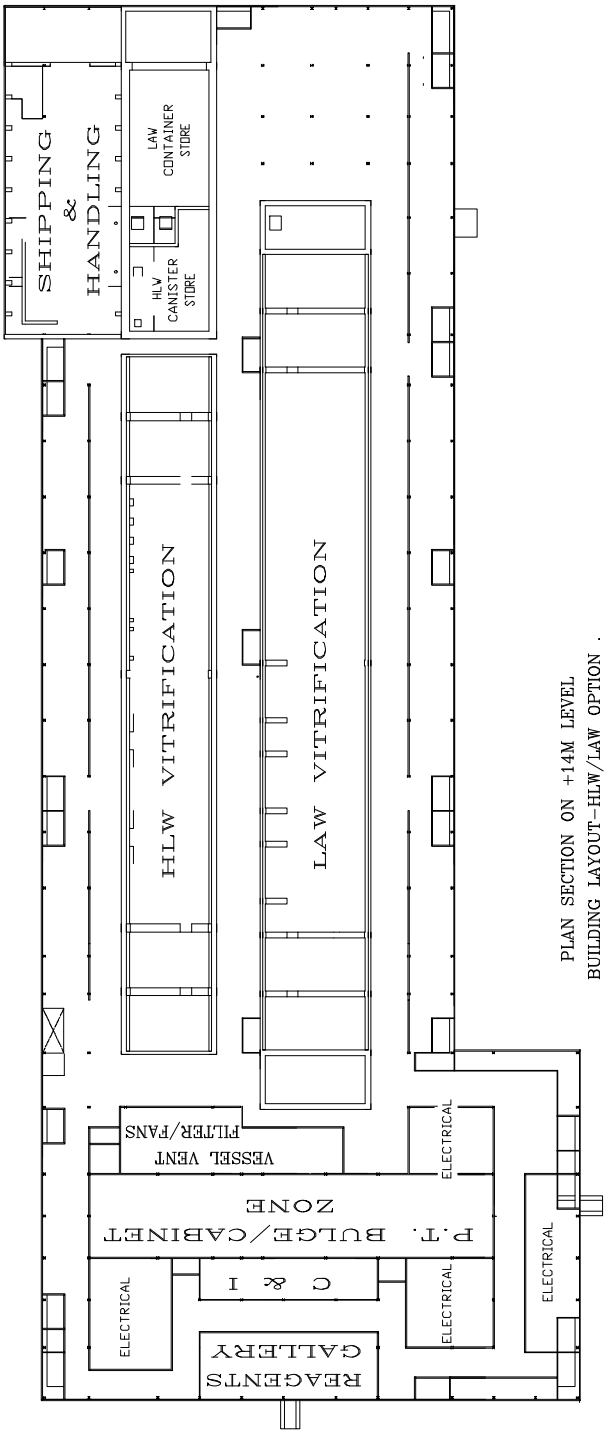
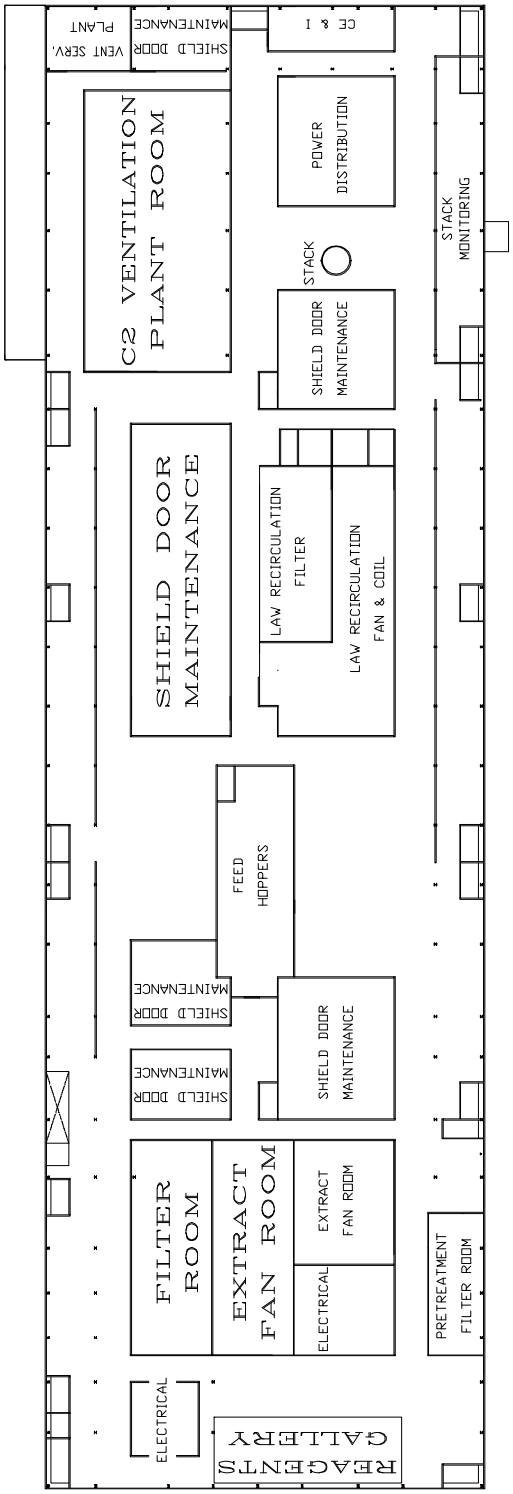


Figure 2-8. Process Building, +21 m Elevation



PLAN SECTION ON +21M LEVEL
BUILDING LAYOUT-HLW/LAW OPTION .

immobilized waste containers are transferred through an underground tunnel into the shipping container handling area using a shielded flask.

For the LAW-Only option, there is a cesium intermediate waste processing area that includes remotely operated equipment contained in stainless-steel-lined concrete cells. The remotely operated equipment consists of vessels, ion-exchange columns, container welding, and decontamination equipment.

For both the LAW-Only and LAW/HLW option, the pretreatment area includes stainless-steel-lined concrete cells that contain remotely operated equipment to perform the following.

- Separate radionuclides from the LAW feed.
- Concentrate the separated radionuclides.
- Concentrate the pretreated LAW solution.
- Stage the pretreated LAW solutions for immobilization.
- Collect and monitor liquid effluents.

For the LAW-only option, the area also includes provisions for the following:

- Interim storage and transfer of the separated entrained solids, strontium, and transuranics (TRU) to the DOE via an underground pipeline

- Interim storage of the technetium separated from the LAW feeds

- Interim storage of the cesium separated from the LAW feeds.

For the LAW/HLW option, storage of separated solids and radionuclides is unnecessary because they are incorporated in the immobilized HLW product. Therefore, the LAW/HLW option also includes cells and equipment that perform the following.

- Concentrate the HLW feed solution.
- Blend the radionuclides separated from the LAW feeds with the HLW feeds.
- Stage the blended HLW feeds for immobilization.

The pretreatment process cells begin at the -14-m (-46-ft) elevation and extend to 14-m (46-ft) above grade. Situated adjacent to the pretreatment process cells are bulges for accessing pumps and valves. The bulges are at the -7-m (-23-ft), 0-m (0-ft), and 7-m (23-ft) elevations.

A cooling water room that services the pretreatment area is situated at the 7-m (23-ft) elevation. In the cooling water room, the primary cooling water closed-loop system is monitored and cooled by the secondary cooling water loop.

An analytical laboratory is located on the west side of the pretreatment process cells. The laboratory is used to analyze samples of process solutions, products, and secondary waste. The analytical laboratory contains remotely operated cells and equipment for receipt and

analysis of radioactive process and product samples. Additionally, fume hoods, gloveboxes, and analytical equipment are provided for handling and analysis of samples that exhibit low radiation levels.

A chemical reagents gallery is located in the pretreatment area at the 14-m (46-ft) elevation. Tanks in the chemical reagents gallery receive chemical solutions from the wet chemical storage building and supply chemicals to vessels in the pretreatment process cells.

The process building contains various rooms for electrical distribution systems, backup battery power, heating, ventilating, and air-conditioning (HVAC) systems, instrumentation and controls, cooling water distribution, and miscellaneous workshops.

A shipping container area along with a drive-through loading bay is provided at the northeast corner of the process building adjacent to the area used for interim storage of the immobilized waste. Within this area, the shipping container provided by DOE is removed from the transport vehicle, the IHLW or ILAW canister/container or cesium intermediate waste package is loaded into the shipping container, and the shipping container is placed onto the transport vehicle.

Adjacent to the shipping container area is the interim store for the IHLW canisters and LAW containers. Sealed waste canisters/containers from the storage area are transferred through underground tunnels into the shipping area using shielded casks to reduce personnel radiation exposure.

2.2.2 Wet Chemical Store

The wet chemical store is located at grade on the southwest side of the process building. The exterior dimensions of the building are approximately 24 m wide by 36 m long by 9 m high (79 ft wide by 118 ft long by 30 ft high). A concrete loading pad is provided on the exterior west side of the building. Delivery trucks can park parallel or perpendicular to the building on a concrete loading pad.

The building is subdivided into an ion-exchange resin storage area and a bulk chemical reagents storage area. The ion-exchange resins storage area is enclosed by walls and a roof to prevent damage to these resin materials. Exterior access to the ion-exchange resins storage area is through a roll-up door located on the west side of the building. A stairway is provided for access to the building roof for service and maintenance of the air handling units.

Ion-exchange resins are brought into the process building from the wet chemical store through a double-door airlock on the east side of the resin storage area.

The bulk chemical reagents storage area does not have exterior building walls, but is covered with a roof to protect the chemicals from the weather. The bulk chemicals are stored in tanks within spill-retention basins. Dry chemicals (e.g., ferric nitrate, strontium nitrate, sodium nitrite) are stored separately in this area as well.

The chemical reagents stored in the bulk chemical reagents storage area are follows:

- 19 M sodium hydroxide solution
- 1 M strontium nitrate solution
- 5 M sodium hydroxide solution
- 3.5 M ferric nitrate solution
- 0.5 M sodium hydroxide solution
- 0.5 M sodium nitrite solution
- 12.2 M nitric acid solution
- 5 M nitric acid solution.

In addition, liquefied ammonia is stored on a pad outside the wet chemical store.

Piping from the discharge pumps from the chemical storage tanks is routed through the exterior wall to the reagents gallery at the 14-m (46-ft) elevation within the process building.

2.2.3 Glass Formers Store

The glass formers store is used for receipt, storage, weighing, and blending of the bulk glass chemicals. The building is located at the east end of the process building. The building consists of a fabricated steel structure with insulated siding and roof. The building dimensions are 10 m wide (33 ft) by 35 m long (115 ft) by 21 m high (69 ft). The building provides space for 11 storage silos and 7 blending vessels.

Trucks deliver the glass-forming chemicals in bulk. On arrival and before the trucks unload, scales weigh the truck contents. A pneumatic vacuum system unloads the truck and charges a pneumatic transporter, which batch transfers the glass former ingredients to one of the bulk storage silos that provide a 14-day supply of the chemical. From the storage silos, the make-up chemicals are weighed, blended, and transferred to the process building.

The glass formers store contains the following:

- Silica sand
- Zinc oxide
- Ferric oxide
- Zircon sand
- Lithium carbonate
- Boric acid
- Alumina
- Magnesium silicate (olivine)
- Calcium silicate (wollastonite).

2.2.4 241-AP-106 Service Building

The 241-AP-106 service building supports new ventilation, instrumentation, electrical, and flushing equipment for tank 241-AP-106. The building is a 60-ft by 36-ft by 10-ft-high rigid frame metal building with the finished floor level at grade level.

2.2.5 Central Pump Pit/Transfer Pump Pit Enclosure Building

The new pump pit enclosure provides both secondary confinement and weather protection to the mixer and transfer pump drive motors, the actuated transfer control valves and pit instrumentation. The building is 16-ft by 40-ft by 10-ft-high pre-engineered rigid frame metal building mounted on a concrete footing. The building is designed with removable roof sections to allow mixer and transfer pump replacement.

2.2.6 Transfer Pump Pit

A new cast-in-place or modular precast concrete transfer pump pit is installed above 241-AP-106 risers 5 and 13 to provide a location for two new transfer pumps and transfer control valves. The lower section of the pit is stainless-steel-lined to provide adequate decontamination requirements. Two existing tank ventilation ducts presently are routed directly below the proposed pit location. These ducts are encased in concrete in the area where they pass below the new pit.

2.2.7 Adjacent Support Buildings

The TWRS-P Facility includes the following additional buildings. Building locations are shown in Figure 2-2.

Melter assembly building. This building is located at grade on the northwest side of the process building and adjacent to the empty canister store. The building is used for the storage and assembly of melters. The melter assembly building also serves as the main equipment access to the process building. An overhead crane is provided for assembly operations.

Empty canister store. This building is located at grade on the northwest side of the process building and adjacent to the melter assembly building. Empty waste canisters are unloaded, inspected, and stored in the building. Sufficient space is provided inside the building to store 120 empty LAW canisters or 20 empty HLW canisters. An overhead crane is provided to handle the canisters.

Services building. This building is located at grade on the west side of the process building. The building provides services to the process building. The building contains an electrical room, a clean maintenance shop, a clean electrical and instrument shop, water chillers, air receivers, after coolers, air compressors, and breathing air equipment.

Steam plant building. This building is located at grade on the southwest corner of the process building. The building provides steam services to the process building. The building contains three fire tube package boilers, boiler make-up feed system, deaerator package, blowdown package, and oxygen scavenger injection package.

Administration building. This building is located at grade on the northwest side of the process building. It contains change rooms, access control, the main control room, and offices and facilities for the operating staff.

2.3 PROCESS DESCRIPTION

For the LAW-only option, the waste feeds to the facility consist of liquid feeds with low solids content. Specification 7 of the contract (BNFL Inc. 1996) states that the insoluble solids fraction of the LAW will not exceed 5 vol% of the waste transferred. The ILAW has radionuclide concentrations less than Class C limits, as this limit is defined in 10 *Code of Federal Regulations* (CFR) 61.55. The average concentrations of cesium-137, strontium-90, and technetium-99 in the ILAW are further limited by Specification 2 of the contract (BNFL Inc. 1996) as follows: cesium-137 <3 Ci/m^3, strontium-90 <20 Ci/m^3, and technetium-99 <0.3 Ci/m^3.

Concentrations of these radionuclides in the LAW waste envelopes are too high to meet these limits. Therefore, the pretreatment of the LAW includes process steps for removing these three radionuclides, as well as entrained solids, from the feed before vitrification and incorporating them into waste forms for storage and eventual return to DOE as described in Specifications 4, 5, and 6 of the contract (BNFL Inc. 1996). In addition to specific limits for radionuclides, the surface dose rate of the ILAW cannot exceed 1,000 mrem/h, which places, additional requirements on radionuclide removal.

For the LAW/HLW option, two processes proceed in parallel. One process treats the same LAW streams as the LAW-only option, yielding the same ILAW product. The HLW process is designed to receive and treat aging waste from the Hanford DST and the sludge retrieved by sluicing from SST 241-AP-106-C. The expected composition of the HLW feed (Waste Envelope D) is given in Specification 8 of the contract (BNFL Inc. 1996). The bulk of the HLW feed components is in the form of insoluble suspended solids in an aqueous slurry. The IHLW product has higher activity than the product from the LAW.

The major difference between the two options is that a HLW melter receives solids-bearing waste, while a LAW melter receives only liquids. Therefore, in the combined LAW/HLW option, the solids recovered during pretreatment of the LAW feeds are routed for mixing with the Envelope D waste for processing by the HLW melter. The condensate streams generated by ultrafiltration of the HLW are routed to the LAW melter. In addition, the cesium-137, strontium-90, TRU elements, and technetium-99 separated from the LAW are routed for mixing with the Envelope D waste for processing into the IHLW product.

Figures 2-9 and 2-10 provide simple flow diagrams for the LAW-only and the LAW/HLW options, respectively.

2.3.1 Waste Receipt, Pretreatment, and Vitrification

2.3.1.1 Waste Receipt. Four new double-contained transfer pipes will be used to transfer waste between the 241-AP Tank Farm (241-AP-106) and the TWRS-P Facility. Two pipes are used to transfer LAW Envelopes A, B, and C and return solids. These pipes are configured to support waste feeds to the TWRS-P Facility through one line and return solids to DOE through the other. A cross-connection is provided between the pipes in the transfer pit as a backup in the event of a line failure. The remaining two pipes connect to a new caisson provided by DOE

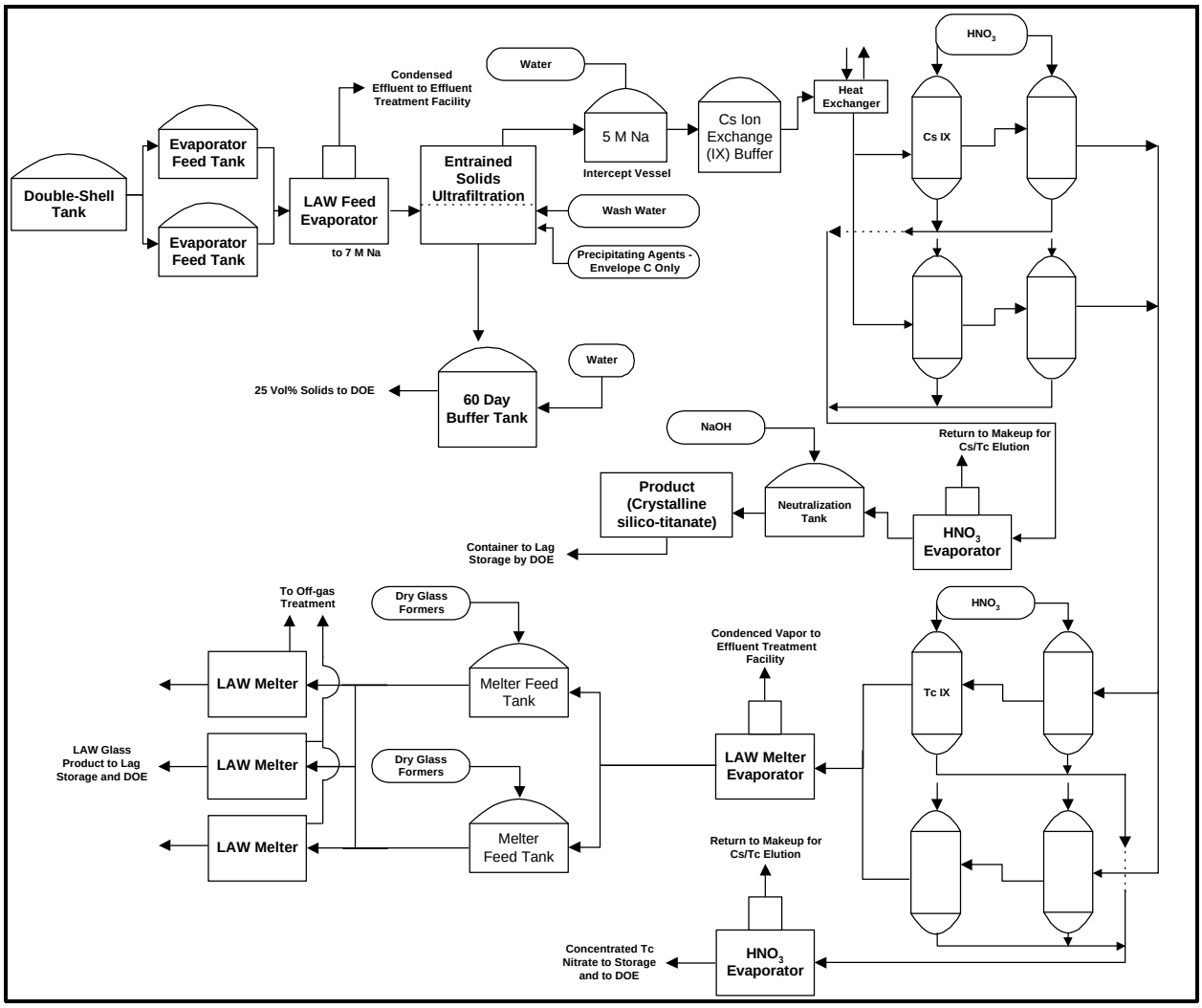
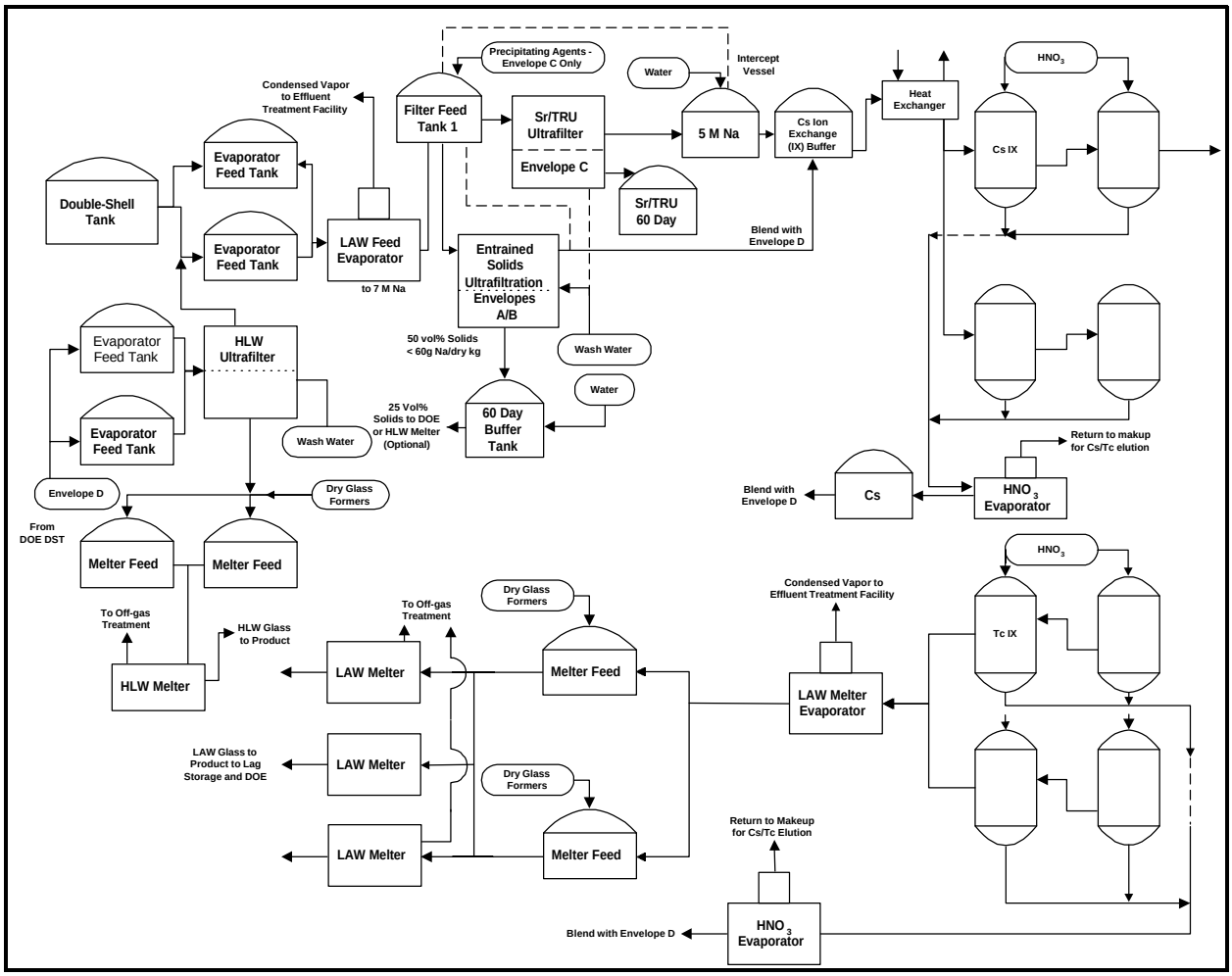


Figure 2-9. Flowchart for the LAW-Only Option

Figure 2-10. Flowchart for the LAW/HLW Option



and feed HLW (Envelope D) to the facility. The inner pipes are stainless steel and the outer pipes are carbon steel. The pipes are sloped toward the TWRS-P Facility. A leak-detection system is provided for all four pipes.

