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Section 2 of 2

Document Information			
Document #	05-ESD-0083		
Title	CLASS 1 MOD TO THE HANFORD FACILITY RCRA PERMIT (QUARTER ENDING 06/30/2005)		
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- **Migration of Wastes.** The system shall prevent the migration of wastes or accumulated liquid out of the system to the soil, ground water, or surface water at any time during the use of the tank system. (WAC 173–303–640[4][b][i]) [Section 14.10.1.2, BOD]
- **Materials of Construction.** The liner shall be constructed of material that is compatible with the waste to be placed in the tank system. (WAC 173–303–640[4][c][i]) [Section 14.10.1.2, BOD]
- **Structure.** The liner shall be of sufficient strength and thickness to prevent failure owing to:
  - Pressure gradients, including static head and external hydrological forces
  - Physical contact with the waste
  - Climatic conditions
  - The stress of daily operation, including stresses from nearby vehicle traffic. (WAC 173–303–640[4][c][i]) [Section 14.10.1.2, BOD]
- **Supporting Base.** The liner shall be placed on a foundation or base capable of:
  - Supporting the secondary containment system
  - Resisting the pressure gradients above and below the system
  - Preventing failure due to settlement, compression, or uplift (WAC 173303640[4][c][ii]) [Section 14.10.1.2, BOD]
- **Slope.** The liner shall slope or be operated to drain and remove liquids resulting from leaks, spills, or precipitation within 24 hours of a leak detection. (WAC 173–303–640[4][c][iv]) [Section 14.10.1.2, BOD]
- **Remove Liquid.** The system shall remove spills, leaks, or accumulated liquid from the secondary containment system within 24 hours or in as timely a manner as possible (Note: Ecology must be notified if the removal of releases or accumulated liquid cannot be accomplished within 24 hours). (WAC 173–303–640[4][c][iv]) [Section 14.10.1.2, BOD]
- **Inspection.** The system shall provide the means to inspect the visible portion of the secondary containment system on a daily basis. (WAC 173–303–640[6][b][iii]) [Section 14.10.1.2, BOD]

4.3.2.3 External Liners

In addition to the liner requirements identified above, external liners used as secondary containment shall comply with the following:

- **Capacity.** The liner shall contain 100 % of the capacity of the largest tank (WAC 173–303–640[4][e][i][A]). One hundred percent capacity means the total volume of the tank. The volume is not the expected process volume of the tank or the volume at the level where overflow prevention measures are implemented. [Section 14.10.1.2.1, BOD]
- **Fire Water.** As applicable, the liner shall be designed to handle a volume of fire-protection water from the fire protection system over the minimum design area for a period of 20 minutes in addition to the 100 % capacity of the largest tank. (*Uniform Building Code*, 307.2.4. 1997) [Section 14.10.1.2.1, BOD]
- **Fire water drainage and containment.** Fire water drainage and containment design shall be in accordance with NFPA 801 and the Uniform Building Code. [Section 13.6.3, BOD]
- **Cracks or Gaps.** The liner shall be free of cracks or gaps. (WAC 173–303–640[4][e][i][C]) [Section 14.10.1.2.1, BOD]
- **Layout.** The liner shall surround the tank completely and cover all surrounding earth likely to come into contact with the waste if it were released from the tank (that is, be capable of preventing lateral as well as vertical migration of the waste). (WAC 173–303–640[4][e][i][D]) [Section 14.10.1.2.1, BOD]

- **Secondary Containment of Piping.** Where process pipes exit cells, the secondary containment shall be maintained by the use of either a coaxial pipeline system or the provision of a stainless steel liner. If a liner is chosen, then a fully enclosed secondary containment system shall be provided when the primary containment (the pipe) is subject to pressure above normal pressures for gravity systems. [Section 11.3.5.2, BOD]
- **Draining of Secondary Containment.** All secondary containments shall be provided with drains. [Section 11.3.5.2, BOD]