LAW Envelope A, B, or C feed is transferred, in approximately 200-m^3 (52,800-gal) batches, from the DST to one of the two LAW Evaporator Feed Vessels. HLW Envelope D feeds are received into three Envelope D Receipt Vessels, each with a capacity of approximately 225 m^3. Each HLW batch will contain at least 5 metric tons of equivalent waste oxide (excluding sodium and silicon). The batch transfer for both LAW and HLW is followed by a water flush of the affected components.

2.3.1.2 LAW Feed Evaporator. The LAW feed stream is evaporated to provide a consistent feed concentration and minimize the volume throughput of the pretreatment process. The LAW feed evaporator is a continuous, submerged-tube, forced-circulation evaporator. The evaporator concentrates the feed to approximately 7 M sodium to provide a consistent feed for the cesium ion-exchange process. The LAW feed is recirculated at a high flow rate through the evaporator reboiler until the sodium content of the stream reaches the desired concentration. The concentrated LAW product stream then is pumped to a buffer vessel before entrained solids removal. The vapor stream is condensed and the condensate routed to the shared active condensate tanks, which receive condensate from several evaporators in the LAW pretreatment process.

2.3.1.3 Entrained Solids Removal by Ultrafiltration. For both options, the concentrated LAW product is sent to the ultrafiltration loop to separate entrained solids. For Envelope C waste, strontium and TRU elements require removal to meet the product specifications for the ILAW glass product. To accomplish this, reagents are added to precipitate strontium and TRU elements before sending the waste through the ultrafiltration loop. Continuous circulation through a crossflow filter removes the entrained solids and precipitate. For the LAW-only option, the precipitated solids, strontium carbonate, and a ferric floc containing the TRU elements, are returned to the DOE. For the LAW/HLW option, the precipitates are sent directly to be mixed with Envelope D feed for processing by the HLW melter.

2.3.1.4 Cesium and Technetium Removal Using Ion Exchange. To meet ILAW product specifications, the radioactive cesium and technetium content of the LAW feed must be reduced. This reduction is accomplished by passing the feed through successive ion-exchange systems for cesium and technetium removal. The cesium is removed first.

Both systems have two sets of columns in parallel each with two columns in series. One set is collecting while elution and regeneration are occurring on the other set. When cesium or technetium can be detected in the effluent from its respective columns, the flow to that set of columns is suspended, and the LAW is diverted to the other set of columns.

The cesium and technetium subsequently are removed from the loaded columns, and the resin regenerated for reuse. The cesium resin has an anticipated useful life of 10 cycles, after which the spent resins are removed from the columns and replaced with fresh resin. The spent resins are incorporated into the ILAW product.

2.3.1.5 Cesium/Technetium Nitric Acid Recovery. The eluate from both the cesium and technetium ion exchange are put through an evaporative process to recover some of the nitric acid and to concentrate the solutions. The recovered nitric acid is reused in the process. For the LAW-only option, the cesium concentrate goes to a neutralization tank to be prepared for recovery onto a solid substrate. It then is packaged and returned to the DOE for storage. For the LAW-only option, the concentrated technetium solution is returned to the DOE at the end of Phase I. For the LAW/HLW option, the cesium concentrate is stored with the technetium and both are mixed with Envelope D waste for processing by the HLW melter.

2.3.1.6 Cesium Recovery as a Solid. The storage of cesium as a dry powder is a requirement of the contract Specification 4.2.2 for the LAW-only option (BNFL Inc. 1996). To meet this requirement, the cesium in the concentrate from the evaporator is adsorbed onto another ion-exchange material, crystalline silico-titanate (CST). The acid concentrate is first neutralized with sodium hydroxide, then passed through the bed of CST. The cesium-loaded bed subsequently is dried by a combination of its own heat generation and a slow passage of air. Once the air feed through the bed reaches its low moisture content limit, the bed is packaged in outer containers. The containers are sealed, decontaminated, tested, and transferred to the DOE for storage.

2.3.1.7 LAW Melter Evaporator. After the LAW stream has passed through the cesium and technetium ion-exchange system, it is sent to the LAW melter evaporator for concentration to approximately 8 M to 10 M Na. This further concentration reduces the electrical power requirements of the LAW melters by minimizing the quantity of water evaporated within the melters. The process condensate stream is routed to the shared active condensate tanks. If laboratory analysis shows that the shared active condensate is within discharge limits for radionuclide concentration, it is discharged from the building to the DOE Effluent Treatment Facility (ETF) located outside the TWRS-P Facility.

2.3.1.8 LAW Glass Melter. The nominal design capacity of each LAW melter is 10 Mt of glass/day. The feed to the melters is a slurry of the concentrated LAW from the evaporator and a blended mixture of dry glass-forming chemicals. The glass-forming chemicals are delivered to the Hanford Site in bulk by truck and stored in silos located near the process building.

Nine glass-forming chemicals are expected to be needed to produce the required LAW glass recipe for feed Envelopes A, B, and C. These are silica, alumina, boric acid, zircon sand, calcium silicate (wollastonite), ferric oxide, lithium carbonate, magnesium silicate (olivine), and zinc oxide. From the storage silos, the dry chemicals are weighed and transferred into pneumatic blending silos. The blending silos use compressed air to blend a 24-hr batch of dry chemicals for each LAW melter. Two blending silos are provided for each melter. One silo is blending while the other is sampled and analyzed to confirm that the blend is within specification. After blending, the glass formers are transferred to a feed hopper within the main facility until required for use. There is a glass-former feed hopper for each melter sized for 8-hr capacity.

The LAW melter feed consists of the LAW concentrate from the LAW evaporator blended with the glass-forming chemicals from the feed hopper. A batch of sampled LAW concentrate is transferred into the LAW melter feed preparation vessel. Dry chemicals from the storage

hopper are metered into the vessel. The thoroughly mixed feed slurry then is transferred into the LAW melter feed vessel. The melter feed vessel is fitted with six fluidic pumps, which deliver the slurry to six feed nozzles on the melter.

The LAW glass melters are electrically-heated (joule-heated) ceramic melters designed to incorporate the metal oxides in the feed slurry into glass while the liquid water is vaporized. The operating temperature of the melter is approximately 1,150°C (2,100°F). Unreacted feed components form a cold cap on the surface of the molten glass. This cold cap helps to minimize the loss of volatile components from the molten glass pool to the offgas system. The external surfaces of the melter are cooled by an integral cooling water jacket to reduce heat losses to the cell and prevent molten glass migration through and corrosion of the refractory package. Air bubblers agitate the glass pool to improve the rate of heat transfer to the cold cap and enhance the rate of incorporation of the feed into the molten glass.

Each melter has two discharge chambers. Each chamber has two container-filling ports. The redundant ports are installed to minimize down time. Vacuum or air lift risers raise the glass pool above the level of the discharge weir. The glass then flows, by gravity, through one of the discharge chambers and filling ports into the stainless-steel ILAW container.

2.3.1.9 HLW Glass Melter. For the LAW/HLW option, in addition to the LAW glass melters, there is another melter system to process HLW. The facility design will allow installation of two HLW melters. The feed to a HLW melter is concentrated Envelope D sludge, and other HLW feeds from pretreatment including strontium/TRU precipitate, cesium ion-exchange eluate, and technetium ion-exchange eluate. The design throughput of the HLW melter is about 1.5 Mt glass/day.

The LAW glass former storage and blending silos also supply the HLW melter. However, to accommodate variations in the composition of Envelope D feed, a different glass formulation is required. At this time, five chemical additives are identified for the HLW glass recipe, including silica, boric acid, calcium silicate (wollastonite), ferric oxide, and lithium carbonate.

Weighing and blending of the dry chemicals and mixing with the HLW feed is essentially the same as for the LAW melters. The blended melter feed is sampled and tested for acceptable composition and then transferred to the HLW melter feed vessel. Fluidic pumps transfer the feed through feed nozzles into the melter.

The HLW melters are also electric-heated (joule-heated), slurry feed melter, with an integral cooling water jacket. The operating temperature of the melter is approximately 1,150°C (2,100°F). In the melter, the feed flows across the molten glass surface and forms a cold-cap on the surface of the melt.

Glass is discharged from the HLW melter via one of two redundant discharge chambers. As described for the LAW melter, a lift system removes the glass from the melter for subsequent discharge to IHLW canisters.

2.3.1.10 Container Decontamination. The vitrified product canisters/containers for both the HLW and the LAW are constructed from stainless steel. After charging with vitrified waste, the canisters/containers, on which a stainless-steel lid is welded, are allowed to cool. The LAW

containers are rectangular in shape with approximate external dimensions of 1.8 m by 1.2 m by 1.2 m (6 ft by 4 ft by 4 ft). The HLW canisters are cylindrical in shape and about 3 m (10 ft) long with a diameter of 0.61 m (24 in.). The facility design is also capable of handling HLW canisters that are 4.5 m (15 ft) long.

Contamination of the outer canister/container walls could occur during filling. Activity on the outside of a canister/container is removed before it is handled for storage. After sealing, the canister/container is moved to a booth in a decontamination cell, where surface contamination is removed using ultra-high-pressure water. The washings are collected in the base tray of the decontamination booth and drained to a dedicated catch vessel. The catch vessel is periodically discharged to a dedicated ETF facility discharge vessel. The decontaminated canister/container is transferred to the adjacent control cell for monitoring and eventual transfer to the vitrified product storage area.

2.3.2 Melter Offgas Treatment Systems

In the LAW and HLW melters, water is evaporated from the feed and released to the offgas system as superheated steam. The feed components then undergo chemical reaction and decomposition. During the decomposition process, gases are formed and released into the melter plenum and offgas system. In addition, a fraction of the feed components is directly carried over to the offgas without incorporation in the glass. The solids and semi-volatile components are recycled back to the melter from the offgas system to increase the incorporation rate in the glass.

2.3.2.1 Film Cooler and Quencher. Each LAW and HLW melter is provided with a dedicated film cooler and quencher. The gas streams from the melters include steam, air from the bubblers, and various acid gases (NO_x, SO_x, HCl, and HF) formed from decomposition of the feed slurry components. These gases pass through a film cooler that cools the gas by direct injection of air, and a quench scrubber that removes particulate entrained in the gas stream. The quench scrubbers capture a high percentage of the HCl and HF gases released from the melter. To minimize the concentration (and hence corrosion rate) of the acids retained in the LAW scrubber liquor, fresh process water is added to the quencher sump. The sump contents then are periodically purged back to the LAW melter evaporator to increase the incorporation rate for these components in the glass. For the HLW quencher, the purge is returned to the HLW receipt tanks.

The purpose of the offgas treatment system is to process offgas such that when it is discharged to the atmosphere, it does not exceed environmental discharge limits. The primary offgas system described in the following sections treats the gas stream from the quench scrubbers to remove potentially radioactive entrained aerosols and small particulate, and to decrease the acid gas content.

2.3.2.2 LAW Melter Primary Offgas System. The LAW primary offgas system consists of high-efficiency mist eliminators (HEME), a selective catalytic NO_x reduction (SCR) unit, heat exchangers, and a condenser.

A pair of HEMEs is provided for each LAW melter. One HEME is in operation while the second unit is in standby mode or being washed. The HEMEs remove approximately 99% of

the activity content from the off gas stream that is in the form of liquid aerosols. The offgas streams exiting the HEMEs are combined before entering the SCR. When the pressure drop across a HEME reaches a pre-determined level, the unit is taken off line and the standby unit brought into service. The HEME then is backwashed with process water to recover its pressure drop. The liquids that result from operation and washing of the HEME are collected in a sump and returned to the LAW melter feed evaporator.

The offgas streams from all the melters are combined for treatment in the SCR unit and condenser. The SCR unit removes NO_x gases by converting nitrogen oxides at about 250 to 300°C (480 to 570°F) to nitrogen and steam using ammonia as the reducing agent. The reaction occurs in a catalyst bed in a column packed with alumina beads impregnated with a metal oxide catalyst. Before entering the catalyst bed, the gas is preheated to the reaction temperature in two separate heat exchangers. The first of these heat exchangers is heated by the column exhaust gases. The ammonia is added after the first heat exchanger where the gas stream temperature is over 200°C (392°F) and above the temperature for ammonium nitrate formation (ammonium nitrate is potentially explosive). The second heat exchanger is used to raise the gas stream to the required reaction temperature.

To dilute the NO_x, in the inlet gas to the SCR unit, air is introduced before the first heat exchanger. The air is preheated in the SCR Dilution Air Preheater to prevent condensation and mist formation in the ductwork.

The gas stream exiting the SCR heat exchanger is further cooled in the LAW offgas condenser. This unit condenses water vapor and significantly reduces the level of radioactivity in the offgas by removing tritium from the offgas as tritiated water. The liquid stream from the condenser is collected and combined with other offgas liquid effluents in the shared active condensate tanks for subsequent transfer to the central effluent handling area. The offgas from the condenser is further treated in the secondary offgas system.

2.3.2.3 HLW Melter Primary Offgas System. The HLW primary offgas system consists of a HEME, a high-efficiency metal filter (HEMF), an iodine adsorption unit, a condenser, and a wet scrubber. The function of the HEME is the same as for the LAW system. However, the 99% efficiency of the HEME is not sufficient for the HLW offgas. The offgas is therefore passed through the HEMF, which is capable of achieving a much higher efficiency of particulate removal then the HEME. The offgas exiting the HEME is heated to well above its dewpoint to prevent condensation and then passed through the HEMF. The liquids resulting from HEME operation, and from washing of the HEME and the HEMF, collect in a sump and are returned to the HLW feed vessel.

There is a significant quantity of iodine-129 present in the HLW offgas. Because iodine exists as a gas, it is not removed by either the HEME or the HEMF. A dry adsorption unit is used to remove over 98% of the iodine gas. The sorbent bed of the unit, either silver nitrate-impregnated silica gel or silver-exchanged zeolite, is disposed of as a solid waste.

Following iodine adsorption, the HLW offgas stream is treated in the HLW offgas condenser, which removes radioactivity (including tritium) and acid gases from the offgas by condensing water vapor. The condensate is disposed of similar to LAW. The offgas is further treated in

the HLW offgas caustic scrubber to remove acid gases and carbon-14. The HLW offgas stream is treated finally in the secondary offgas system.

2.3.2.4 Standby Offgas Systems. As discussed, a primary offgas system is provided for each melter system (i.e., LAW and HLW melters). As a safety feature, standby LAW and HLW melter offgas systems (designated emergency offgas systems) are provided to treat the melter offgases in the following cases:

- Overpressurization of a melter during normal operation, resulting from variation in the offgas generation rate
- Blockage of a film cooler, quench scrubber, HEME, or associated duct work
- Shutdown and maintenance of the melter offgas system when the melter requires ventilation.

The LAW and HLW melter standby offgas systems are designed to be used infrequently. The primary and secondary offgas ducting for the LAW and HLW melters are designed to withstand surge flows of 50% above normal gas flowrate. When the pressure in a melter rises, its feed is stopped, which normally prevents overpressurization. A standby offgas system for a melter is activated only in case of unusually high pressure.

Each standby offgas line (one for each LAW and HLW melter) is of the same basic design. Ducts connect the melters to isolation dampers, one for each melter. These dampers isolate the melters from the standby offgas lines during normal operation. The dampers are activated by high pressure in the melter. Immediately downstream of the dampers, air is injected into the gas streams. The air volume is regulated to limit the temperature of the diluted stream. This cools the gas stream to below the softening point of the entrained glass particulates to protect downstream equipment.

The diluted gas streams each pass through to a high-efficiency cartridge filter of fine fibers or ceramic. Deposited solids are removed from the filter by backblowing with compressed air after or during use. The pressure drop across the filter continuously is measured during operation to check that the filter is not clogging. If the pressure drop becomes too high, the cartridge is washed, or if the pressure drop cannot be recovered by washing, the cartridge is replaced. Particles removed from the filter by backblowing fall into the base of the vessel, where they are washed out and drain down to a sump vessel that is common to all gas streams for a particular melter type. The sump is monitored for level, and when full, is emptied by fluidic pump to the contaminated condensate tank in the central effluent handling area of the plant. After washing, the filters are dried.

The pressure drop across the standby offgas lines is less than across the corresponding main line. To avoid excessively low pressure in the melter, the streams pass through vortex amplifiers that have process air fed in at varying rates. The vortex amplifier is highly reliable fluidics device (no moving parts) used in BNFL Inc. nuclear facilities. The operation is based on the Coriolis effect. The air rates control the pressure drops. This allows the system to stabilize after the pressure surge; a vortex amplifier is used to maintain the melter pressure at the desired level until the original reason for the emergency offgas system being used is

corrected. At this point, the isolation damper is closed, and the main offgas system used again.

After filtration, the streams for a particular melter type combine and rejoin the melters primary offgas treatment system. The LAW stream rejoins the primary stream at the inlet to the LAW offgas condenser, and the HLW stream rejoins the main stream at the inlet to the iodine removal column. Removal of oxides of nitrogen and acid gas takes place downstream.

2.3.2.5 Secondary Offgas Treatment System. The secondary offgas system receives offgas streams from the vitrification primary offgas treatment systems, reverse flow diverter exhausts, pulse jet mixer exhausts, and process vessel vent. Combined reverse flow diverter exhausts, pulse jet mixer exhausts, and process vessel vent stream are passed through one of two HEMEs to remove entrained droplets and particulate. The HEMEs work on a duty-standby basis, and each HEME has inlet and outlet sealpots to allow isolation for maintenance and replacement purposes. The HEMEs require routine washing to remove the buildup of particulates. The effluent generated from the washing operation is recycled to the LAW feed evaporator. The treated stream then is combined with the combined HLW and LAW primary offgas streams.

The combined offgas stream then is passed through a counter-current scrubbing column to perform a final cleanup of the offgas and to cool the offgas stream, thus lowering the water content. The scrubbing column is a packed column and is provided with an integral sump to collect scrubber liquor. The cooling coils are supplied with chilled water. Liquor is recirculated to the top of the scrubbing column. Fresh makeup water is added to the top of the column and the sump tank overflows to a collection vessel.

After leaving the scrubbing column, the offgas passes through a high-efficiency particulate air (HEPA) preheater where the gases are heated to above their dewpoint to prevent condensation within the filters. The HEPA preheater is electrically powered, with spare elements installed to provide redundancy. After heating, the offgas passes through primary and secondary HEPA filters and then through one of two exhaust fans before discharge to the atmosphere.

2.3.3 Water and Steam Systems

This section provides descriptions of the TWRS-P Facility water and steam systems. For each system, the function, major components, and system interfaces are discussed.

2.3.3.1 Process Water System. The 200 East Area raw water system is to be extended by the DOE to the TWRS-P Facility site. The TWRS-P Facility process water storage tank receives raw water from this extension. The raw water is treated at the TWRS-P Facility with the following chemicals:

- NaOH to neutralize the acidity
- A biocide to control organic material
- A corrosion inhibitor.

The process water system is located in the water treatment facility adjacent to the process building. The process water system consists of the following components:

- Water treatment chemical day tanks
- Chemical metering pumps
- Chemical area flow sump pump
- Process water storage tank
- Process water feed pumps
- Process water day tank
- Process water circulation pumps
- Water softening package
- Demineralizer package.

Process water feed pumps deliver water from the process water storage tank to the boilers of the high-pressure steam system, cooling tower, chilled water system, and process water users in the process building. In this building, the process water is collected in a day tank and then circulated to the users by process water circulation pumps.

Pressure relief valves are provided at discharge of the chemical metering pumps to prevent pressure buildup due to inadvertent valve closure. Eye wash and safety showers are provided in the chemical handling area for personnel protection.

2.3.3.2 Cooling Water System. The cooling water system transfers heat from equipment coolers to a multi-cell mechanical draft cooling tower. The system uses a secondary loop to provide isolation from contaminated areas. The primary and secondary loops are thermally coupled by two full-capacity heat exchangers.

The open circuit primary cooling water system loop is comprised of three half-capacity pumps, the cooling tower, chemical feed system, standby sand filtration system, piping, valves, and instrumentation and controls. Sodium hypochlorite biocide is fed into the cooling water system primary loop by the chemical feed system. Cooling tower blow down is sent to the nonactive effluent tank. Equipment in nonactive areas is supplied cooling water from the primary loop. This includes air compressors, secondary loop main heat exchangers, chillers, and standby diesel generators.

Three half-capacity pumps circulate water through the secondary system. The secondary loop includes a chemical addition tank that allows manual addition of a corrosion inhibitor and pH control chemicals. Sample connections on both the primary and secondary loops facilitate water sampling for quality analysis.

Some critical items require a backup cooling water supply in the event of cooling water system failure. This backup supply is from the chilled water system discussed below.

The cooling water system provides cooling water to the following systems and components:

- Air compressors
- Condensate system
- Process equipment on the secondary loop main heat exchangers

- Chilled water chiller condensers
- Standby diesel generators
- High-pressure steam blow down package.

2.3.3.3 Chilled Water System. The chilled water system is a closed loop system that supplies chilled water to various air handling unit cooling coils and equipment coolers. This includes various process heat exchangers, vessels and columns in the pretreatment area, and LAW melter cells and HLW melter cells (LAW/HLW option). The system is comprised of chillers, pumps, heat exchangers, expansion tanks, chemical feed tanks, air separators, piping, valves, and instrumentation and controls. The major components (e.g., chillers, heat exchanges, and pumps) are located in the service building chiller area.

The chilled water system is the primary-secondary circuit type. The primary chilled water circuit consists of three half-capacity chillers and two full-capacity recirculation pumps. The secondary circuits are used to reduce the power consumption from pumps and prevent possible contamination from process equipment. Plate heat exchangers are used to separate the primary circuit from the process area secondary circuits. Seven secondary circuits serve chilled water to the following users:

- Pretreatment process area
- LAW process area
- HLW process area (LAW/HLW option)
- Process Building C2 supply air handling units
- Process Building C2 recirculation air handling units
- Process Building C5 recirculation air handling units
- Support Building C1 supply air handling units.

The chilled water pumps supply corrosion-inhibited demineralized water in a closed loop piping distribution system to cooling coils in air handling units, building supply air units, and facility equipment coolers. Chillers are equipped with refrigerant pressure-relief valves mounted on the evaporator and cooler.

2.3.3.4 HVAC Hot Water System. The HVAC hot water system is a closed-loop hot water system that supplies hot water to air handling unit heating coils and room unit heaters. It is comprised of two full-capacity hot water generators (using a steam to hot water heat exchanger), hot water recirculation pumps, an expansion tank, air separator tank, chemical feed tank, piping, valves, and instrumentation and controls. The major components are located in the service building. The air handling units and room unit heaters are located in the buildings and rooms serviced.

The HVAC hot water system provides heating water to the following equipment:

- Service building air handling unit heating coils
- Wet chemical storage building air handling unit heating coils
- Service building chiller room unit heaters
- Administration building office air handling unit heating coils
- Empty canister area air handling unit heating coils
- Melter assembly area air handling unit heating coils

- Process building C2 area air handling unit heating coils
- Glass former building area unit heaters.

2.3.3.5 High- and Low-Pressure Steam. The high-pressure steam system is located in the steam facility building. The high-pressure steam system consists of two half-capacity continuously operating boilers, a deaerator package, blow down package, and a piping distribution network. A third half-capacity boiler is provided as standby. The high-pressure steam system provides steam to the following:

- Low pressure steam system
- Ejectors in the LAW, HLW (LAW/HLW option), and the pretreatment areas
- Deaerator package.

The low-pressure steam system originates at the reduction station in the steam facility building and provides the steam supply to the end users in the process building. The low-pressure steam system consists of a pressure reducing station and a piping distribution network. The low-pressure steam system provides steam to the following:

- LAW feed evaporator reboiler
- Cesium acid recovery evaporator
- Evaporator vessel
- Melter feed evaporator reboiler
- Concentrate collection tanks
- HLW ultrafiltration circuit coolers
- HVAC hot water generators in the process and service buildings
- HVAC humidifiers in the process and administration buildings.

2.3.3.6 Potable Water System. The 200 East Area potable water system is to be extended by the DOE to the TWRS-P Facility site. Potable water from this extension is routed to a storage tank located adjacent to the water treatment building. The potable water from the storage tank is pumped to the users by potable water circulation pumps. The pumps are designed to deliver potable water to the lavatory facilities, eyewash stations, safety shower, and miscellaneous potable water users. Tie-in of potable water to nonpotable process lines are protected by approved backflow preventers.

2.3.4 Air and Vacuum Systems

This section describes the function and major components of the air and vacuum systems.

2.3.4.1 Compressed and Instrument Air Systems. The compressed and instrument air systems are located in the service building attached to the process building. The systems provide clean and dry air to the pretreatment, LAW, HLW (LAW/HLW option), and other support facilities. The compressed air system includes four centrifugal compressors that feed two air receivers. From the receivers, the air is dried by two refrigerated air dryers. The air distribution system is divided into two main systems for critical and noncritical use.

The instrument air system receives air from the compressed air critical air supply. Desiccant tower dryers with pre-filter and after-filter provide additional drying of the instrument air. Local instrument air receivers are located in each building served.

2.3.4.2 Breathing Air System. The breathing air system is located in the service building adjacent to the southwest side of the process building. The breathing air system consists of the following equipment:

- Compressor air inlet filter
- Centrifugal, oil-free compressor
- Air purifier with particulate after filter
- Air receiver with relief valve
- Two banks of air bottles with regulators and relief valves
- Piping and valves.

Compressed air is purified, passed through a particulate after filter, and distributed throughout the facility. A back-up air supply is provided by two banks of bottled air that are automatically placed in service in the event of compressor failure or loss of electrical power. The breathing air system is equipped with pressure relief valves to prevent equipment damage due to overpressurization.

2.3.4.3 Vacuum System. The vacuum system is located in the process building. The vacuum system provides a header and connections to supply air flow to

Alpha and beta radiation air monitoring equipment and air samplers throughout the process building and in the duct and stack sample systems.

The vacuum system consists of two vacuum blower packages and the piping distribution network.

The vacuum blowers are provided with relief protection on the suction and discharge. Silencers are provided to minimize noise. Blower discharge is routed through HEPA filters to minimize the potential for personnel contamination.

2.3.5 Heating, Ventilating, and Air Conditioning Systems

This section provides descriptions of the HVAC systems for the process building and other buildings (i.e., nonprocess building HVAC). For each HVAC system, the function and major components of the system are described.

2.3.5.1 Process Building HVAC

Heating, Ventilation, and Air-Conditioning Systems

The waste treatment facility ventilation is designed to provide pressure gradients between confinement zones in which the air flow cascades from the areas of low/no contamination, (i.e., offices and support areas) to areas with the greatest potential of contamination, (i.e., process

cells with no personnel entry). The contamination area designations identified for the design of the ventilation systems consist of the following areas:

- C5-Pretreatment cells, cesium powder handling line, melter cells, pour/cooling cells, buffer store, weld/lidding cell, and the filter cave
- C4-Decontamination caves, washdown cells, and posting stations
- C3-Normally unoccupied areas but can be accessed for maintenance activities
- C2-Operating areas, equipment rooms, stores, access corridors and plant rooms
- C1-Offices and equipment rooms in adjoining buildings. The HVAC system for this area is separate from the process building HVAC.

The process vessels are maintained at a pressure less than the surrounding process cells by the vessel ventilation system. The air exhausted from the process vessels, pulse jet mixers, and reverse flow diverter (RFD) devices pass through a HEME to separate entrained droplets. The exhaust air then is combined with the primary offgas from the LAW melters and the HLW melter. The combined offgas stream passes through a water scrubber and is then filtered using two stages of HEPA filters before stack discharge.

The ventilation fans for the facility consist of the 1) vessel vent extract and melter offgas system fans; 2) C5 extract fans; 3) C3 extract fans; 4) C2 supply and extract fans; and 5) LAW and cesium store supply fans.

Air will be drawn from C2 areas and cascaded through C3 areas into C4 or C5 areas, or alternatively extracted from the C3 areas by the C3 extract system. Where there is no cascade to C3 from C2 areas, the C2 extract system will maintain a nominal negative pressure to atmosphere. Air is supplied by the C2 supply system that consists of 4 x 25% duty air handling units operating on 100% outside air (no recirculation). The LAW glass container and cesium powder storage areas each have a dedicated 1 x 100% duty air handling unit operating on 100% outside air.

Heating and Cooling

The HVAC system provides cooling for the heat loads within the building and allows areas within the building to be maintained within the temperature range of 10°C and 27°C for internal occupied C2/C3 areas and between 15°C db and 35°C db for unoccupied C2/C3 areas.

Areas within the building that have requirements for heating and/or cooling that are not met by the C2 supply ventilation system are provided with local heaters and/or coolers.

2.3.5.2 Nonprocess Building HVAC System. The design of the nonprocess building HVAC systems are based on the location and function of the building. HVAC systems are provided to serve the following nonprocess buildings:

- Administration building

- Administration building control room
- Service building shop area
- Empty canister storage and inspection
- Melter assembly area
- Glass former building
- Wet chemical storage building
- Main electrical room (service building)
- Pump house
- Steam plant
- Water treatment building
- Sewage treatment facility.

2.3.6 Fire Protection System

The 200 East Area fire suppression distribution system is to be extended to include the TWRS-P Facility. To prevent the contamination of fire suppression system components or the spreading of contaminates during fire suppression activities, the water quality of the fire suppression distribution system meets the contaminate limits for bodies of surface water covered by the *Clean Water Act*. Particles greater than 3 mm (0.125 in.) are strained to prevent damage to the pumps.

The TWRS-P fire protection system performs the following functions.

- Monitors the suppression system status, detects and locates fires, and provides operator indication of the fire location.

- Provides automatic and/or manual capability to extinguish fires in any plant area to protect site personnel and limit fire damage.

- Aids in minimizing exposure to personnel and releases to the environment of radioactivity of hazardous chemicals as a result of a fire.

The fire protection system consist of several subsystems for fire detection and alarm, fire water supply system, and automatic and manual fixed fire suppression systems.

2.3.6.1 Fire Detection and Alarm System. The fire detection alarm system is designed to detect and locate fires, provide alarms, inform the control room of the fire location, and monitor the fire protection system status. The system also monitors the status of the fire protection system and annunciates the suppression system actuations. Manual fire alarm boxes (pull stations) are provided in accordance with National Fire Protection Association (NFPA) 72.

2.3.6.2 Fire Water System. The fire water system includes fire water storage tanks, pumps, piping, valves, and other components needed to deliver water to fire hydrants, standpipes, and fixed-fire suppression systems. The two fire water storage tanks, located outdoors, each contain a 2-hour supply to the expected largest demand. The fire water storage tanks are permanently connected to the fire pump suction. Each pump is full capacity and can take suction from either or both tanks. The lead fire pump is electric motor-driven and the second

pump is diesel engine-driven. A motor-driven jockey fire pump is provided to maintain the fire main header pressure.

2.3.6.3 Automatic Fire Suppression Systems. Fixed automatic fire suppression systems are provided in selected building fire areas based on the fire hazard analysis (FHA). The selection of the type of system for each facility area is governed by the guidance of NFPA 801, with consideration of the effects of fire suppression agents on personnel and sensitive plant equipment. Water systems are preferred, but the use of automatic water suppression systems for fire fighting in radiation areas is minimized because of the possible spread of contamination. Clean agent extinguishing systems are provided for protection of electrical equipment rooms where a water system is deemed not suitable.

2.3.6.4 Manual Fire Suppression Systems. Fixed manual fire suppression systems are provided based on the results of the FHA. Plant areas that have an automatic suppression system also have manual backup fire suppression capability.

Hydrants are provided on the yard main at intervals of up to about 91 m (300 ft). The hydrants provide hose stream protection for every part of each building and two hose streams for every part of the interior of each building not covered by standpipe protection. The hydrants are located at intervals of not more than 305 m (1,000 ft) along the yard main. Class III standpipes and hose stations are provided for buildings in accordance with NFPA 14 requirements. Wet standpipe systems are used.

Hose stations are located to facilitate access for firefighting. Alternative hose stations are provided in areas where fire could block access to a single hose station serving that area. Each hose station has no more than 30.5 m (100 ft) of 40-mm (1.5-in.)-diameter woven jacket lined hose. One or more fixed or adjustable spray nozzles are provided at each station. No-shock nozzles are provided for use in areas where electrical shock hazard exists.

Portable fire extinguishers are installed in easily accessible locations along routes of travel in the vicinity of doors and hallways. Fire extinguishers are readily accessible for use in high radiation areas.

2.3.7 Miscellaneous Mechanical Systems

This section provides descriptions of the TWRS-P Facility fuel oil and sewage treatment systems.

2.3.7.1 Fuel Oil and Transfer. The fuel oil storage and transfer system provides storage and distribution. Diesel fuel is stored for supply to individual users (e.g., boilers, standby diesel generators, and diesel fire pumps). This includes the capability of off-load diesel fuel from supply trucks. Diesel fuel is distributed from the storage tank to the day tanks for each of the individual users.

The fuel oil storage and transfer system includes the following equipment:

- Diesel fuel storage tank
- Unloading pump

- Two transfer pumps
- Two diesel fuel day tanks for the boilers
- Two diesel fuel day tanks for the standby diesel generators.

2.3.7.2 Sewage Treatment. The sewage treatment system collects domestic waste from the cafeteria, water closets, showers, and drinking fountains located in the administration and service buildings. The waste is transferred via gravity drain to the sewage lift station located in the sewage treatment building. Two sewage lift pumps, each capable of pumping the anticipated peak flow of waste, transfer the sewage to an equalization tank. The waste is processed through the sludge aeration tank, clarifier, filter, and chlorine disinfection before discharge to the storm drain.

2.3.8 Electrical Power

The TWRS-P Facility electrical system receives power from the Hanford Site A4-8 230-kV transmission system. This system is to be modified and looped into a new 230-kV substation that will include two 230 to 13.8-kV transformers. The new substation will be capable of providing up to 40 MW to the two TWRS-P Facilities.

2.3.8.1 Normal/Alternate Power. As discussed, two identical 230 to 13.8-kV transformers are provided by the DOE as offsite power sources. Within the TWRS-P Facility, power will be distributed at the 13.8 kV, 4.16 kV, and 480 V level.

2.3.8.2 Standby Power. Standby power is provided on loss of offsite power by onsite diesel generators. The electrical loads provided with standby power include those loads that can tolerate a short power interruption as the diesel generators start and load.

Standby power at 13.8 kV is supplied by three parallel diesel generators to support the LAW melter loads and HLW melter loads (LAW/HLW option). Diesel start and load transfer is by operator action. Standby power at 480 V is provided from a single diesel generator. This diesel generator starts and acquires its loads automatically. Automatic transfer switches provide for transfer of the motor control center power sources from the normal source to the 480-V standby source.

2.3.8.3 Uninterruptible Power Supply. Loads that must be provided a continuous source of electric power are powered by a battery-backed uninterruptible power supply (UPS). The UPS is powered from an AC bus that is backed up by a standby power source via a DC rectifier and inverter. The UPS system includes a static inverter, AC static transfer switch, hardwired maintenance bypass switch, distribution panels, and a step-down transformer as a bypass alternate source of power.

The UPS loads generally are limited to instrumentation loads sensitive to power interruption and emergency lighting but may include other loads/systems as deemed necessary. The UPS loads include the following:

- Main control system
- Melter control system

- Radiological surveillance system
- Intercom system
- Stack discharge monitor
- Effluent discharge monitor
- Area gamma monitor
- Alpha/beta-in-air monitor
- Public address and evacuation system
- Waste tracking system.

2.3.8.6 Egress, Emergency Escape, and Essential Lighting Systems

Egress Lighting. Egress lighting is provided via integral self-contained dry battery packs/ inverters within each lighting fixture identified as egress lighting. These fixtures are used for stairways and exit routes. The egress system operates on a nonmaintained basis with the exception for the control room and the door emergency exits, which operate on a maintained basis. A short interruption of supply is acceptable during operation of the changeover switch.

Emergency Escape Lighting. The emergency escape lighting power supply is backed up by the UPS system. The escape lighting fixtures are separate from the normal lighting fixtures and used in the areas, such as the main control room, that are required to sustain the minimum illumination level at all times, including the period of a temporary loss of power.

Essential Lighting. A selected part of the normal lighting operates as essential lighting designed to provide a minimum level of illumination throughout the facility to aid in restoring the facility to normal operation or to aid in safe shutdown. This lighting is powered from a bus backed up by the standby diesel generator.

2.3.9 Instrumentation and Control Systems

The Integrated Control System (ICS) provides monitoring and control of chemical process equipment and mechanical handling systems. The ICS includes operator interfaces at 10 separate workstations within the Central Control Room (CCR), 5 fixed local workstations within the process building, and at portable workstations that can be connected to approximately 100 outlets within the TWRS-P Facility. During normal operation, the facility processes are automatically controlled via the workstations located in the CCR and the fixed local workstations within the process building

Central Control Room Workstations. The CCR workstations are provided for monitoring and control of the chemical process and associated process services, ventilation, environmental monitoring, and building evacuation. Within the CCR, the 10 workstations have the ability to fully control all the systems within their area. Additionally, some degree of redundancy is applied to the workstations so that if a workstation becomes inoperable, control functionality is available from another workstation. The CCR workstations are provided for monitoring and control of the following:

- Pretreatment including LAW receipt, and removal of entrained solids, strontium/TRU, cesium, and technetium (three workstations)

- LAW vitrification (one workstation)
- HLW vitrification or cesium line in the LAW-Only option (one workstation)
- Vitrification support services, glass formers, quencher, and the offgas systems (two workstations)
- Out cell services, (e.g., inactive feeds, vacuum and air systems, fire protection, fuel oil, water and steam systems, and sewage treatment) (one workstation)
- Ventilation systems, waste management, electrical power distribution, lighting, fire detection, and closed-circuit television (one workstation)
- Storage, export, and maintenance facilities (one workstation)
- Cesium line (e.g., container/canister handling, canister charging, and cesium line maintenance).

Fixed Local Control Workstations. The fixed local workstations are similar to the CCR workstations, but are hardened industrially. These workstations are used for mechanical handling operations that are dependant on continuous operator interactions and are located in the operating areas adjacent to the equipment under control. The fixed local control workstations are structured so that each of the systems assigned to the individual control workstations operate independently of the other control workstations and their associated systems. Fixed local control work stations are provided for the following:

- LAW vitrification area (e.g., for container import and export; operation of the pour cell bogie system; glass pouring; container cooling; equipment decontamination; container decontamination, swabbing, and monitoring; and melter maintenance)
- HLW vitrification area (e.g., for container import and transport; container filling and cooling; equipment decontamination; lid positioning and welding, container decontamination, swabbing, and monitoring; and melter maintenance)
- Storage export and maintenance (e.g., melter construction; C3 maintenance; in-cell crane and bogie maintenance; flask handling; and HLW, LAW, and solid waste handling).

Portable Control Workstations. For operation of in-cell remote handling equipment, portable workstations can be located next to the appropriate window at the cave face. The portable control workstations are used where nonroutine operations are dependent on continuous operation interaction such as inching of individual drives during maintenance. The portable control workstations are compact, industrially hardened workstations. A socket is provided at each caveface window to enable a portable control workstation to be connected to the control system. The portable control workstation accesses the plant control system via these sockets. The sockets are 'coded' such that the point of control can be recognized by the system. All normal and maintenance control actions are available from the portable control workstation for the appropriate area.

2.4 DEACTIVATION FACILITATING FEATURES

During the conceptual and detailed design phases of the TWRS waste treatment facilities, a substantial and important element of the design process will be the incorporation of features to minimize the cost and complexity of decommissioning. BNFL, as an owner/operator of extensive nuclear facilities, has developed extensive expertise in designing facilities and equipment with the necessary features for efficient and effective decommissioning. The BNFL Inc. TWRS waste treatment design process will therefore, consider and determine methodologies and mechanisms for decommissioning and incorporate these into the design of the facility. Areas for consideration will include the following:

- Control of airborne contamination - radioactive particulate, mist, fumes and/or gases that may be released as a result of deactivation and decommissioning
- Removal or control of fixed contamination - radioactive materials ingrained into the interior of surfaces or structures, equipment, or other items
- Control of loose contamination - undesirable materials that have been deposited on the surface of structures, equipment, or other items
- Identification, minimization, and disposal routes for high-level radioactive waste, TRU waste, and low-level waste
- Identification, minimization, and disposal routes for mixed waste (hazardous and radioactive)
- Release criteria - the criteria for release of nonradioactive materials as specified in *Solid Waste Control Manual* (WHC 1994)
- Unrestricted release criteria - decontamination of structures or equipment to levels consistent with release criteria.

The design of the waste treatment facilities will ensure the following.

- Process and radioactive service equipment is designed to be effectively cleared of contaminated materials before the dismantling process.
- Modular, separable confinements are used (where possible) for radioactive and other hazardous materials to preclude contamination of fixed portions of the structure.
- Suitable nonpermeable surface finishes (where practicable) are provided for both equipment and buildings to ease the decontamination process.
- In-cell wash down facilities are provided to aid decontamination and deactivation.
- Larger items are designed to break down into manageable units to aid deactivation, decommissioning, and disposal.

- Exhaust filtration equipment is located at or near individual enclosures to minimize long runs of ventilation ducting.

- Pipework carrying contaminated (or potentially contaminated) liquid is designed to be fully drainable. Physical provision shall be made for the cleaning and draining of hardware, vessels, and associated piping.

- Construction materials are resistant to radiation, process solutions, and decontamination agents. Equipment and facilities are constructed where possible from materials amenable to volume reduction and eventual disposal.

- The design of the facility and materials of construction will be selected to minimize the eventual quantities of radioactive and hazardous waste requiring disposal. They also shall be compatible with future waste treatment, storage, and disposal routes.

- Plant layouts minimize “dead” spaces (nooks and crannies) where contamination could build up and be difficult to remove. All protruding members and beams shall be cut flush to eliminate, where possible, crevices and ledges.

- Hoisting equipment is designed into the facility to aid deactivation and decommissioning.

- There is adequate headroom and clearances for maintenance and removal of equipment during deactivation and decommissioning.

- Designs and specifications are checked against the previous criteria to ensure compliance.

3.0 APPLICABLE DOCUMENTATION

This section identifies documents, codes and standards, government regulations, and best industry standards that shall be reviewed for applicability to the deactivation of the Tank Waste Remediation System Privatization (TWRS-P) waste treatment facilities. A definitive selection of applicable standards will be included in later issues of this plan. The latest issue of all documents shall be assumed applicable.

10 CFR 20	Standards for Protection Against Radiation
10 CFR 70	Domestic Licensing Of Special Nuclear Material
10 CFR 835	Occupational Radiation Protection
10 CFR 830.120	Nuclear Safety Management - QA Requirements
29 CFR 1910	Occupational Safety and Health Standards
40 CFR 264	Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal facilities.
40 CFR 52.21	Prevention of Significant Deterioration of Air Quality
40 CFR 61 Sub Part H	National Emission Standards For Emissions of Radionuclides Other than Radon from DOE Facilities
40 CFR 60	New Source Performance Standards
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards
BHI-00066	Hanford Surplus Facilities Hazardous Identification Document
BHI-00961	Facility Transition Instruction (prepared by Bechtel Hanford, Inc.)
BNFL-5193-IMP-01	TWRS-P Integrated Safety Management Plan
BNFL-5193-SRD-01	TWRS-P Safety Requirements Document
BNFL-5193-SSP-01	TWRS Privatization Program Safeguards and Security Program Plan
DE-AC06-RL13308	DOE TWRS Privatization Contract (BNFL Inc. 1996)
DOE Order 5633.3	Control and Accountability of Nuclear Materials
DOE/EM-0246	Decommissioning Resource Manual
DOE/EM-0318	Facility Deactivation Guide Methods and Practices Handbook
DOE Order 430.1	Life-Cycle Asset Management
DOE Order 4330.4A	Maintenance Management Program

DOE Order 5633.3	Control and Accountability of Nuclear Materials
DOE M 430.1-1	Facility Disposition Manual (Draft, March 1997)
DOE M 440.1	Worker Protection Management For DOE Federal and Contractor Employees
DOE Project Policies and Supplementary Information (July 1995)	
DOE/RL-96-0002	Top-Level Safeguards and Security Requirements for TWRS Privatization
DOE P 450.4	Safety Management Systems Policy
DOE Order 5480.23	Safety Analysis Reports
DOE-STD-1027-92	Guidance on Preliminary Hazard Classification and Accident Analysis Techniques for Compliance with DOE Order 5480.23 Safety Analysis Reports
Ecology, EPA and DOE	Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)
National Environmental Policy Act of 1969, 42 U.S.C. 4321 et. seq.	
NRC RG 3.52	Nuclear Safety Analysis Reports
Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq., as amended.	
WAC 173-303	Dangerous Waste Regulations
WAC 173-400	General Regulations for Air Pollution Sources
WAC 173-401	Operating Permit Regulations
WAC 173-460	Controls for New Sources of Air Pollutants
WAC 173-480	Ambient Air Quality Standards and Emission Limits for Radionuclides
WAC 246-221	Radiation Protection Standards
WAC 246-247	Radiation Protection - Air Emissions

4.0 DEACTIVATION MANAGEMENT

4.1 DEACTIVATION PERSONNEL

It is anticipated that operations and technical staff from the operational phase Tank Waste Remediation System-Privatization (TWRS-P) waste treatment facility will provide the management and personnel for the deactivation of the facilities. This staffing will ensure that facility knowledge is retained and used to best advantage and that an experienced configuration management system is retained. The management structure, numbers of deactivation staff, and technical backup requirements will be finalized during the latter stages of waste treatment operations.

4.2 DEACTIVATION MANAGEMENT PLAN

A Deactivation Management Plan will be prepared before the start of deactivation. This plan will define the organization and responsibilities for executing the deactivation tasks and outline the work breakdown structure of activities. It also will clearly identify the scope of work based on the technical criteria established and will include cost and schedule planning. The plan will be used to establish cost controls and milestones for tracking and reporting status on key processes and activities for all elements of the deactivation process. It is presently assumed that the DOE will provide 12 months advance notice of the last waste shipment to BNFL. This will allow BNFL to commence deactivation planning and associated documentation including preparation and submission of a Deactivation Authorization Request (DAR). Deactivation of the facility will commence after completion of processing the last batch of waste feed and receipt, from the DOE, of an approved DAR.

4.2.1 Administrative Deactivation Requirements

The following facility deactivation steps are typical of those required to deactivate a facility as complex and extensive as the proposed TWRS-P waste treatment facility. The Deactivation Project Management Plan, when prepared, will discuss these steps and will identify the schedule of activities as follows.

Step 1 Define Deactivation Overall End Point and Objectives - Deactivation facility overall end point, objectives, and requirements (see Chapters 6.0 and 7.0) shall be determined before deactivation. It shall be confirmed that all deactivation objectives and requirements have been identified.

Note: The term facility deactivation overall end point refers to the set of conditions that comprise the completion of facility deactivation (i.e., radiological, structural, equipment, and documentation.)

Step 2 Safe storage and/or Decommissioning *Resource Conservation and Recovery Act of 1976* (RCRA) Closure Vision - Determine post-deactivation requirements in collaboration with the U.S. Department of Energy (DOE) and regulatory agencies. Include requirements in deactivation objectives, Step 1.

Step 3 Develop End Point Criteria and End Points - Develop and agree end-point criteria and end points in collaboration with the DOE and regulatory agencies. These will include equipment and requirements for the post-deactivation activities.

Step 4 Maintain Safety Basis - Ensure that the safety basis documentation is revised to reflect facility conditions during the various stages of deactivation. The Safety Basis at the completion of deactivation shall reflect the conditions and safety requirements of the deactivated plant.

4.2.2 Work Requirements

Step 5 Develop Baseline - Develop a deactivation baseline consisting of a work breakdown structure, cost estimate, and schedule of activities.

Step 6 Develop Safety Strategy - Develop a strategy and safety requirements that ensure the safe deactivation of the facilities. This will include personnel, public, and environmental safety.

Step 7 Create Definition Packages - Prepare work packages defining the processes to achieve the end point conditions.

Step 8 Walkdown Definition Packages - Confirm the applicability of the definition packages by a walkdown and facility/equipment review.

Step 9 Verify that work as defined has adequate controls to be conducted safety.

Step 10 Prepare Job Hazards Analyses (JHA) - Breakdown each end point work package into its component parts. Prepare a JHA identifying hazards, requirements and qualifications of staff, and identifying solutions that reduce to a minimum the consequences of hazards.

Step 11 Perform Work - Deactivation of the facilities to proceed until all agreed end point conditions have been achieved.

4.2.3 Turn-Over Requirements

Step 12 Document Work Results - Verify the achievement of the agreed end-point conditions.

Step 13 Assemble Turnover Package - Prepare a turnover package that will consist of the various deactivation approvals, reports, verifications, and post-deactivation operational and maintenance requirements.

Step 14 Handover Facilities - Handover deactivated facilities.

4.3 PHASES OF DEACTIVATION

The TWRS-P Facilities will be deactivated in two phases. The first phase, or initial deactivation, is a preparation phase and will include shutting down redundant equipment and systems, flushing/removal of materials, and equipment draining. The second phase or final physical deactivation is the isolation and closure phase of deactivation. During this phase, access to the facilities will be limited, connections will be isolated, migrateable contamination will be sealed in place, limiting notices will be installed, and final monitoring and surveillance equipment will be installed or activated.

4.4 DETAILED END POINTS

Subsequent to BNFL Inc., DOE, and regulator agreement on a facility deactivation overall end point, specific end-point criteria and individual end points will be established for all facility areas, structures, systems, and equipment within the facility. When end points have been determined, a detailed work breakdown structure, schedule, and budget will be established for facility deactivation. All end points shall be measurable, explicit, and verifiable.

The agreed end points shall be documented in a facilities end point conditions document. This document will be developed before deactivation but may be added to or modified during deactivation. The document will detail the physical state of the systems and spaces within the facility to be achieved at the end of deactivation. It also will be used to satisfy contractual requirements to transition to the post-deactivation phase. The condition of the facility at the end of deactivation will be documented in the facilities characterization report.

4.5 POST-DEACTIVATION SAFE STORAGE AND/OR DECOMMISSIONING/RCRA CLOSURE

During deactivation planning BNFL Inc. will liaise with the DOE and regulators to establish the facility requirements for post-deactivation safe storage and/or decommissioning/RCRA closure. This interaction is to ensure that equipment and facility conditions at the conclusion of deactivation support cost-effective safe storage and/or decommissioning/RCRA closure operations.

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5.0 TRANSITION READINESS

5.1 TRANSITION READINESS REVIEW

At the completion of waste processing operations and before commencing deactivation, BNFL Inc. will undertake a facility transition readiness review. This review will identify and document the physical conditions within the facility and the condition of all facility structures. The review will include an examination of the status of all facility documentation and the collected information will be used as a basis for deactivation planning and actions. Before undertaking the review, a plan will be prepared identifying the methodology, equipment, scope, and schedule of review activities.

The following subjects will be evaluated and the results incorporated in the transition readiness review report:

- Explicit delineation of the physical boundaries of the facilities and physical structures included
- A facilities condition assessment survey
- A characterization survey to determine the nature, level, and probable extent of contamination (radioactive and chemical residues)
- A listing of the types and quantities of nuclear and fissionable materials (if any)
- An inventory/estimate of existing toxic, hazardous, and radioactive materials
- A listing of the documents that define the Safety Basis and safe storage requirements to maintain the safety envelope
- Listing of permits, licenses, and agreements that remain imposed on the facility
- Listing of outstanding commitments to the U.S. Department of Energy, regulatory authorities, and stakeholders that require action
- A safe shutdown implementation plan that addresses the facility safety envelope, safe storage requirements, security, preservation of facility structures, systems, and components.
- A plan to remove personal property and equipment and materials not required to operate and maintain the facility.
- Human resource requirements and availability for deactivation.

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6.0 DEACTIVATION OVERALL END POINT AND OBJECTIVES

6.1 OVERALL FACILITY END POINT

An essential part of deactivation planning is the establishment of an overall facility end point that defines the condition of the facilities at the conclusion of deactivation. The determination of this end point will be the subject of negotiation between BNFL Inc. and the U.S. Department of Energy (DOE), and agreement on this issue will be achieved before the completion of the Tank Waste Remediation System-Privatization (TWRS-P) waste treatment operations. The formulation of an overall facility end point is dependent on a decision by the DOE of the timing and composition of post-deactivation activities. At present, it is uncertain if the DOE will place the facilities into a long- or short-term safe storage phase, or commence immediate decommissioning/*Resource Conservation and Recovery Act of 1976* (RCRA) closure.

Knowledge of the DOE post-deactivation activities is needed to ensure that equipment and facilities necessary for post-deactivation activities are included in the overall facility end point. For example, if it is decided to place the facilities in an extended safe storage mode: cranes and lifts would be mothballed; monitoring and heating, ventilation, and air conditioning (HVAC) equipment would be minimized; and electrical/water supplies would be eliminated or reduced. If the decision is made to immediately decommission the facilities, few, if any, of the above activities would be undertaken during deactivation. In the absence of a detailed overall facility end point, the following generalized end point will be used as a basis for this plan. Future issues will be modified to reflect the BNFL Inc./DOE agreed end point, when issued.

The overall facility end point for deactivation shall be as follows:

> **Deactivation, when completed, shall leave the facilities in a safe, stable, and passive state that can be monitored with minimal cost and minimal requirements for service support from either personnel or active equipment. All residual radioactive source terms shall be removed or stabilized to reduce risk to below a low hazard facility in accordance with DOE Order 5480.23 and DOE-STD-1027-92.**

The overall facility end point includes the following:

- Placing and maintaining the facility in a safe, environmentally secure, and as low as economically achievable state while the facility awaits decommissioning/RCRA closure
- Maximizing the effectiveness of deactivation to minimize future safe storage and/or decommissioning/RCRA closure costs for the deactivated facilities
- The provision of adequate monitoring and control systems for equipment essential to the continued safety of the facility during the post-deactivation period
- Removing and/or stabilizing materials sufficiently to ensure that the facility complies with radiological control standards applicable to a nonoccupied facility after completion of deactivation

6.2 DEACTIVATION PROCESS OBJECTIVES

The following objectives identified for the deactivation process shall be used as a basis for deactivation planning.

- Protect the public, workers, and the environment.
- Deactivation shall facilitate safe storage and/or decommissioning/RCRA closure.
- Comply with all applicable regulations and requirements.
- Maintain radiation dose uptake to personnel and industrial hazard exposure during deactivation to as low as reasonably achievable.
- Minimize the production of all forms of waste and pollutants during deactivation.
- Deactivation activities shall ensure that the facility is remediated through the removal, stabilization, or disposal of major radiation sources, dangerous chemicals, and waste. Radiation fields shall be eliminated, shielded, or isolated. Residual hazardous or potentially hazardous materials shall be isolated and contained.
- Hazardous and radioactive materials shall be removed from the facility or stabilized sufficiently to ensure long-term safety and regulatory compliance, enable facility classification as a nonoccupied facility, and enable subsequent successful decommissioning/RCRA closure.

Note: The TWRS-P contract Standard 8: Facility Deactivation states in a. 1) (d) that *All Special Nuclear Material shall be removed to the practical extent possible. The quantity of nuclear materials remaining shall be no greater that category IV-E levels established in DOE Order 5633.3B.* The special nuclear materials to be provided for processing to BNFL Inc. under the terms of the contract will not exceed category IV levels and BNFL Inc. processing will not increase the concentration or attractiveness level of this material above category IV-E. Therefore, the quantity of nuclear materials remaining in the facility will not be greater than category IV-E levels. See the *TWRS-P Project Safeguards and Security Program Plan* (BNFL Inc. 1998b) for further details.

7.0 FACILITY DEACTIVATION END POINT CRITERIA

7.1 END-POINT CRITERIA

This section details end-point criteria that have been developed as a selection tool to assist in the development of specific deactivation end points (see Chapter 8.0). The end-point criteria selected have been developed to satisfy the following three sources of requirements:

- Contract requirements contained in Standard 8 of the Tank Waste Remediation System Privatization (TWRS-P) Part 1A contract
- Facility end-point requirements and deactivation objectives stated in Chapter 6.0 of this plan
- Recommendations contained in the DOE *Facility Deactivation Guide Methods and Practices Handbook* (DOE/EM-0318).

End-point criteria focus on explicitly measurable or identifiable objectives such as the configuration of systems and equipment, removal of materials, residual contamination levels, and preservation of records for future need. The end-point criteria, when used in conjunction with the Hierarchical Method for determining end points contained in Chapter 5 of the *Deactivation Guide Methods and Practices Handbook* (DOE/EM-0318), will ensure that the selection of specific end points is based on a logical, systematic, and auditable procedure. The end points chosen by this method will be measurable and/or identifiable, and; therefore, completion can be recognized and approved. The criteria identified in the following will be re-evaluated and may be updated in later issues of the Deactivation Plan when detailed design, construction, and operational information is available.

7.2 REGULATORY REQUIREMENTS AND RELATED DOCUMENTATION

Each procedure, plan, and environmental document detailed in the following shall be reviewed for applicability to TWRS-P deactivation and the U.S. Department of Energy (DOE) handover. Applicable documentation shall be identified as an end-point deliverable and specified in end-point documentation. The end-point specifications will stipulate that each document shall be updated and revised as needed to reflect the deactivated status of the facility.

7.2.1 Safety Documentation

The following safety documentation shall be reviewed for applicability.

- Safety Basis: an approved authorization basis for the deactivated facilities
- Building emergency plans
- Documented compliance with the Hazards Communication and Confined spaces programs

- Final Safety Analysis Report (including all inventory data and assumptions used as a basis for the report)
- Fire Hazards Analysis (FHA)
- Hazards Identification Document (draft) for inclusion in, *Hanford Surplus Facilities Hazards Identification Document,* BHI-00066
- Safety equipment list.

7.2.2 Environmental Documentation

The following Environmental documentation shall be checked for applicability.

- Air-permitting documentation
- Chemical and hazardous materials inventory
- Facility effluent monitoring plan
- Final radiological and chemical residue surveys of all areas and buildings
- Health Physics Technician routine survey requirements and procedures
- *National Environmental Policy Act of 1969* (NEPA) documentation to support the deactivation work
- National Pollutant Discharge Elimination System Permit Closeout documentation.

7.2.3 Configuration Management Documentation

The following Configuration Management documents shall be checked for applicability.

- All available facility operating log books
- Facility and equipment drawings
- As-built drawings for operable systems
- Vendor equipment information
- Complete set of occurrence reports and off-normal events
- Deactivation log books and reports
- Deactivation work plans
- Description/photo history of internal spaces into which routine access is not anticipated

- Maintenance Procedures for post-deactivation operational equipment
- Physical Property Records
- Plant Operating Procedures (for inactive systems, to be used as an historic file)
- Pre-Closure Work Plan
- Post-Deactivation System Operating Procedures
- Records inventory and disposition schedule
- Structural and weather-tight shell inspections and assessments
- Technical information to support end points identification, specification, and closure
- *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et. al 1990) and regulatory commitments
- Transfer of documents to records holding
- Transfer documentation to transfer the ownership of the TWRS-P waste treatment facilities from BNFL Inc. to the DOE
- Turnover package including how end-point closure was achieved and documented
- Waste characterization and disposal information for egress waste
- Zero energy checks for shutdown and isolated electrical and high-energy systems following deactivation

7.3 PROCESS EQUIPMENT

Process equipment, piping, and deactivated electrical systems will not be removed during the deactivation process.

Internal surfaces of all storage and process pipework and vessel systems shall be flushed to remove water-soluble or transportable chemical and radioactive material. This includes all waste treatment process equipment and the flow and return process pipework from the low-activity waste feed tank (241-AP-106) and, if included in the contract, the feed and return lines to the high-level waste transfer caisson.

External surfaces of process equipment shall be cleaned and decontaminated, where appropriate, to minimize radioactive source terms and chemical residues.

7.4 SALVAGEABLE EQUIPMENT

Salvageable equipment, materials, and tools suitable for other use will be identified, removed, and suitably dispositioned. The identification and selection of this equipment will be maximized to reduce waste generation.

7.5 LOCKS, SECURITY, AND EMERGENCY DOORS

7.5.1 Locks

All doors to the facilities shall be locked from the inside except those required for entrance by post-deactivation crews.

7.5.2 Emergency Exits

Adequate provisions shall be made for emergency exit from facilities by the use of crash bars where necessary. When exits are locked from the inside and are not designated normal or emergency exits, the exit signs shall be removed. All access to ladders and stairways leading to the facility roof shall be removed or blocked as required to support post-deactivation activities.

7.5.3 Gates and Fences

The existing facility security fence will be refurbished and locking gates provided, as necessary, to support post-deactivation activities.

7.6 SPACES

7.6.1 Radiation and Contamination Control

Permanent contaminated zones shall be either decontaminated and released, contamination levels reduced or fixed to prevent resuspension, or isolated to prevent migration of contamination to uncontaminated areas.

Use of ventilation in an area to prevent contaminant migration to uncontaminated areas or the environment shall be used only as a last approach and not as the method of choice.

All temporary radiation and contamination zones inside and outside the facilities shall be decontaminated, or stabilized and released.

Radiation space monitoring and facility criticality monitoring alarms shall be eliminated or reduced to the maximum extent possible.

Full compliance with radiation protection requirements shall be demonstrated and documented just before turnover to the DOE.

7.6.2 Radioactive Materials

All stored, (i.e., containerized) radioactive and mixed waste shall be removed from the facilities and disposed of in accordance with appropriate procedures.

All nuclear materials, where appropriate, shall be removed from the facility. If this is not appropriate, remaining nuclear materials shall meet Attractiveness Level E criteria (DOE Order 5633.3).

All tanks, vessels, drums, and open pits shall be drained with heels removed, or the remaining materials characterized for radiological content, and, with the concurrence of the DOE and appropriate regulatory agencies, the contents and/or heels left in place.

7.6.3 Hazardous Materials

All stored mixed and hazardous waste (i.e., containerized) shall be removed from the facilities and disposed of in accordance with appropriate procedures.

All hazardous materials shall be removed from the facility or documented as remaining (i.e., type, amount, and location) in the facility. This information shall be forwarded to the appropriated regulatory agencies in accordance with the Tri-Party Agreement.

All tanks, vessels, drums, and open pits shall be drained and heels removed, or the remaining materials will be characterized for hazardous content and, with the concurrence of the DOE and the appropriate regulatory agencies, the contents and/or heels left in place.

7.6.4 Housekeeping

All excess office furniture, loose equipment, spare parts, and tools shall be dispositioned. All janitorial supplies from the facilities shall be dispositioned. Good housekeeping shall be performed in all areas in and around the facilities.

7.7 SYSTEMS

7.7.1 Monitoring and Control

Instrumentation, monitoring, and control system(s) required for post-deactivation activities shall be maintained in operable condition. If it is decided to have a prolonged period of safe storage, the TWRS-P Facility system shall provide a sufficient level of monitoring, control, and reliability to necessitate only quarterly staffed entries in the TWRS-P Facilities.

Radiation monitoring alarms from the unoccupied facility shall be relayed to a staffed control center for action. This will preclude the possibility that surveillance staff can inadvertently walk into a contaminated area.

All environmental monitoring systems (e.g., stack monitoring systems) required for post-deactivation activities shall be identified and maintained in serviceable condition.

7.7.2 Water

All fire protection and alarm systems will be reduced or eliminated to the maximum extent possible within the limits of the FHA. (This will normally require that the facility be zero valued with the DOE records systems.)

All water supply services to the facility shall be reduced or eliminated as determined by post-deactivation activities. Remaining pressurized portions of these systems shall be noted in the handover documentation and shall be protected as required for freeze protection.

7.7.3 Electrical

The lighting electrical service controls for post-deactivation activities shall be minimized. No emergency lighting system will be needed for any safe storage, activities and all existing emergency light batteries shall be removed.

Electrical supply services to the facility shall be minimized to an extent that supports post-deactivation activities. The remaining energized portions of these systems shall be noted in the handover documentation.

7.7.4 HVAC

Air supply and exhaust systems shall be minimized to the extent possible to support post-deactivation activities.

Air and effluent monitoring shall be eliminated or reduced to the maximum extent possible to support post-deactivation activities.

7.7.5 Inactive Systems

If it is decided to place the facilities in long-term safe storage, all elevator and crane systems shall be mothballed in accordance with the manufacturer's recommendations. Manufacturer’s documentation will be on file to determine the type, weight, and class of fluids used in the system so that the system can be restored in the future. Also included shall be files that relate to load certification, test, and preventative maintenance information.

All equipment and systems not needed to support post-deactivation activities shall be de-energized, drained and/or otherwise deactivated. Zero energy checks shall be applied and documented as needed. This limits maintenance and operator actions required for these systems.

7.8 CONTAINMENT/FACILITY STRUCTURES

7.8.1 Penetrations

Unless required by post-deactivation activities, liquid effluent flow routes to disposal sites shall be isolated by sealing (blank flange installed and an air space in the pipe). The outlet end of discharged pipes shall be screened off for varmint control.

All facility openings, (i.e, louvers, pipe openings), shall be closed off to prevent bird, animal, and weather intrusions.

7.8.2 Containers (seal pits, wells)

All systems that could present a radiological and/or industrial safety concern if left open shall be adequately closed off. Conversely, rooms, tanks, and pits, that do not present a radiological or industrial safety concern shall be left open (i.e., doors removed) with covers installed ajar with viewing access allowed.

Any seal pits, dry or wet, will be identified in the post-deactivation surveillance procedures for periodic monitoring. The radiological status of any such pit shall be documented in the turnover documentation.

7.8.3 Roofs

All known facility roof leaks and/or deteriorated roof panels shall be repaired. Documentation shall be presented that indicates no significant repairs will be required, nor water inleakage occur, on any roof for 5 years following facility transfer.

7.8.4 Accessibility/Visibility

All systems that could present a radiological and/or industrial safety concern if left open shall be adequately closed off. Conversely, rooms, tanks, and pits, that do not present a radiological or industrial safety concern normally shall be left open (i.e., doors removed, windows installed, covers installed ajar with viewing access allowed).

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8.0 DEACTIVATION END POINTS

Subsequent to agreement on an overall facility deactivation end point, deactivation objectives, and end-point criteria, BNFL Inc. in consultation with the U.S. Department of Energy (DOE) will determine a series of individual end points for specific plant areas, structures, systems, equipment, and documentation. The selection of these individual end points will translate the overall facility end point, objectives, and criteria into a discreet number of deactivation end point work packages. These end point work packages will be measurable and explicit, and their completion shall be readily identifiable and verifiable. The completion of all individual end-point work packages will mark the completion of facility deactivation.

Appendix A provides an outline of the deactivation specifications and end points BNFL Inc. anticipates will form the core activities for the deactivation of the Tank Waste Remediation System-Privatization (TWRS-P) Facility. As previously stated, definitive end points will be compiled and included in later revisions of this plan when the DOE requirements and facility equipment and conditions are better defined.

8.1 GUIDING PRINCIPLES FOR SPECIFYING END POINTS

The following guiding principles shall form the foundation of the end-point determination process.

- Driven by Objectives - The decision to specify an end point shall be driven by, and clearly linked to, major deactivation objectives. This is the central principle of the logical, systematic approach BNFL Inc. shall use for end-point determination. End-point determination, along with the allocation of resources and the selection of methods, stem directly from the deactivation facility overall end point and objectives.

- Cost Effective - BNFL Inc. will undertake deactivation that is cost effective (i.e., BNFL Inc. will not undertake deactivation where expanding further resources to reduce risk will not achieve a commensurate reduction in immediate post-deactivation costs).

- Defense-in-Depth - The overall end-point condition of the deactivated facility will employ defense-in-depth as a fundamental safety approach. The application of this principle will involve three layers of protection: elimination or stabilization of hazards, effective facility containment, and facility monitoring and control.

- Ownership - BNFL Inc. will determine and agree to all end points in collaboration with the DOE.

- Clarity - All end points shall be clear, quantitative, practical, and achievable.

- Flexible - End-point development is an iterative process and changes may be required during deactivation. However, changes to end points after the initial agreement shall be acceptable only if agreed to by all parties.

- Research Avoided - Existing technologies will be used where possible.

- All end points shall be documented to include detailed end-point specifications and justification.

8.2 END POINT SPECIFICATIONS

BNFL Inc. shall produce end-point specifications that define the condition of the facility when deactivation is complete. End-point specifications shall delineate the scope of the deactivation activities and accomplish the following goals:

- Systematically establish a set of conditions that define the work to be completed during deactivation
- Show the rationale for each end point and its linkage to a project objective
- Provide objective evidence that deactivation is specific and complete
- Establish an authorization basis that reflects the achievement of the deactivation end points and defines safe storage needs following deactivation

End point specifications also shall be used for the following reasons:

- Provide input data for scheduling and estimating deactivation costs
- Create detailed work plans for each area/system in the facility
- Demonstrate conformance with BNFL Inc., the DOE, and regulator agreements
- Show compliance with both local and federal regulations
- Ensure that the central element of the deactivation objective - achieve stability - is achieved
- Provide a basis for BNFL Inc. and the DOE to achieve agreement on the conditions for transfer of the facility at the completion of deactivation
- Ensure worker exposure to radiation or dangerous chemicals is minimized by avoiding unnecessary work
- Where possible, be in concert with, or at a minimum not preclude, longer-term disposition options.

8.3 DEFINING END POINTS

This issuance of the Deactivation Work Plan is provided as an element of the Part A Privatization Contract and will accompany the TWRS-P Facility preliminary design package. As the design of the waste treatment facility is at the preliminary design phase, there is insufficient information at this time to identify specific facility deactivation end points. Specific

deactivation end points will be determined and defined in later issues of this plan when detailed design, construction, and operational information is available.

8.3.1 Methodology for Defining End Points

The methodology to be used by BNFL Inc. to determine specific end points is the Hierarchical End Points method (or similar system) described in the *Facility Deactivation Guide Methods and Practices Handbook* (DOE/EM-0318) dated December 1996. The deactivation guide describes two end point identification methods. Of these two, the Hierarchical End Points method is best suited for use on the TWRS-P waste treatment facilities due to the extent and complexity of the facilities. The Hierarchical End Points methodology includes a system to confirm, refine, or modify end-point criteria. BNFL Inc. will use this system to review and modify, as required, the end-point criteria in Chapter 7.0 during the determination of facility end points.

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9.0 FINAL FACILITY AND SITE CHARACTERIZATION SURVEY

9.1 FINAL FACILITY CHARACTERIZATION

At the completion of deactivation operations, BNFL Inc. will undertake a final facility characterization survey. This survey will identify and document the final physical and administrative characteristics of the facility before transfer of ownership from BNFL Inc. to the U.S. Department of Energy (DOE). The survey will review the deactivated condition of the facilities and its infrastructure, monitor facility radiological and residual chemical conditions, (including external ground areas and soils), and identify any remaining hazardous waste. The survey will verify that satisfactory deactivation conditions have been achieved and are verified and documented. A final characterization plan will be prepared identifying the methodology, equipment, scope, and schedule of characterization survey activities.

The following shall be evaluated during characterization and the results incorporated in the final characterization report:

- The condition of the deactivated facilities (generally in accordance with DOE Order 4320.2A, *Capital Asset Management Process*).
- The nature, level, extent, and location of radiation
- The nature, level, extent, and location of contamination (radiological and chemical, fixed, removable, and airborne). This action includes identifying any residual radiological and chemical contamination and spills. Contamination surveys will include external ground areas and soils in addition to internal facility surveys
- Any remaining special nuclear and fissionable materials (inventory and location)
- Any remaining toxic and hazardous chemicals and materials (inventory and location)
- Condition and operational status of utility systems required for safe storage and/or decommissioning/*Resource Conservation and Recovery Act of 1976* (RCRA) closure
- Condition and operational status of any heating, ventilation, and air conditioning systems required for safe storage and/or decommissioning/RCRA closure
- Condition and operational status of the control and monitoring systems required for safe storage and/or decommissioning/RCRA closure
- Condition and operational status of the safety related systems required for safe storage and/or decommissioning/RCRA closure
- Condition and operational status of liquid and solid waste handling systems required for safe storage and/or decommissioning/RCRA closure
- A listing of the documents that define the authorization basis and safe storage requirements to maintain the safety envelope at the completion of deactivation

- Listing of permits, licences, and agreements that remain imposed on the facility at the completion of deactivation.

While individual data points will be valid and supportable, BNFL Inc. will use a graded approach to data collection, (i.e., 100% coverage will not be attempted). As stated in the DOE *Decommissioning Resource Manual* (DOE/EM-0246, August 1995) Appendix G.2, it is not necessary to know the total quantities of contamination present with a high degree of certainty. Sufficient data, of an appropriate quality, should be collected to meet characterization objectives.

10.0 OPERATIONAL AND MAINTENANCE REQUIREMENTS - DEACTIVATED FACILITY

As the operational life of the waste treatment facility is completed and the deactivation process shuts down most operating equipment, the number and/or content of operating and maintenance procedures will diminish. This section outlines the reduced operational and maintenance requirements for the deactivated facility.

10.1 OPERATIONAL REQUIREMENTS FOR THE DEACTIVATED FACILITY

BNFL Inc. shall provide operational procedures and instructions for all post-deactivation operational equipment. Complete details of the operating equipment are not known at this time however, it is likely to be limited to equipment as follows that will:

- Ensure adequate containment of contamination, (e.g., environmental monitoring equipment, heating, ventilation, and air conditioning [HVAC] discharge stack(s), cell containment systems)

- Provide physical safety and security controls, (e.g., closed circuit television systems [CCTV])

- Provide a mechanism for the identification and compliance with applicable environmental, safety and health, safeguard, and security requirements (e.g., monitoring results and documentation).

In addition to the previous requirements, BNFL Inc. will provide reactivation and operational procedures for systems and equipment essential for decommissioning/*Resource Conservation and Recovery Act of 1976* (RCRA) closure but placed in a shutdown (mothballed) or standby mode during deactivation. After transfer of the waste treatment facilities from BNFL Inc. to the U.S. Department of Energy (DOE), post-deactivation operations and engineering staff will be unfamiliar with the operation of the remaining systems and equipment. The DOE, or designee, is responsible for the familiarization training and qualification of operations and technical staff.

10.2 MAINTENANCE REQUIREMENTS FOR THE DEACTIVATED FACILITY

BNFL Inc. shall provide maintenance procedures and schedules for the post-deactivation facilities. These shall maintain facilities in a safe state, minimizing potential hazards to the public and workforce, while minimizing maintenance costs. Maintenance procedures shall be provided for the following:

- Buildings and confinement structures

- Operating systems and equipment, (e.g., monitoring systems, HVAC, discharge stacks, CCTV systems)

- Systems and equipment essential for decommissioning/RCRA closure but placed in a shutdown (mothballed) or standby mode during deactivation and safe storage, (e.g., lifting equipment, elevators).

BNFL Inc. will supply sufficient maintenance information to demonstrate compliance with DOE Order 4330.4A, *Maintenance Management Program*. It is presently assumed that the DOE or designee will produce the Maintenance Implementation Plan mandated in DOE Order 4330.4A. BNFL Inc. will provide the information for the following sections of the Maintenance Implementation Plan:

- Types of maintenance
- Maintenance procedures
- Schedule of maintenance activities
- Post-maintenance testing
- Historical records of maintenance activities during facility operations.

BNFL Inc. shall, after discussion with the DOE, provide a general description of the maintenance philosophy and objectives for the deactivated facility. BNFL Inc. also will provide details of the structures, systems, components, and equipment included in the maintenance program and the required surveillance, preventative maintenance, and calibration frequencies and schedules.

11.0 END-POINT VERIFICATION AND FACILITY TRANSFER

At the completion of deactivation, the Tank Waste Remediation System-Privatization (TWRS-P) Facilities will be transferred to the U.S. Department of Energy (DOE) Office of Environmental Restoration (EM-40 or equivalent) for safe storage and/or decommissioning/*Resource Conservation and Recovery Act of 1976* (RCRA) closure. To facilitate this transfer, the deactivated condition of the facility must be acceptable to BNFL Inc. and the DOE. The identification of suitable end points (discussed in Chapter 8.0) and an agreed verification method to confirm that end points have been achieved (discussed below) are fundamental to reaching a consensus that deactivation is complete and that the transfer of ownership of the facilities proceed. Transfer of ownership shall take place when all deactivation end points have been achieved, conditions for safe storage and/or decommissioning/RCRA closure are in place, and the DOE assumes responsibility for the TWRS-P waste treatment facilities. These conditions will be shown to be met when the DOE accepts and signs the transfer of ownership documentation.

Included in this chapter are the process and protocols for turning over the TWRS-P facilities and site to the DOE, content of the facility transfer package, and various end point verification methodologies that will be used to confirm end points have been achieved.

11.1 PROCESS AND PROTOCOLS FOR TURNING OVER FACILITIES TO DOE

The process and protocols for transfer of the facility to the DOE shall include the following.

- DOE and/or authorized third party shall review the facility deactivation status as described in the end-point completion report and agree that all deactivation end points have been successfully achieved. It is anticipated that the DOE and/or authorized third party will approve and endorse each end point completion as it occurs and that the final review of the end point completion report will be for administrative closure only.

- BNFL Inc. shall issue to the DOE a transfer documentation package comprising administrative, technical, and post-deactivation operations and maintenance documents. Later revisions of this plan will contain a schedule for the issue of the individual documents. It is anticipated that the DOE (or authorized third party) will endorse each document as it is issued and approved and that final review of the transfer documentation package will be for administrative closure only.

- BNFL Inc. will inform the DOE 30 days before completion of the final date for the deactivation of BNFL Inc. facilities. Subsequent to the DOE review and acceptance of BNFL Inc. handover documentation and deactivation end point status, the DOE shall endorse the ownership transfer documentation and accept ownership of the facilities. Handover of the facilities to the DOE shall be completed within 30 days of deactivation completion.

- BNFL Inc. will hand over to the DOE the BNFL Inc. facility authorization basis, which shall reflect the deactivated status of the facilities. This authorization basis shall have been approved by the BNFL Inc. regulatory unit. If the authorization basis requires

modification to suit the DOE regulator requirements, this modification shall be the responsibility of the DOE and shall not be a condition of facility transfer.

- At the completion of deactivation, the DOE shall submit permit modifications that reflect the facilities change of status and remove BNFL Inc. as co-signee and owner operator from the dangerous waste and air permits.

11.2 TRANSFER PACKAGE

The transfer package will consist of three elements, an administrative package, a technical package, and a safe storage/deactivation package. The content of each of these sections is described in the following sections.

11.2.1 Administrative Transfer Package

The administrative transfer package will consist of a collection of documents including procedures, agreements, permits, and other documents not directly related to the physical facility. Typical documents that would be included in this package are indicated as follows. Documents required for turnover will be agreed to with the DOE immediately before deactivation and will be documented in later revisions of this plan:

- Transfer of Ownership - Legal documentation transferring ownership of the TWRS-P waste treatment facilities to the DOE

- Safe Shutdown and Deactivation Report - BNFL Inc. summary of deactivation completion, general facility status and condition, demonstrating conformance with the agreed overall end point. The report will reference the end points completion document and the final facility characterization report

- Emergency Response Plan - An emergency response plan will be provided and revised to reflect the deactivated status of the facility. It will include responses to fire, flood, severe storms, and other natural or human-caused events

- Safety Documentation **-** Current safety documentation for the deactivated facility. A copy of the Technical Safety Requirements (TSR) surveillance program description and statement of compliance will be included

- Status/Compliance of Regulatory Commitments - Details of the status of and compliance with all regulatory commitments will be provided, (e.g., Occupational Safety and Health Administration [OSHA], *Resource Conservation and Recovery Act of 1976* (RCRA), *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA), *National Environmental Policy Act of 1964* (NEPA).

- Status of Agency Agreements - Provide status of any agreements with federal, state, and local agencies identifying terms and milestones, (e.g., *Hanford Federal Facility Agreement and Consent Order* [Tri-Party Agreement] [Ecology et. al 1990]).

- Status of Permits - Provide status of existing permits, (e.g., National Pollutant Discharge Elimination System [NPDES], air permits, RCRA.)

11.2.2 Technical Turnover Package

The technical turnover package will consist of documents that describe the facility, its equipment, and facility conditions at the completion of deactivation. The content of this package will include the following:

- Deactivation Documentation, (e.g., completed work plans and work packages)
- End Points Completion Report - Report verifying and documenting the accomplishment of all end points
- End Point Technical Information - Documented technical specifications and basis for end point selection
- Final Deactivated Facility Condition - Copy of the final site characterization report containing a summary of the overall condition/status of the site, buildings, systems, and equipment. It will also include a complete inventory of chemical and hazardous substances including nuclear material remaining in the facilities
- Facility Drawings - Copies of all drawings modified to reflect as-left deactivated conditions, as necessary
- Descriptions and photos - Photographs or descriptions of sealed, contaminated cells or areas
- Technical Manuals - Technical manuals for operational, mothballed, and redundant facility.

11.2.3 Post-deactivation Operations and Maintenance Package

The post-deactivation operations and maintenance package will consist of documents that have been created for use during a post-deactivation safe storage and/or decommissioning/RCRA closure phase or that contribute to these phases of facility operations. Typical documents will include the following:

- Operational and maintenance procedures for all active systems and equipment
- Maintenance requirements to ensure the structural integrity of buildings and containment structures
- Procedures necessary to reactivate essential systems for eventual decommissioning/RCRA closure

- Post-Deactivation Effluent Monitoring Plan

- Post-Deactivation Safety Equipment List.

11.3 END POINT COMPLETION AND CLOSURE

Acceptable criteria for end-point closure will be determined and agreed on through the development of an end-point conditions document. This document will list all the agreed end points and their specifications and will contain a signature block for BNFL Inc. and the DOE representatives. When an end point has been verified as complete, this will be documented by the signatures of both BNFL Inc. and the DOE representatives in their respective signature blocks. The chosen verification method for closure determination also is added in the reference space on the signature block.

11.3.1 End-Point Closure Methods

End points will be closed using one or more of the following methods. The basis for determining the level of closure documentation depends on the nature of the end point, (e.g., the risks or hazards involved). Consistency of closure also will be considered when determining the closure method for a specific space or system.

- Visual - Visual verification is a walkthrough or visual inspection of the space or system to verify the stated condition or intent of the end point has been met. This method shall be used if documentation is not required to perform and/or indicate the full scope of work required to achieve the closure condition (e.g., acceptable housekeeping, fire extinguisher removal, vermin isolation)

- Work Plan or Order - A signed copy, or applicable portions of the work plan or order written to provide detailed work instructions of the work scope necessary to close the stated condition or meet the intent of the end point. These copies shall be placed in a common indexed work plan file for retrievability

- Drawings/Instrument and equipment flow diagrams - Copies of the essential drawing indicating ‘redlined’ portions that reflect as-left configurations and Engineering Change Notices shall be used to document acceptable conditions. These copies will be placed in the applicable end point file for reference

- Letters/Summaries/Memorandums - Specific letters, summaries, or memorandums documenting concurrence, explanations, or descriptions of activities leading up to closure of the stated condition or the intent of the end point. These documents will be uniquely identified for traceability throughout the filing system in the applicable end point file

- Audits/Assessments/Inspections - Reports, letters, and electronic messages written to document audits, inspections, or assessments performed to support closure of the stated condition or the intent of the end-point (e.g., confined space audits surveys)

  Note: Visual verification may be used as the reference to indicate that field conditions are acceptable before turnover of the administrative portion of the end-point.

- Video and Photographs - Video-tapes will be taken to document the stated condition or the intent of the end point. Videos or photographic descriptions are required for most Case 2 spaces where no immediate access is required for post-deactivation activities

  Note: On viewing of the tape, visual verification may be used as the reference to indicate that field conditions are acceptable. Video viewing will be used to minimize waste and as low as reasonably achievable (ALARA) concerns created by additional entries into the facilities.

- Waiver or Justification of Change - Waivers written to justify changes of intent or workscope stated by the end points will be written and concurred with by both BNFL Inc. and the DOE representatives. Major modifications to the end-points document will require a revision or page change to be completed. Copies of the waiver (in a memorandum format) will be placed in the specific space or systems file and will be used as documentation to support end point closure.

- Radiological Surveys - Specific radiological surveys will be used to document the stated condition or the intent of the end-point. Copies of the surveys will be attached to a memorandum explaining the relationship of the survey to the end-points. For example, a survey performed to document that no contamination exists will be used to close a ‘mitigate contamination migration’ end-point.

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12.0 LICENSING BASIS DEVELOPMENT

12.1 LICENSING BASIS

BNFL Inc. will provide an auditable safety analysis for the deactivation of the Tank Waste Remediation System-Privatization (TWRS-P) Facilities, which will be reviewed and updated as needed throughout the deactivation process. This analysis will be the foundation for the licensing basis, which also will be reviewed and modified as required during deactivation, to reflect changes in the facilities condition and associated hazards. The content of the safety analysis will include the following:

- Facility and process description, including structures, systems, and components relied on for safety
- Hazards analysis, including a qualitative natural phenomenon hazards evaluation
- Basis of technical safety requirements (if necessary) and safety management programs.

The hazard analysis will include the identification of hazards and credible scenarios, (including an explanation of the process used to arrive at the consequences) and identification of the controls needed to protect the worker and public if the consequences warrant such controls.

It is the intention of BNFL Inc. that as soon as possible and after the completion of waste treatment operations, remaining hazardous materials will be identified, and where possible, removed and dispositioned. The quantity of nuclear materials remaining after deactivation shall be no greater than Category IV-E levels established in the U.S. Department of Energy (DOE) (DOE Order 5633.3B). The goal for the final safety basis of the TWRS-P Facility is a Category 3 hazard as defined in, *Control and Accountability of Nuclear Materials* (DOE Order 5480.23) and (DOE-STD-1027-92). This states that the hazard analysis shows the potential for only significant localized consequences.

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13.0 REFERENCES

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APPENDIX A

TANK WASTE REMEDIATION SYSTEM PRIVATIZATION DEACTIVATION END POINTS

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1.0 TWRS-P DEACTIVATION END POINTS

Appendix A is an outline of the deactivation specifications and end points anticipated for the Tank Waste Remediation System-Privatization (TWRS-P) Facility. This outline has been prepared to satisfy the TWRS-P contract Part 1A, Standard 8 (BNFL Inc. 1996), requirements, which state BNFL Inc. is to provide a Deactivation Plan that shall contain:

a. 1) *".....detailed end-points for the site, facilities, systems/equipment and documentation*."

As stated in the Deactivation Plan, the waste treatment facility is at a preliminary design phase and insufficient information exists at this time to identify specific and detailed deactivation end points. These deactivation end points shall be determined and defined in later issues of this plan when detailed design, construction, and operational information is available. It is feasible however, to generate an outline of end-point work package specifications and end points that BNFL Inc. anticipates will form the core activities of deactivation. These specifications and end points are documented in the following.

1.1 DEFINITION OF 'END POINTS'

BNFL Inc., in agreement with the U.S. Department of Energy (DOE), shall determine a series of individual end points (i.e., identify the required post-deactivation condition) for specific plant areas, structures, systems, equipment, and documentation. The end points selected shall translate the facility deactivation requirements, objectives, and criteria into specific deactivation work packages. These work packages shall be measurable and/or explicit and completion shall be readily identified and verified. The TWRS-P Facility deactivation shall be considered complete when all individual end points have been verified as completed.

1.2 DOCUMENTATION

1.2.1 Regulatory Requirements and Related Documentation

The issuance of each document detailed as follows shall be identified as a specific end point for deactivation. Documents shall be updated and revised as needed to reflect the final deactivated status of the TWRS-P Facilities as follows:

- Air permitting documentation - modify the air permit as required to reflect the changes in discharges for the deactivated facility

- Safety Analysis Report and Safety Basis - provide an auditable Safety Analysis Report for the deactivated facilities. This analysis shall be the foundation for the Safety Basis, which shall be updated to reflect the final deactivated condition of the facilities and associated hazards. The updated final Safety Basis shall be approved by the regulatory unit (see Chapter 12 of this document for further details)

- Building emergency plans - building emergency plans shall be modified as required to reflect the building's deactivated status

- Facility Effluent Monitoring Plan - update the Facility Effluent Monitoring Plan as required to reflect the deactivated status of the facility

- Final radiological and chemical residue surveys for all areas and buildings - at the completion of deactivation, a final radiological and chemical residue survey shall be completed that will document the extent of contamination of facilities and surrounding BNFL Inc. areas

- Fire Hazards Analysis (FHA) - prepare and issue a FHA for the deactivated facilities

- *National Environmental Policy Act* (NEPA) - documentation to support the deactivation work

- National Pollutant Discharge Elimination System Permit Closeout Documentation

- Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) (Ecology et. al 1990) and regulatory commitments

- Document as required compliance with the Hazards Communication and Confined Spaces programs

- Hazards Identification Document (draft) for inclusion in *Hanford Surplus Facilities Hazards Identification Document [BHI 1996])* - at the completion of deactivation, prepare a draft hazards identification document for issue to the DOE. The content and format of this document shall be consistent with the requirements of BHI-00066.

- Health Physics Technician routine survey requirements and procedures - copies of routine Health Physics Technician survey requirements and procedures shall be collated and prepared for issue to the DOE

- Safety equipment list

- Chemical and hazardous materials inventory - compile a remaining chemical and hazardous materials inventory for the deactivated facility and include inventory in the deactivated facility final characterization report

- Deactivation log books and reports - compile and issue a deactivation log book containing a complete log of deactivation activities. Prepare and issue a deactivation activities and results report at the completion of deactivation.

1.2.2 Deactivation Documentation

The following procedures, plans, and drawings shall be identified as specific end points for deactivation. Each document/drawing shall be updated and revised as needed to reflect the work undertaken for final deactivated status of the TWRS-P Facilities as follows:

- Documentation transferring ownership of the TWRS-P waste treatment facilities from BNFL Inc. to the DOE

- Turnover package, including how end point closure was achieved and documented
- Deactivation work plans - all deactivation work plans shall be collated and prepared for issue to the DOE
- As-built drawings for operable systems - update all drawings as required to as-built status for systems required to remain operable at the completion of deactivation
- Description and photo history of internal sealed spaces - compile a description and/or photo history of facility internal spaces into which routine access is not anticipated after deactivation. This information is to be presented to the DOE
- Maintenance procedures for post-deactivation operational equipment - maintenance procedures for post-deactivation operational equipment shall be identified and prepared
- Post-Deactivation System Operating Procedures
- Structural and weather-tight shell inspections and assessments
- Zero energy checks for shutdown and isolated electrical and high-energy systems following deactivation
- Technical information to support end points identification, specification, and closure.

1.2.3 Historical Plant Records

The following historical facility records shall be identified as specific end points for deactivation. Each of the following documents or type of document shall be collated and prepared for issue to the DOE.

- Facility operating log books
- Operational occurrence reports, off-normal events
- Facility and equipment drawings - review and confirm all drawings reflect the as-built status of the facilities, collate drawings ready for issue to the DOE
- Vendor equipment information
- Physical Property Records
- Plant Operating Procedures (for nonoperational systems)
- Pre-Closure Work Plan
- Records inventory and disposition schedule
- Waste characterization and disposal information for egress waste.

1.3 PROCESS EQUIPMENT

All mechanical, electrical, and instrumentation systems shall be left in their installed configuration and shall not be removed as part of deactivation. The only exception shall be salvageable equipment (see Section 1.4). Deactivation of TWRS-P Facility systems shall consist of clean-out, flush, surface clean, isolation, and/or removal of power supply, as applicable. Residual radioactive source terms shall be removed or stabilized to reduce risk to at least a low hazard facility in accordance with DOE Order 5480.23 and DOE-STD-1027-92.

Process equipment and areas shall be subdivided into discrete work packages. Deactivation specifications shall be prepared for these work packages and completion to the specifications shall be identified as a specific end point. Deactivation activities for major facility areas are further described in the following.

1.3.1 Services Equipment

Services equipment is comprised of the following facility items: steam raising boilers and associated equipment, air compressors/dryers and air receivers, breathing air compressor/dryer, heating systems, fire pumps, fire water storage tanks, cooling water/chilled water systems, administration building services, water softener equipment, potable water systems, sewage systems, and medium voltage electrical supply systems. Those services and systems not required for the DOE safe store/decommissioning operations shall be cleaned and electrically and/or mechanically isolated. Salvageable equipment shall be identified and removed.

1.3.2 Chemical Receipt and Storage Tanks and Systems

Situated at the west end of the building are the wet and dry chemical receipt, storage, and transfer systems for diesel oil, nitric acid, sodium hydroxide, strontium nitrate, ferric nitrate, sodium nitrite, anhydrous ammonia, and ion-exchange resins. At the east end of building are the dry chemical receipt, storage, and transfer facilities for the glass-forming materials: alumina, boric acid, wollanstonite, ferric oxide, lithium carbonate, olivine, silica, zinc oxide, zircon sand, and copper oxide.

All the above wet and dry chemical receipt, storage, and transfer systems and immediate surrounding areas shall be flushed and/or cleaned to remove residual chemicals. Left-over chemicals and cleaning residues shall be suitably dispositioned by BNFL Inc.

1.3.3 Pretreatment Systems

The pretreatment system separates radioactive elements from the incoming waste streams. This area of the facility may have extensive contamination within vessels, pipework, and valves but external surfaces should have minimal surface contamination. Pretreatment systems may include a high-level waste (HLW) system in addition to the low-activity waste (LAW) system dependent on contractual agreements.

1.3.3.1 Low-Active Waste System. **Ion-exchange columns** - Remove resin from all ion-exchange columns and encapsulate resin in glass via the LAW melters. Ion-exchange column valves shall be repositioned ready for water/acid/water flush.

Ultra-filters - Back flush all filters and remove/disposition ultra-filter elements. Ultra-filter lids shall be replaced and sealed ready for water/acid/water flush.

All process equipment - After removal of the ion-exchange resins and ultra-filter elements, internal surfaces of all process equipment (e.g., vessels, filters, columns, pumps, valves, pipework) shall be flushed to remove water soluble or transportable chemical and radioactive material. This includes the feed and return pipework to the LAW feed tank (241-AP-106) and to the HLW caisson if installed.

Flushing shall include the following.

1) All LAW enclosed vessels/pipework systems in the process shall be flushed sequentially using inhibited water (pH 13). Resulting wash liquors shall be collected in a selected 227-m^3 LAW pretreatment storage tank.

2) Subsequent to the inhibited water, vessels, pipework, pumps, and valves shall be subject to a nitric acid or similar flush. Flush liquors shall be added to the previous flush liquors in the LAW pretreatment storage tank.

3) All equipment shall receive a final flush of demineralized water. These flush liquors shall be added to the previous flush liquors in the pretreatment storage tank. (If deemed necessary, an additional water flush may be used after the inhibited water flush and before the acid flush.)

4) After mixing and at the completion of flushing operations, flush liquors shall be concentrated in the process evaporator. The resultant concentrated liquors shall be vitrified using a LAW melter.

1.3.3.2 High-Level Waste System. If the treatment of HLW is included in the BNFL Inc. contract, the HLW treatment system shall be deactivated as follows.

Ultra-filters - Back flush all HLW filters and remove/disposition ultra-filter elements. Ultra-filter lids shall be replaced and sealed ready for water/acid/water flush.

All HLW process equipment - After removal of the ultra-filter elements, internal surfaces of all process equipment (e.g., vessels, filters, pumps, valves, pipework) shall be flushed to remove water-soluble or transportable chemical and radioactive material.

Flushing shall include the following.

1) Vessels, pipework, pumps, and valves shall be subject to a nitric acid or similar flush. Flush liquors shall be dispositioned to the HLW 70-m^3 permeate collection tank.

2) All equipment shall receive a final flush of demineralized water. These flush liquors shall be added to the previous flush liquors in the permeate collection tank.

3) After mixing, and at the completion of flushing operations, flush liquors shall be vitrified using a HLW melter.

1.3.4 Melters and Offgas Systems

The HLW and LAW melters shall be flushed by feeding glass formers mixed with concentrated flushing liquors through each melter. After this glass flush, each melter offgas system shall be subjected to the same inhibited water/acid/water flush as described in this Appendix A, Section 1.3.3 for pretreatment equipment.

External surfaces of process equipment shall be washed, where appropriate, to minimize lose contamination and chemical residues. In remote maintenance cell areas, washdown shall be achieved using in-built spray fittings or posted-in decontamination equipment. The use of water/liquid cleaners for washdown shall be minimized to reduce effluent arisings.

1.3.5 Melter Cut-Up Cells

The walls and floor surfaces of the melter cut-up cells shall be washed using the in-built spray fittings to minimize loose radioactive contamination and chemical residues. The use of water for washdown shall be minimized to reduce effluent volumes. If, in the latter part of waste treatment operations, one or two melters or melter offgas vessels fail, these melters/vessels shall be placed in the respective cut-up cells and shall not be size reduced. This is to minimize the generation and spread of contamination before facility handover to the DOE. It would be preferable (if possible) for the DOE to remove and disposition these items as single units. However, a minimum of one cut-up cell shall be left empty for decommissioning size reduction operations.

1.3.6 Product Cooling, Lid Welding, and Decontamination Areas

External surfaces of process equipment, cell walls, and transport bogies shall be washed down using in-built decontamination spray equipment or posted-in decontamination equipment, where appropriate. This will minimize loose radioactive contamination and chemical residues. In remote maintenance cell areas, washdown shall be achieved using in-built spray rings or posted-in decontamination equipment. The use of washdown water shall be minimized to reduce effluent volumes.

1.3.7 Product Stores and Load-out Areas

It is anticipated that after the removal of the containerized radioactive products, the product store will be radiologically and chemically clean. If spot contamination is found, the contaminated surface shall be washed and/or fixative applied to minimize loose contamination.

1.3.8 HEPA Filter Systems

On high-efficiency particulates air (HEPA) filter systems with stainless-steel filter elements, deactivation shall consist of flushing the elements with the installed backwash system to reduce loose radioactive contamination. On HEPA filter systems with disposable filter elements contaminated filter elements, will be removed and replaced with clean filters. Removed filters shall be suitably dispositioned.

1.3.9 Laboratories

Gloveboxes - All gloveboxes shall be emptied of nonsecured items and interior surfaces wiped to reduce contamination. A fixative spray shall be applied to 'fix in-place' any remaining contamination. All glove ports then shall be sealed with protective covers.

Fume hoods - Before switching off the fume hood ventilation system, the fume hoods shall be wiped inside and out to reduce contamination. A sealing plate then shall be placed and secured over the fume intake and the ventilation system shut down.

Laboratory equipment - All radioactively contaminated laboratory equipment shall be identified, encapsulated, and dispositioned. All noncontaminated equipment shall be salvaged or dispositioned by BNFL Inc.

Other laboratory areas - After equipment removal, the laboratory shall be monitored and cleaned to reduce loose contamination levels on the floor and walls.

1.3.10 Other Areas

Tables A-1 (LAW/HLW Option) and A-2 (LAW-Only option) list all the rooms in the facility with a description of room usage and the anticipated personnel entry requirements following deactivation.

1.4 SALVAGEABLE EQUIPMENT, MATERIALS, AND TOOLS

Salvageable equipment, materials, and tools from the TWRS-P Facility, identified as suitable for other use, shall be removed and suitably dispositioned. The identification and selection of this equipment shall be maximized to reduce waste generation.

1.5 LOCKS, SECURITY, AND EMERGENCY DOORS

1.5.1 Locks

All doors to the facilities shall be locked from the inside except those required for entrance by post-deactivation crews.

1.5.2 Emergency Exits

Adequate provisions shall be made for emergency exit from facilities by the use of crash bars, where necessary. When exits are locked from the inside and are not designated normal or emergency exits, the exit signs shall be removed. All access to ladders and stairways leading to the facility roof shall be removed or blocked as required to support post-deactivation activities.

1.5.3 Gates and Fences

The existing facility security fence shall be refurbished and locking gates provided, as necessary, to support post-deactivation activities.

1.6 SPACES

1.6.1 Radiation and Contamination Control

All radioactively contaminated zones designated C2, C2/C3, or C3 (see Tables A-1 and A-2) shall be wiped (as required and feasible) to minimize loose radioactive contamination. At the completion of deactivation C2 zones (general plant areas) will be accessible via the main changeroom for surveillance requirements. It is anticipated that after deactivation, entry into C2 areas will require personnel to use shoe covers or similar protective foot coverings. Exit requirements will be removal of shoe coverings, hand wash, and monitoring of hands and feet. Entry into C2/C3 and C3 zones (rooms) is not advisable for facility surveillance requirements and; therefore, these will be locked and signs appended - CONTROLLED ENTRY ONLY. Entry into these areas will be controlled by the DOE (or authorized agent) radiological protection advisor. The notes in Tables A-1 and A-2 present the potential contamination and radiation levels of C2/C3 areas.

Contaminated zones designated C5 (see Tables A-1 and A-2) shall be washed (as required and feasible) using in-built spray fittings to minimize loose radioactive contamination. The use of water for washdown shall be minimized to reduce effluent volumes. At the completion of deactivation, C5 entry points shall be locked/closed and signs appended - NO PERSONNEL ENTRY. It is not anticipated that personnel will enter these areas until facility equipment has been decontaminated/removed. The notes in Tables A-1 and A-2 present the potential contamination and radiation levels of C5 areas.

Use of ventilation in an area to prevent contaminant migration to uncontaminated areas or the environment shall be used only as a last approach and not as the method of choice. All C1/C2 areas and any temporary contamination/radiation zones inside and outside the facility shall be

decontaminated, or stabilized and released for uncontrolled entry. Radiation space monitoring and facility criticality monitoring alarms shall be eliminated or reduced to the maximum extent possible. Full compliance with radiation protection requirements shall be demonstrated and documented before turnover of the facilities from BNFL Inc. to DOE.

1.6.2 Radioactive Materials

All stored (i.e., containerized) radioactive and mixed waste shall be removed from the facilities and disposed of in accordance with appropriate procedures.

All nuclear materials, if possible, shall be removed from the facility. If this is not possible, all remaining nuclear materials shall meet Attractiveness Level E criteria (DOE 5633.3 Order*, Control and Accountability of Nuclear Materials).*

All tanks, vessels, drums, and open pits shall be drained with heels removed. Or, the remaining materials characterized for radiological content, and with the concurrence of the DOE and appropriate regulatory agencies, the contents and/or heels left in place.

1.6.3 Hazardous Materials

All stored mixed and hazardous waste (i.e., containerized) shall be removed from the facilities and disposed of in accordance with appropriate procedures.

All hazardous materials shall be removed from the facility or documented as remaining (i.e., type, amount, location) in the facility. This information shall be forwarded to the appropriated regulatory agencies in accordance with the Tri-Party Agreement.

All tanks, vessels, drums, and open pits shall be drained and heels removed. Or, the remaining materials shall be characterized for hazardous content and, with the concurrence of the DOE and the appropriate regulatory agencies, the contents and/or heels left in place.

1.6.4 Housekeeping

All excess office furniture, loose equipment, spare parts, tools, and janitorial supplies shall be dispositioned. Good housekeeping shall be performed in all areas in and around the facilities.

1.7 SYSTEMS

1.7.1 Monitoring and Control

Instrumentation, monitoring, and control system(s) required for post-deactivation activities shall be maintained in operable condition. If it is decided to have a prolonged period of safe storage, the TWRS-P Facility system shall provide a sufficient level of monitoring, control, and reliability to necessitate only quarterly staffed entries into the TWRS-P Facilities. Radiation monitoring alarms from the unoccupied facility shall be relayed to a designated control center for action. This will preclude the possibility that surveillance staff can inadvertently walk into a contaminated area.

All environmental monitoring systems (e.g., stack monitoring systems) required for post-deactivation activities shall be identified and maintained in serviceable condition. All nonrequired systems shall be deactivated and labeled - DEACTIVATED.

1.7.2 Water

All fire protection and alarm systems shall be reduced or eliminated to the maximum extent possible within the limits of the fire hazards analysis.

All water supply services to the facility shall be reduced or eliminated as determined by post-deactivation activities. Remaining pressurized portions of these systems shall be noted in the handover documentation and shall be prepared as required for freeze protection.

1.7.3 Electrical

The lighting and electrical service controls for post-deactivation activities shall be minimized. No emergency lighting system shall be needed for safe storage activities, and all existing emergency light batteries shall be removed.

Electrical supply services to the facility shall be minimized to an extent that supports post-deactivation activities. The remaining energized portions of these systems shall be noted in the handover documentation. All deactivated systems shall be labeled - DEACTIVATED.

1.7.4 HVAC

Air supply and exhaust systems shall be minimized to the extent possible to support post-deactivation activities. Air and effluent monitoring also shall be eliminated or reduced to the maximum extent possible to support post-deactivation activities in accordance with regulatory requirements.

1.7.5 Inactive Systems

If it is decided to place the facilities in long-term safe storage, all elevator and crane systems shall be mothballed in accordance with the manufactures recommendations. Manufacturer's documentation shall be on file to determine the type, weight, and class of fluids used in the system so that the system can be restored in the future. Also included shall be files that relate to load certification, test, and preventive maintenance information.

All cranes and power manipulators in radioactive cells shall be decontaminated and parked in the crane maintenance areas.

All equipment and systems not needed to support post-deactivation activities shall be de-energized, drained, and/or otherwise deactivated to minimize post-deactivation maintenance requirements. Zero energy checks shall be applied and documented as needed.

1.8 CONTAINMENT/FACILITY STRUCTURES

1.8.1 Penetrations

Unless required by post-deactivation activities, liquid effluent flow routes to disposal sites shall be isolated by sealing (i.e., blank flange installed and air space adjacent to flange in pipe). The outlet end of discharged pipes shall be screened off for varmint control.

All facility openings, (e.g., louvers, pipe openings), shall be closed off to prevent bird, animal, and weather intrusions.

1.8.2 Containments/Access/Visibility

All systems that could present a radiological and/or industrial safety concern if left open shall be adequately closed. Conversely, rooms, tanks, and pits that do not present a radiological or industrial safety concern shall be left open (i.e., doors removed) with covers installed ajar with viewing access allowed.

Any seal pits, dry or wet, shall be identified in the post-deactivation surveillance procedures for periodic monitoring. The radiological status of any such pit shall be documented in the turnover documentation.

1.8.3 Roofs

All known facility roof leaks and/or deteriorated roof panels shall be repaired. Documentation shall be presented that indicates that no significant repairs shall be required, nor water inleakage occur, on any roof for 5 years following facility transfer.

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 1)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
				See Notes Regarding Entry Limits
1	-14.0m	HLW ENVELOPE 'D' RECEIPT	IN-CELL VESSELS & PIPEWORK	NO ENTRY
2	-14.0m	ENTRAINED SOLIDS REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
3	-14.0m	LAW FEED RECEIPT & EVAPORATION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
4	-14.0m	PLANT EFFLUENT COLLECTION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
5	-14.0m	ENTRAINED SOLIDS STORAGE	IN-CELL VESSELS & PIPEWORK	NO ENTRY
6	-14.0m	PLANT EFFLUENT COLLECTION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
7	-14.0m	NITRIC ACID RECOVERY	IN-CELL VESSELS & PIPEWORK	NO ENTRY
8	-14.0m	LAW TECHNETIUM REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
9	-14.0m	LAW CESIUM REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
10	-14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
11	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
12	-14.0m	PRE-TREATMENT BULGE ZONE	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
13	-14.0m	SUSPECT ACTIVE EFFLUENT COLLECTION	COLLECTION TANKS AND ASSOCIATED PUMPS	CONTROLLED ENTRY
14	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
15		UN-USED ROOM NUMBER		
16	-14.0m	HLW FEED TANK CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
17	-14.0m	LAW FEED TANK CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
18		UN-USED ROOM NUMBER		
19	-14.0m	C3 WORKSHOP	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
20		UN-USED ROOM NUMBER		
21	-14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
22	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
100		UN-USED ROOM NUMBER		
101		UN-USED ROOM NUMBER		
102		UN-USED ROOM NUMBER		
103		UN-USED ROOM NUMBER		
104		UN-USED ROOM NUMBER		
105		UN-USED ROOM NUMBER		
106		UN-USED ROOM NUMBER		
107		UN-USED ROOM NUMBER		
108		UN-USED ROOM NUMBER		
109		UN-USED ROOM NUMBER		

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 2)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
110	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
111	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
112	-7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
113	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
114	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
115	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS WEST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
116	-7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
117	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
118	-7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
119	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
120		UN-USED ROOM NUMBER		
121	-7.0m	LAW MELTER 1 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
122	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
123	-7.0m	LAW MELTER 2 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
124	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
125		UN-USED ROOM NUMBER		
126	-7.0m	LAW MELTER 3 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
127	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
128		UN-USED ROOM NUMBER		
129	-7.0m	OFFICE	N/A	UNCONTROLLED ENTRY
130		UN-USED ROOM NUMBER		
131	-7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
132	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
133	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 3)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
134	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
135		UN-USED ROOM NUMBER		
136	-7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
137	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
138	-7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
139	-7.0m	VENTILATION COOLER ROOM FOR HLW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
140		UN-USED ROOM NUMBER		
141	-7.0m	HLW MELTER 1 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
142	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
143	-7.0m	VENTILATION COOLER ROOM FOR HLW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
144	-7.0m	HLW MELTER 2 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
145		UN-USED ROOM NUMBER		
146	-7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
147	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
148	-7.0m	OFFICE	N/A	UNCONTROLLED ENTRY
149	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS EAST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
150		UN-USED ROOM NUMBER		
151	-7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
152	-7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
153	-7.0m	PRODUCT STORE VENTILATION PLANT ROOM	VENTILATION COOLER, FANS	UNCONTROLLED ENTRY
154	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
155		UN-USED ROOM NUMBER		
156	-7.0m	LAW MELTER 1 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
157	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 4)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
158	-7.0m	LAW MELTER 2 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
159	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
160		UN-USED ROOM NUMBER		
161	-7.0m	LAW MELTER 3 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
162	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
163	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
164	-7.0m	UHP PUMP ROOM	UHP PUMPS AND ASSOCIATED VALVES	CONTROLLED ENTRY
165		UN-USED ROOM NUMBER		
166		UN-USED ROOM NUMBER		
167	-7.0m	LAW CONTAINER TRANSFER TUNNEL	BOGIE	UNCONTROLLED ENTRY
168	-7.0m	LAW POUR CELL BOGIE DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH/DECONTAMINATION FACILITIES	CONTROLLED ENTRY
169	-7.0m	LAW POUR CELL BOGIE MAINTENANCE CELL (EAST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
170		UN-USED ROOM NUMBER		
171	-7.0m	LAW POUR CELL BOGIE CABLE REELING ROOM (EAST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
172	-7.0m	LAW MELTER TRANSFER BOGIE CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
173	-7.0m	LAW POUR CELL BOGIE CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
174		UN-USED ROOM NUMBER		
175		UN-USED ROOM NUMBER		
176	-7.0m	LAW POUR CELL BOGIE MAINTENANCE CELL (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
177	-7.0m	LAW POUR CELL BOGIE DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH/DECONTAMINATION FACILITIES	CONTROLLED ENTRY
178	-7.0m	LAW MELTER 1 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
179	-7.0m	LAW MELTER 2 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
180		UN-USED ROOM NUMBER		
181	-7.0m	LAW MELTER 3 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
182	-7.0m	LAW POUR CELL	BOGIES, EJECTORS	NO ENTRY
183	-7.0m	LA/HL WASTE TRANSFER TUNNEL	BOGIE	NO ENTRY
184		UN-USED ROOM NUMBER		

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 5)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
185		UN-USED ROOM NUMBER		
186	-7.0m	HLW MELTER TRANSFER BOGIE CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
187	-7.0m	HLW CANISTER CARRIAGE CABLE REELING ROOM	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
188		UN-USED ROOM NUMBER		
189	-7.0m	HLW POUR CELL	BOGIES, EJECTORS	NO ENTRY
190		UN-USED ROOM NUMBER		
191		UN-USED ROOM NUMBER		
192	-7.0m	HLW MELTER A TRANSFORMER ROOM	TRANSFORMERS	UNCONTROLLED ENTRY
193	-7.0m	HLW MELTER A OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
194		UN-USED ROOM NUMBER		
195		UN-USED ROOM NUMBER		
196	-7.0m	HLW MELTER B TRANSFORMER ROOM	TRANSFORMERS	UNCONTROLLED ENTRY
197	-7.0m	HLW MELTER B OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
200		UN-USED ROOM NUMBER		
201		UN-USED ROOM NUMBER		
202		UN-USED ROOM NUMBER		
203		UN-USED ROOM NUMBER		
204		UN-USED ROOM NUMBER		
205		UN-USED ROOM NUMBER		
206		UN-USED ROOM NUMBER		
207		UN-USED ROOM NUMBER		
208		HLW OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
209		LAW OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
210	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
211	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
212	0.0m	PRE-TREATMENT SOLID WASTE ACCUMULATION AREA	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
213	0.0m	ULTRA FILTER HANDLING AREA	INSTRUMENT PANELS	UNCONTROLLED ENTRY
214	0.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
215		UN-USED ROOM NUMBER		
216	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
217	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
218	0.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 6)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
219	0.0m	BATTERY ROOM	N/A	UNCONTROLLED ENTRY
220	0.0m	INVERTER ROOM	N/A	UNCONTROLLED ENTRY
221	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
222	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
223	0.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
224	0.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
225		UN-USED ROOM NUMBER		
226	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
227	0.0m	LAW MELTER 1 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
228	0.0m	LAW MELTER 1 CONTROL ROOM	N/A	UNCONTROLLED ENTRY
229	0.0m	LAW MELTER 2 CONTROL ROOM	N/A	UNCONTROLLED ENTRY
230		UN-USED ROOM NUMBER		
231	0.0m	LAW MELTER 2 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
232	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
233	0.0m	LAW MELTER 3 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
234	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
235		UN-USED ROOM NUMBER		
236	0.0m	OFFICE	N/A	UNCONTROLLED ENTRY
237	0.0m	LAW MELTER 3 CONTROL ROOM	N/A	UNCONTROLLED ENTRY
238	0.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
239	0.0m	MANIPULATOR WORKSHOP	POWER TOOLS/MACHINERY	UNCONTROLLED ENTRY
240		UN-USED ROOM NUMBER		
241	0.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
242	0.0m	MECHANICAL HANDLING CE&I ROOM FOR INERT FILL/WELD LIDDING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
243	0.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 7)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
244	0.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
245		UN-USED ROOM NUMBER		
246	0.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
247	0.0m	VENTILATION COOLER ROOM FOR HLW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
248	0.0m	HLW MELTER 1 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
249	0.0m	HLW MELTER 1 CONTROL ROOM	N/A	UNCONTROLLED ENTRY
250		UN-USED ROOM NUMBER		
251	0.0m	HLW MELTER 2 CONTROL ROOM	N/A	UNCONTROLLED ENTRY
252	0.0m	HLW MELTER 2 TRANSFORMER ROOM	N/A	UNCONTROLLED ENTRY
253	0.0m	VENTILATION COOLER ROOM FOR HLW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
254	0.0m	MANIPULATOR WORKSHOP	POWER TOOLS/MACHINERY	UNCONTROLLED ENTRY
255		UN-USED ROOM NUMBER		
256	0.0m	OFFICE	N/A	UNCONTROLLED ENTRY
257	0.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
258	0.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
259	0.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
260		UN-USED ROOM NUMBER		
261	0.0m	SHIPPING CONTAINER HANDLING AREA	CONTAINER HANDLING EQUIPMENT AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
262	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
263	0.0m	C1/C2 CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	UNCONTROLLED ENTRY
264	0.0m	LOADING BAY	POWER TOOLS	UNCONTROLLED ENTRY
265		UN-USED ROOM NUMBER		
266		UN-USED ROOM NUMBER		
267		UN-USED ROOM NUMBER		
268		UN-USED ROOM NUMBER		
269	0.0m	LAW MELTER TRANSFER BOGIE MAINTENANCE CELL (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
270		UN-USED ROOM NUMBER		

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 8)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
271	0.0m	LAW MELTER TRANSFER BOGIE DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH /DECONTAMINATION FACILITIES	CONTROLLED ENTRY
272	0.0m	LAW CONTAINER RECEPTION AREA	CONTAINER LIFTING/TRANSPORT EQUIPMENT	CONTROLLED ENTRY
273	0.0m	LAW CONTAINER INTRODUCTION CELL	CONTAINER LIFTING/TRANSPORT EQUIPMENT	CONTROLLED ENTRY
274	0.0m	LAW MELTER CELL	MELTER, BOGIE, CRANES, MANIPULATORS, VESSELS, AND EJECTORS	NO ENTRY
275		UN-USED ROOM NUMBER		
276	0.0m	LAW BREAKDOWN CELL	MELTER, BOGIE, CRANES, MANIPULATORS, REDUCTION EQUIPMENT	NO ENTRY
277	0.0m	LAW MELTER TRANSFER BOGIE DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH /DECONTAMINATION FACILITIES	CONTROLLED ENTRY
278	0.0m	LAW MELTER TRANSFER BOGIE MAINTENANCE CELL (EAST)	POWER TOOLS, MACHINERY	CONTROLLED ENTRY
279	0.0m	LAW CONTAINER DECONTAMINATION, SWABBING, AND MONITORING CELL	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
280		UN-USED ROOM NUMBER		
281	0.0m	HLW MELTER TRANSFER BOGIE MAINTENANCE CELL (WEST)	POWER TOOLS, MACHINERY	CONTROLLED ENTRY
282	0.0m	CANISTER CARRIAGE MAINTENANCE CELL	POWER TOOLS, MACHINERY	CONTROLLED ENTRY
283	0.0m	CANISTER CARRIAGE DECONTAMINATION CELL	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
284	0.0m	HLW MELTER TRANSFER BOGIE DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
285		UN-USED ROOM NUMBER		
286	0.0m	CANISTER RECEPTION AREA	CANISTER LIFTING/TRANSPORT EQUIPMENT	CONTROLLED ENTRY
287	0.0m	HLW MELTER CELL	MELTER, BOGIE, CRANES, MANIPULATORS, VESSELS, AND EJECTORS	NO ENTRY
288	0.0m	HLW BREAKDOWN CELL	MELTERS, BOGIES, CRANES. MANIPULATORS. REDUCTION EQUIPMENT	NO ENTRY
289	0.0m	HLW LID PLACING & WELDING CELL	BOGIES, WELDERS, EJECTORS	NO ENTRY
290		UN-USED ROOM NUMBER		
291	0.0m	CANISTER DECONTAMINATION & SWABBING CELL	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
292	0.0m	HLW MELTER TRANSFER BOGIE DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
293	0.0m	HLW MELTER TRANSFER BOGIE MAINTENANCE CELL (EAST)	POWER TOOLS, MACHINERY	CONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 9)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
294		UN-USED ROOM NUMBER		
295		UN-USED ROOM NUMBER		
296	0.0m	HLW CANISTER 60 DAY STORE	CRANE, LIFTING EQUIPMENT	UN-CONTROLLED ENTRY
297	0.0m	LAW CONTAINER 60 DAY STORE	CRANE, LIFTING EQUIPMENT	UN-CONTROLLED ENTRY
300		UN-USED ROOM NUMBER		
301		UN-USED ROOM NUMBER		
302		UN-USED ROOM NUMBER		
303		UN-USED ROOM NUMBER		
304		UN-USED ROOM NUMBER		
305		UN-USED ROOM NUMBER		
306		UN-USED ROOM NUMBER		
307		UN-USED ROOM NUMBER		
308		UN-USED ROOM NUMBER		
309		UN-USED ROOM NUMBER		
310	+7.0m	AUTOSAMPLING PLANT MARSHALING AREA	AIR EXHAUSTERS, FILTERS & SAMPLE DIVERTERS	CONTROLLED ENTRY
311	+7.0m	CARRIER RECEIPT, DISPATCH AND MAINTENANCE AREA	SAMPLE CARRIER RECEIPT, DISPATCH, MAINTENANCE & STORAGE FACILITIES	CONTROLLED ENTRY
312	+7.0m	SAMPLE PREPARATION, DILUTION AND DISPATCH AREA	SHIELDED SAMPLE PREPARATION BULGE, INCLUDING MSM'S	CONTROLLED ENTRY
313	+7.0m	CORRIDOR	N/A	CONTROLLED ENTRY
314	+7.0m	SAMPLE PREPARATION CABINETS, ACCOUNTANCY & RESIDUE DISPOSAL AREA	FUMEHOODS/GLOVEBOXES & SAMPLE STORAGE AREA	CONTROLLED ENTRY
315		UN-USED ROOM NUMBER		
316	+7.0m	ICP, AAS, TITRATION & MISC. ANALYTICAL EQUIPMENT AREA	FUMEHOODS & ANALYTICAL EQUIPMENT	CONTROLLED ENTRY
317	+7.0m	BETA COUNTING & ACIDITY MONITORING AREA	FUMEHOODS & ANALYTICAL EQUIPMENT	CONTROLLED ENTRY
318	+7.0m	ALPHA/GAMMA SPECTROMETRY AREA	ANALYTICAL EQUIPMENT	CONTROLLED ENTRY
319	+7.0m	FUTURE ANALYTICAL EQUIPMENT	FUTURE EQUIPMENT	CONTROLLED ENTRY
320		UN-USED ROOM NUMBER		
321	+7.0m	CORRIDOR	N/A	CONTROLLED ENTRY
322	+7.0m	OFFICES/LAB ADMINISTRATION	GENERAL OFFICE/ADMIN FITMENTS	CONTROLLED ENTRY
323	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
324	+7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
325	+7.0m	COOLING WATER SUPPLY ROOM	HEAT EXCHANGERS AND PUMPS	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 10)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
326	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
327		UN-USED ROOM NUMBER		
328	+7.0m	PRE-TREATMENT COOLING WATER ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
329	+7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
330		UN-USED ROOM NUMBER		
331	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
332	+7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
333	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
334	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
335		UN-USED ROOM NUMBER		
336	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
337	+7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
338	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST/CONTAINER POSTING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
339	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
340		UN-USED ROOM NUMBER		
341		UN-USED ROOM NUMBER		
342	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
343	+7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
344	+7.0m	BATTERY ROOM	N/A	UNCONTROLLED ENTRY
345		UN-USED ROOM NUMBER		
346	+7.0m	INVERTER ROOM	N/A	UNCONTROLLED ENTRY
347	+7.0m	OFFICE	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
348	+7.0m	C& I	N/A	UNCONTROLLED ENTRY
349	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW VIT/BREAKDOWN CELL	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
350		UN-USED ROOM NUMBER		
351	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 11)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
352	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST/CONTAINER DECONTAM	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
353	+7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
354	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
355		UN-USED ROOM NUMBER		
356	+7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
357	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS WEST/CONTAINER POSTING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
358	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
359		UN-USED ROOM NUMBER		
360		UN-USED ROOM NUMBER		
361	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW VIT/BREAKDOWN CELL	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
362	+7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
363	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
364	+7.0m	OFFICE	N/A	UNCONTROLLED ENTRY
365		UN-USED ROOM NUMBER		
366	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS EAST/CONTAINER DECONTAM	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
367	+7.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
368	+7.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
369	+7.0m	PRODUCT STORE CRANE MAINTENANCE	POWER TOOLS	UNCONTROLLED ENTRY
370		UN-USED ROOM NUMBER		
371	+7.0m	LAW MELTER 1 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
372	+7.0m	LAW MELTER 2 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
373	+7.0m	LAW MELTER 3 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
400		UN-USED ROOM NUMBER		

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 12)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
401		UN-USED ROOM NUMBER		
402		UN-USED ROOM NUMBER		
403		UN-USED ROOM NUMBER		
404		UN-USED ROOM NUMBER		
405		UN-USED ROOM NUMBER		
406		UN-USED ROOM NUMBER		
407		UN-USED ROOM NUMBER		
408		UN-USED ROOM NUMBER		
409		UN-USED ROOM NUMBER		
410		UN-USED ROOM NUMBER		
411	+14.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
412		PRE-TREATMENT BULGE/CABINET ROOM	PUMP/VALVE BULGES, CABINETS AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
413	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
414	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
415	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
416	+14.0m	REAGENTS GALLERY	REAGENT VESSELS, PUMPS AND ASSOCIATED INSTRUMENT PANELS	UNCONTROLLED ENTRY
417	+14.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
418	+14.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
419	+14.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
420	+14.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
421		UN-USED ROOM NUMBER		
422		UN-USED ROOM NUMBER		
423		UN-USED ROOM NUMBER		
424	+14.0m	VESSEL VENT FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY
425		UN-USED ROOM NUMBER		
426	+14.0m	VESSEL VENT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
427	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
428	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
429	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
430		UN-USED ROOM NUMBER		
500		UN-USED ROOM NUMBER		
501		UN-USED ROOM NUMBER		
502		UN-USED ROOM NUMBER		

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 13)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
503		UN-USED ROOM NUMBER		
504		UN-USED ROOM NUMBER		
505		UN-USED ROOM NUMBER		
506		UN-USED ROOM NUMBER		
507		UN-USED ROOM NUMBER		
508		UN-USED ROOM NUMBER		
509		UN-USED ROOM NUMBER		
510		UN-USED ROOM NUMBER		
511	+21.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
512	+21.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
513	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
514	+21.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
515	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
516	+21.0m	ELECTRICAL	N/A	UNCONTROLLED ENTRY
517	+21.0m	C3 EXTRACT FILTER ROOM	HEPA FILTERS	CONTROLLED ENTRY
518	+21.0m	C2 EXTRACT FAN ROOM	VENTILATION FANS	UNCONTROLLED ENTRY
519	+21.0m	C3 EXTRACT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
520	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
521		UN-USED ROOM NUMBER		
522	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
523	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
524	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS WEST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
525	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
526		UN-USED ROOM NUMBER		
527	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
528	+21.0m	MELTER GLASS FORMER FEEDS	MELTER GLASS FORMER FEED DAY HOPPERS	UNCONTROLLED ENTRY
529	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
530		UN-USED ROOM NUMBER		
531	+21.0m	HLW VITRIFICATION CELL TOP	WASH CABINETS, STEAM VALVE BULGES	UNCONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 14)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
532	+21.0m	DUST LOCK	N/A	UNCONTROLLED ENTRY
533	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW & HLW GLASS FORMER FEED DAY HOPPERS	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
534	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
535		UN-USED ROOM NUMBER		
536	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR HLW SHIELD DOORS EAST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
537	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
538	+21.0m	LAW VITRIFICATION CELL TOP	WASH CABINETS, STEAM VALVE BULGES	UNCONTROLLED ENTRY
539	+21.0m	C2 SUPPLY VENTILATION PLANT ROOM	AIR HANDLING UNITS, FROST COILS	UNCONTROLLED ENTRY
540	+21.0m	VENTILATION SERVICES PLANT ROOM	N/A	UNCONTROLLED ENTRY
541	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
542	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
543	+21.0m	POWER DISTRIBUTION	N/A	UNCONTROLLED ENTRY
544	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR PRODUCT STORE SHIELD DOOR	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
545		UN-USED ROOM NUMBER		
546	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
547	+21.0m	PRE-TREATMENT FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY
548	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
549	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
550		UN-USED ROOM NUMBER		
551	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
552	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
553	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
554	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
555		UN-USED ROOM NUMBER		
556	+21.0m	LAW RECIRCULATION FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY

Table A-1. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW/HLW Option). (Sheet 15)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
557	+21.0m	LAW RECIRCULATION FANS & COILS AND C5 EXTRACT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
558	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UN-CONTROLLED ENTRY
559		UN-USED ROOM NUMBER		
560		UN-USED ROOM NUMBER		
561	+21.0m	STACK MONITORING	N/A	UN-CONTROLLED ENTRY

Notes:

1) UNCONTROLLED ENTRY

After deactivation C2 areas will be classified as uncontrolled entry. Entry to these areas will be via the main change room in the administration building. Paper (or similar) shoe covers shall be used on entry into the C2 areas.

Personnel when leaving the facility shall remove paper shoe covers, and wash/monitor.

Maximum radiation levels are expected to be less than 0.25 mr/hr. Maximum contamination level in spots < 4 Bq/cm2 (<24K dpm/100 cm2) Alpa, < 40 Bq/cm2 (<240K dpm/100 cm2) Beta. Mean airborn contamination 0.01 - 0.03 % DAC

The term uncontrolled entry refers to radiological controls and not personnel safety. After deactivation some C2 areas may be locked for personnel safety i.e. electrical switch rooms.

2) CONTROLLED ENTRY

After deactivation C3 AND C4 areas will be classified as controlled entry. Entry is by sub change room from C2 areas. These areas shall not be entered during safe storage.

Maximum radiation levels are expected to be less than 10 mr/hr. Maximum contamination level in spots 4 Bq/cm2 (24K dpm/100 cm2) Alpha, 40 Bq/cm2 (240K dpm/100 cm2) Beta. Mean airborn contamination 0.1 - 1.0 DAC

3) NO ENTRY

C5 areas are classified as no entry areas. Radiation Levels are not controlled. Contamination levels are greater than C3 areas.

4) ATTACHED DRAWINGS

Drawings 0 BE /1634033-8 attached ilustrate the position of the rooms within the proposed facility.

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 1)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
1	-14.0m	LAW FEED RECEIPT	IN-CELL VESSELS & PIPEWORK	NO ENTRY
2	-14.0m	LAW FEED RECEIPT & EVAPORATION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
3	-14.0m	ENTRAINED SOLIDS REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
4	-14.0m	LAW MELTER FEED EVAPORATION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
5		UN-USED ROOM NUMBER		
6	-14.0m	ENTRAINED SOLIDS STORAGE	IN-CELL VESSELS & PIPEWORK	NO ENTRY
7	-14.0m	PLANT EFFLUENT COLLECTION	IN-CELL VESSELS & PIPEWORK	NO ENTRY
8	-14.0m	RECOVERED NITRIC ACID STORAGE	IN-CELL VESSELS & PIPEWORK	NO ENTRY
9	-14.0m	LAW TECHNETIUM REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
10	-14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
11	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
12	-14.0m	PRE-TREATMENT BULGE ZONE	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
13	-14.0m	SUSPECT ACTIVE EFFLUENT COLLECTION	COLLECTION TANKS AND ASSOCIATED PUMPS	CONTROLLED ENTRY
14	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
15	-14.0m	NITRIC ACID RECOVERY	IN-CELL VESSELS & PIPEWORK	NO ENTRY
16	-14.0m	LAW CAESIUM REMOVAL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
17	-14.0m	LAW FEED TANK CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
18		UN-USED ROOM NUMBER		
19	-14.0m	C3 WORKSHOP	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
20		UN-USED ROOM NUMBER		
21	-14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
22	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
23	-14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
24	-14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
25		UN-USED ROOM NUMBER		
26	-14.0m	PRE-TREATMENT BULGE ZONE	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
100		UN-USED ROOM NUMBER		
101		UN-USED ROOM NUMBER		
102		UN-USED ROOM NUMBER		
103		UN-USED ROOM NUMBER		
104		UN-USED ROOM NUMBER		
105		UN-USED ROOM NUMBER		
106		UN-USED ROOM NUMBER		
107		UN-USED ROOM NUMBER		

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 2)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
108		UN-USED ROOM NUMBER		
1O9		UN-USED ROOM NUMBER		
110	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
111	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
112	-7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
113	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
114	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
115		UN-USED ROOM NUMBER		
116	-7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
117	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
118	-7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
119	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
120		UN-USED ROOM NUMBER		
121	-7.0m	LAW MELTER 1 TRANSFORMER ROOM	DIURETIC TO ADVISE	UNCONTROLLED ENTRY
122	-7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
123	-7.0m	LAW MELTER 2 TRANSFORMER ROOM	DIURETIC TO ADVISE	UNCONTROLLED ENTRY
124	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
125		UN-USED ROOM NUMBER		
126	-7.0m	LAW MELTER 3 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
127	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
128		UN-USED ROOM NUMBER		
129	-7.0m	OFFICE	N/A	UNCONTROLLED ENTRY
130		UN-USED ROOM NUMBER		
131	-7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
132	-7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
133	-7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
134	-7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST/BOGIE REELING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
135		UN-USED ROOM NUMBER		
136	-7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
137	-7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 3)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
138	-7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
139		UN-USED ROOM NUMBER		
140		UN-USED ROOM NUMBER		
141		UN-USED ROOM NUMBER		
142		UN-USED ROOM NUMBER		
143		UN-USED ROOM NUMBER		
144		UN-USED ROOM NUMBER		
145		UN-USED ROOM NUMBER		
146		UN-USED ROOM NUMBER		
147		UN-USED ROOM NUMBER		
148		UN-USED ROOM NUMBER		
149		UN-USED ROOM NUMBER		
150		UN-USED ROOM NUMBER		
151		UN-USED ROOM NUMBER		
152		UN-USED ROOM NUMBER		
153	-7.0m	PRODUCT STORE VENTILATION PLANT ROOM	VENTILATION COOLER, FANS	UNCONTROLLED ENTRY
154	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
155		UN-USED ROOM NUMBER		
156	-7.0m	LAW MELTER 1 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
157	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
158	-7.0m	LAW MELTER 2 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
159	-7.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
160		UN-USED ROOM NUMBER		
161	-7.0m	LAW MELTER 3 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
162	-7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
163	-7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
164	-7.0m	UHP PUMP ROOM	UHP PUMPS AND ASSOCIATED VALVES	CONTROLLED ENTRY
165		UN-USED ROOM NUMBER		
166		UN-USED ROOM NUMBER		
167	-7.0m	LAW CONTAINER TRANSFER TUNNEL	BOGIE	UNCONTROLLED ENTRY
168	-7.0m	LAW POUR CELL BOGIE DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH/DECONTAMINATION FACILITIES	CONTROLLED ENTRY
169	-7.0m	LAW POUR CELL BOGIE MAINTENANCE CELL (EAST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 4)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
170		UN-USED ROOM NUMBER		
171	-7.0m	LAW POUR CELL BOGIE CABLE REELING ROOM (EAST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
172	-7.0m	LAW MELTER TRANSFER BOGIE CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
173	-7.0m	LAW POUR CELL BOGIE CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
174		UN-USED ROOM NUMBER		
175		UN-USED ROOM NUMBER		
176	-7.0m	LAW POUR CELL BOGIE MAINTENANCE CELL (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
177	-7.0m	LAW POUR CELL BOGIE DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH/DECONTAMINATION FACILITIES	CONTROLLED ENTRY
178	-7.0m	LAW MELTER 1 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
179	-7.0m	LAW MELTER 2 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
180		UN-USED ROOM NUMBER		
181	-7.0m	LAW MELTER 3 OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
182	-7.0m	LAW POUR CELL	BOGIES, EJECTORS	NO ENTRY
183	-7.0m	Cs CANISTER TRANSFER TUNNEL	BOGIE	UN-CONTROLLED ENTRY
200		UN-USED ROOM NUMBER		
201		UN-USED ROOM NUMBER		
202		UN-USED ROOM NUMBER		
203		UN-USED ROOM NUMBER		
204		UN-USED ROOM NUMBER		
205		UN-USED ROOM NUMBER		
206		UN-USED ROOM NUMBER		
207		UN-USED ROOM NUMBER		
208		UN-USED ROOM NUMBER		
209		LAW OFF-GAS CELL	IN-CELL VESSELS & PIPEWORK	NO ENTRY
210	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
211	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
212	0.0m	PRE-TREATMENT SOLID WASTE ACCUMULATION AREA	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
213	0.0m	ULTRA FILTER HANDLING AREA	INSTRUMENT PANELS	UNCONTROLLED ENTRY
214	0.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
215		UN-USED ROOM NUMBER		
216	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 5)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
217	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
218	0.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
219	0.0m	BATTERY ROOM	BNI TO ADVISE	UNCONTROLLED ENTRY
220	0.0m	INVERTER ROOM	BNI TO ADVISE	UNCONTROLLED ENTRY
221	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
222	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
223	0.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
224	0.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
225		UN-USED ROOM NUMBER		
226	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 1 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
227	0.0m	LAW MELTER 1 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
228	0.0m	LAW MELTER 1 CONTROL ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
229	0.0m	LAW MELTER 2 CONTROL ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
230		UN-USED ROOM NUMBER		
231	0.0m	LAW MELTER 2 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
232	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 2 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
233	0.0m	LAW MELTER 3 TRANSFORMER ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
234	0.0m	VENTILATION COOLER ROOM FOR LAW MELTER 3 TRANSFORMERS	VENTILATION COOLER	UNCONTROLLED ENTRY
235		UN-USED ROOM NUMBER		
236	0.0m	OFFICE	N/A	UNCONTROLLED ENTRY
237	0.0m	LAW MELTER 3 CONTROL ROOM	DURATEK TO ADVISE	UNCONTROLLED ENTRY
238	0.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
239	0.0m	MANIPULATOR WORKSHOP	POWER TOOLS/MACHINERY	UNCONTROLLED ENTRY
240		UN-USED ROOM NUMBER		
241	0.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
242	0.0m	MECHANICAL HANDLING CE&I ROOM FOR INERT FILL/WELD LIDDING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
243	0.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
244	0.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
245		UN-USED ROOM NUMBER		

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 6)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
246	0.0m	MECHANICAL HANDLING CE&I ROOM FOR CAESIUM EXTRACTION CAVE (WEST)	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
247	0.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
248	0.0m	MECHANICAL HANDLING CE&I ROOM FOR CAESIUM EXTRACTION CAVE (EAST)	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
249	0.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
250		UN-USED ROOM NUMBER		
251	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
252	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
253	0.0m	POLAR CRANE, POWERED MANIPULATOR & GENERAL MAINTENANCE AREA (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
254	0.0m	POLAR CRANE, POWERED MANIPULATOR & GENERAL DECONTAMINATION AREA	MONITORING EQUIPMENT, WASH/ DECONTAMINATION FACILITIES	CONTROLLED ENTRY
255		UN-USED ROOM NUMBER		
256	0.0m	PROCESS CELL	CRANE, MANIPULATORS, PROCESS COLUMNS, VESSELS & EJECTORS	NO ENTRY
257	0.0m	HANDLING CELL	CRANE, MANIPULATORS & BOGIES	CONTROLLED ENTRY
258	0.0m	POLAR CRANE, POWERED MANIPULATOR & GENERAL MAINTENANCE AREA (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
259		UN-USED ROOM NUMBER		
260		UN-USED ROOM NUMBER		
261	0.0m	SHIPPING CONTAINER HANDLING AREA	CONTAINER HANDLING EQUIPMENT AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
262	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
263	0.0m	C1/C2 CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	UNCONTROLLED ENTRY
264	0.0m	LOADING BAY	POWER TOOLS	UNCONTROLLED ENTRY
265		UN-USED ROOM NUMBER		
266	0.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
267	0.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
268	0.0m	C2 WORKSHOP	POWER TOOLS/MACHINERY	UNCONTROLLED ENTRY
269	0.0m	LAW MELTER TRANSFER BOGIE MAINTENANCE CELL (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
270		UN-USED ROOM NUMBER		
271	0.0m	LAW MELTER TRANSFER BOGIE DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 7)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
272	0.0m	LAW CONTAINER RECEPTION AREA	CONTAINER LIFTING/TRANSPORT EQUIPMENT	CONTROLLED ENTRY
273	0.0m	LAW CONTAINER INTRODUCTION CELL	CONTAINER LIFTING/TRANSPORT EQUIPMENT	CONTROLLED ENTRY
274	0.0m	LAW MELTER CELL	MELTERS, BOGIES, CRANES, MANIPULATORS, VESSELS & EJECTORS	NO ENTRY
275		UN-USED ROOM NUMBER		
276	0.0m	LAW BREAKDOWN CELL	MELTERS, BOGIES, CRANES, MANIPULATORS, REDUCTION EQUIPMENT	NO ENTRY
277	0.0m	LAW MELTER TRANSFER BOGIE DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
278	0.0m	LAW MELTER TRANSFER BOGIE MAINTENANCE CELL (EAST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
279	0.0m	LAW CONTAINER DECONTAMINATION, SWABBING, AND MONITORING CELL	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
300		UN-USED ROOM NUMBER		
301		UN-USED ROOM NUMBER		
302		UN-USED ROOM NUMBER		
303		UN-USED ROOM NUMBER		
304		UN-USED ROOM NUMBER		
305		UN-USED ROOM NUMBER		
306		UN-USED ROOM NUMBER		
307		UN-USED ROOM NUMBER		
308		UN-USED ROOM NUMBER		
309		UN-USED ROOM NUMBER		
310	+7.0m	AUTOSAMPLING PLANT MARSHALING AREA	AIR EXHAUSTERS, FILTERS & SAMPLE DIVERTERS	CONTROLLED ENTRY
311	+7.0m	CARRIER RECEIPT, DESPATCH AND MAINTENANCE AREA	SAMPLE CARRIER RECEIPT, DESPATCH, MAINTENANCE & STORAGE FACILITIES	CONTROLLED ENTRY
312	+7.0m	SAMPLE PREPARATION, DILUTION AND DESPATCH AREA	SHIELDED SAMPLE PREPARATION BULGE, INCLUDING MSM'S	CONTROLLED ENTRY
313	+7.0m	CORRIDOR	N/A	CONTROLLED ENTRY
314	+7.0m	SAMPLE PREPARATION CABINETS, ACCOUNTANCY & RESIDUE DISPOSAL AREA	FUMEHOODS/GLOVEBOXES & SAMPLE STORAGE AREA	CONTROLLED ENTRY
315		UN-USED ROOM NUMBER		
316	+7.0m	ICP, AAS, TITRATION & MISC ANALYTICAL EQUIPMENT AREA	FUMEHOODS & ANALYTICAL EQUIPMENT	CONTROLLED ENTRY
317	+7.0m	BETA COUNTING & ACIDITY MONITORING AREA	FUMEHOODS & ANALYTICAL EQUIPMENT	CONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 8)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
318	+7.0m	ALPHA/GAMMA SPECTROMETRY AREA	ANALYTICAL EQUIPMENT	CONTROLLED ENTRY
319	+7.0m	FUTURE ANALYTICAL EQUIPMENT	FUTURE EQUIPMENT	CONTROLLED ENTRY
320		UN-USED ROOM NUMBER		
321	+7.0m	CORRIDOR	N/A	CONTROLLED ENTRY
322	+7.0m	OFFICES/LAB ADMINISTRATION	GENERAL OFFICE/ADMIN FITMENTS	CONTROLLED ENTRY
323	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
324	+7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
325		COOLING WATER SUPPLY ROOM	HEAT EXCHANGERS AND PUMPS	UNCONTROLLED ENTRY
326	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
327		UN-USED ROOM NUMBER		
328	+7.0m	PRE-TREATMENT COOLING WATER ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
329	+7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
330		UN-USED ROOM NUMBER		
331	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
332	+7.0m	PRE-TREATMENT BULGE ROOM	PUMP/VALVE BULGES AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
333	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
334	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
335		UN-USED ROOM NUMBER		
336	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
337	+7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
338	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST/CONTAINER POSTING	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
339	+7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
340		UN-USED ROOM NUMBER		
341		UN-USED ROOM NUMBER		
342	+7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
343	+7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
344	+7.0m	BATTERY ROOM	BNI TO ADVISE	UNCONTROLLED ENTRY
345		UN-USED ROOM NUMBER		
346	+7.0m	INVERTER ROOM	BNI TO ADVISE	UNCONTROLLED ENTRY
347	+7.0m	OFFICE	N/A	UNCONTROLLED ENTRY
348	+7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 9)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
349	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW VIT/BREAKDOWN CELL	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
350		UN-USED ROOM NUMBER		
351	+7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
352	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST/CONTAINER DECONTAM	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
353	+7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
354		UN-USED ROOM NUMBER		
355		UN-USED ROOM NUMBER		
356	+7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
357	+7.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
358	+7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
359	+7.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
360		UN-USED ROOM NUMBER		
361	+7.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
362	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR CAESIUM EXTRACTION CAVE EQUIPMENT (WEST)	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
363	+7.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
364	+7.0m	CAESIUM EXTRACTION CAVE FILTERS	FILTER HOUSINGS	CONTROLLED ENTRY
365		UN-USED ROOM NUMBER		
366	+7.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
367	+7.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
368		UN-USED ROOM NUMBER		
369	+7.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
370		UN-USED ROOM NUMBER		
371	+7.0m	LAW MELTER 1 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
372	+7.0m	LAW MELTER 2 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
373	+7.0m	LAW MELTER 3 PUMP BULGE/COOLING WATER ROOM	PUMP/VALVE BULGES AND COOLING WATER EQUIP PLUS ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
374	+7.0m	MECHANICAL HANDLING CE&I ROOM FOR CESIUM EXTRACTION CAVE EQUIPMENT (EAST)	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
375		UN-USED ROOM NUMBER		

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 10)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
376	+7.0m	PRODUCT STORE CRANE MAINTENANCE	POWER TOOLS	UNCONTROLLED ENTRY
377		UN-USED ROOM NUMBER		
378		UN-USED ROOM NUMBER		
379		UN-USED ROOM NUMBER		
380		UN-USED ROOM NUMBER		
381		UN-USED ROOM NUMBER		
382		UN-USED ROOM NUMBER		
383		UN-USED ROOM NUMBER		
384		UN-USED ROOM NUMBER		
385		UN-USED ROOM NUMBER		
386		UN-USED ROOM NUMBER		
387	+7.0m	LAW CRANE AND POWER MANIPULATOR CABLE REELING ROOM (WEST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
388	+7.0m	LAW CRANE AND POWER MANIPULATOR MAINTENANCE CELL (WEST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
389	+7.0m	LAW CRANE AND POWER MANIPULATOR DECONTAMINATION CELL (WEST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
390		UN-USED ROOM NUMBER		
391		UN-USED ROOM NUMBER		
392		UN-USED ROOM NUMBER		
393		UN-USED ROOM NUMBER		
394		UN-USED ROOM NUMBER		
395	+7.0m	LAW CRANE AND POWER MANIPULATOR DECONTAMINATION CELL (EAST)	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES	CONTROLLED ENTRY
396	+7.0m	LAW CRANE AND POWER MANIPULATOR MAINTENANCE CELL (EAST)	POWER TOOLS/MACHINERY	CONTROLLED ENTRY
397	+7.0m	LAW CRANE AND POWER MANIPULATOR CABLE REELING ROOM (EAST)	CABLE REELING EQUIPMENT	CONTROLLED ENTRY
400		UN-USED ROOM NUMBER		
401		UN-USED ROOM NUMBER		
402		UN-USED ROOM NUMBER		
403		UN-USED ROOM NUMBER		
404		UN-USED ROOM NUMBER		
405		UN-USED ROOM NUMBER		
406		UN-USED ROOM NUMBER		
407		UN-USED ROOM NUMBER		
408		UN-USED ROOM NUMBER		
409		UN-USED ROOM NUMBER		

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 11)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
410		UN-USED ROOM NUMBER		
411	+14.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
412		PRE-TREATMENT BULGE/CABINET ROOM	PUMP/VALVE BULGES, CABINETS AND ASSOCIATED INSTRUMENT PANELS	CONTROLLED ENTRY
413	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
414	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
415	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
416	+14.0m	REAGENTS GALLERY	REAGENT VESSELS, PUMPS AND ASSOCIATED INSTRUMENT PANELS	UNCONTROLLED ENTRY
417	+14.0m	C & I	CONTROL AND INSTRUMENT EQUIPMENT	UNCONTROLLED ENTRY
418	+14.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
419	+14.0m	ELECTRICAL	BNI TO ADVISE	UNCONTROLLED ENTRY
420	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
421	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
422	+14.0m	PRE-TREATMENT FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY
423		UN-USED ROOM NUMBER		
424	+14.0m	VESSEL VENT FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY
425		UN-USED ROOM NUMBER		
426	+14.0m	VESSEL VENT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
427	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
428	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
429	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
430		UN-USED ROOM NUMBER		
431	+14.0m	C2 EXTRACT FAN ROOM	VENTILATION FANS	UNCONTROLLED ENTRY
432	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
433	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
434	+14.0m	C3 EXTRACT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
435		UN-USED ROOM NUMBER		
436	+14.0m	C3 EXTRACT FILTER ROOM	HEPA FILTERS	CONTROLLED ENTRY
437	+14.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
438	+14.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
439	+14.0m	C2 SUPPLY VENTILATION PLANT ROOM	AIR HANDLING UNITS, FROST COILS	UNCONTROLLED ENTRY
440		UN-USED ROOM NUMBER		
441	+14.0m	VENTILATION SERVICES PLANT ROOM	BNI TO ADVISE	UNCONTROLLED ENTRY
442	+14.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
500		UN-USED ROOM NUMBER		

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 12)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel
501		UN-USED ROOM NUMBER		
502		UN-USED ROOM NUMBER		
503		UN-USED ROOM NUMBER		
504		UN-USED ROOM NUMBER		
505		UN-USED ROOM NUMBER		
506		UN-USED ROOM NUMBER		
507		UN-USED ROOM NUMBER		
508		UN-USED ROOM NUMBER		
509		UN-USED ROOM NUMBER		
510		UN-USED ROOM NUMBER		
511	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS WEST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
512	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
513	+21.0m	MELTER GLASS FORMER FEEDS	MELTER GLASS FORMER FEED DAY HOPPERS	UNCONTROLLED ENTRY
514	+21.0m	DUST LOCK	N/A	UNCONTROLLED ENTRY
515		UN-USED ROOM NUMBER		
516	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR GLASS FORMER FEED DAY HOPPERS	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
517	+21.0m	LAW VITRIFICATION CELL TOP	WASH CABINETS, STEAM VALVE BULGES	UNCONTROLLED ENTRY
518	+21.0m	LAW RECIRCULATION FILTER ROOM	FILTER HOUSINGS	CONTROLLED ENTRY
519	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
520		UN-USED ROOM NUMBER		
521	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
522	+21.0m	LAW RECIRCULATION FANS & COILS AND C5 EXTRACT FAN ROOM	VENTILATION FANS	CONTROLLED ENTRY
523	+21.0m	C2/C3 AIR LOCK	N/A	CONTROLLED ENTRY
524	+21.0m	C2/C3 SUB-CHANGE ROOM	MONITORING EQUIPMENT, WASH / DECONTAMINATION FACILITIES.	CONTROLLED ENTRY
525		UN-USED ROOM NUMBER		
526	+21.0m	SHIELD DOOR MAINTENANCE AREA	SHIELD DOOR OPERATING MECHANISM	UNCONTROLLED ENTRY
527	+21.0m	MECHANICAL HANDLING CE&I ROOM FOR LAW SHIELD DOORS EAST	MCC, CONTROL EQUIPMENT	UNCONTROLLED ENTRY
528	+21.0m	POWER DISTRIBUTION	BNI TO ADVISE	UNCONTROLLED ENTRY
529	+21.0m	STACK MONITORING	N/A	UNCONTROLLED ENTRY

Table A-2. TWRS-P Anticipated Personnel Entry Requirements for Each Room of the Deactivated Facility (LAW Only Option). (Sheet 13)

Room	Floor Level	Description	Equipment	Deactivated Facility - Room Entry Conditions For Personnel

Notes:

1) UNCONTROLLED ENTRY

After deactivation C2 areas will be classified as uncontrolled entry. Entry to these areas will be via the main change room in the administration building. Paper (or similar) shoe covers shall be used on entry into the C2 areas.

Personnel when leaving the facility shall remove paper shoe covers, and wash/monitor.

Maximum radiation levels are expected to be less than 0.25 mr/hr. Maximum contamination level in spots < 4 Bq/cm2 (<24K dpm/100 cm2) Alpa, < 40 Bq/cm2 (<240K dpm/100 cm2) Beta. Mean airborn contamination 0.01 - 0.03 % DAC

The term uncontrolled entry refers to radiological controls and not personnel safety. After deactivation some C2 areas may be locked for personnel safety i.e. electrical switch rooms.

2) CONTROLLED ENTRY

After deactivation C3 AND C4 areas will be clarified as CONTROLLED entry. Entry is by sub change room from C2 areas. These areas shall not be entered during safe storage.

Maximum radiation levels are expected to be less than 10 mr/hr. Maximum contamination level in spots 4 Bq/cm2 (24K dpm/100 cm2) Alpha, 40 Bq/cm2 (240K dpm/100 cm2) Beta. Mean airborn contamination 0.1 - 1.0 DAC

3) NO ENTRY

C5 areas are classified as no entry areas. Radiation Levels are not controlled. Contamination levels are greater than C3 areas.

4) ATTACHED DRAWINGS

Drawings 0 BE /1634113-8 attached ilustrate the position of the rooms within the proposed facility.

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