4.3.2.4 Detection and Control of a Release

The following requirements pertain to the detection of a release:

- **Detection and Collection of Releases.** All secondary containments shall be provided with leak detection systems for detection of primary containment leaks. [Section 11.3.5.2, BOD] The system shall detect and collect releases and accumulated liquids until the collected material is removed (WAC 173–303–640[4][b][ii]). [Section 14.10.1.2, BOD]
- **Leak Detection.** The system shall provide a leak-detection system that will detect the failure of primary tank system or the secondary containment system, the presence of any release of mixed or dangerous waste, or accumulated liquid in the secondary containment system within 24 hours of a leak (WAC 173–303–640[4][c][iii]) [Section 14.10.1.2, BOD]
- **Detection of Piping Leaks.** Coaxial lines (pipe-in-pipe) shall have on-line primary containment leak detection capability. [Section 14.3, ORD]

The following requirements pertain to the control of a release:

- **Engineered Overflows.** In the event that controls fail to stop overfilling, engineered overflows shall prevent liquid from entering the vessel ventilation system. Vessels or systems that normally operate above atmospheric pressures are not provided with overflows. [Section 6.6.5, BOD]
- **Overflow System Availability.** The overflow system for any vessel must be instantaneously and continuously available for use. [Section 6.6.5, BOD]
- **Recipient Vessel Compatibility.** The compatibility of the overflowing liquid and the recipient vessel shall be confirmed. [Section 6.6.5, BOD]
- **Overflow Routing.** Overflow systems must meet the requirements of WAC 173–303, *Dangerous Wastes Regulations*. In meeting this requirement, overflowing direct to the cell floor shall only be considered as the last overflow in a cascaded system. Where an overflow is from a vessel to the cell, the overflow system maintains segregation of the cell and vessel ventilation systems. Any deviation from this requirement or those of the code is referred to WTP Environmental and Nuclear Safety (E&NS). [Section 6.6.5, BOD]
- **Overflow Recipient Vessel Size.** The overflow receiver shall be sufficiently sized to contain the overflow. [Section 6.6.5, BOD]
- **Overflow Line Size.** A vessel overflow line is sized to handle the maximum inflow to the vessel without the liquid level in the overflowing tank reaching an unacceptably high level. No valves or other restrictions are permitted in the overflow line. This line is also designed to prevent the buildup of material that could cause blockages. [Section 6.6.5, BOD]
- **Return of the Overflow Stream.** Overflowed process streams must be returned to the waste treatment process. [Section 6.6.5, BOD]
- **Decontamination.** The system shall include design features to safely and efficiently facilitate cell and wall flushing capabilities where there is a potential for leakage of radioactive and hazardous materials. [Section C.7(a)(12), *DOE / BNI Contract*] [CCN 052452]

4.4 Access Control

Access to hazardous areas of the system shall be controlled as follows:

- **Access to Vessel Areas.** The system shall restrict access to the vessel areas, thus limiting operator exposure. [Section 3.3.3.7, SED]
- **C5/R5 areas.** The system shall restrict access to C5/R5 areas. [Section 3.3.3.7, SED]
- **Valve and Pump Vaults.** Controlled access to valve and pump vaults. [Section 3.3.3.7, SED]
- **Tank Signage.** Tank systems shall be marked with signs or labels that are visible at a distance for 50 feet, where routine personnel access is required. (WAC 173–303–640[5][d]) [Section 14.10.1.1, BOD]
- **Content Warning.** The system shall provide signs or labels with a legend identifying the material within the tank system, to warn employees, emergency response personnel, and the public of major risks associated with the material. (WAC 173–303–640[5][d]) [Section 14.10.1.1, BOD]
- **Valve Lockout.** Valves shall be designed/procured where possible to support lockout using commercially manufactured devices other than chains. Any exceptions must be approved by the applicable Operations Lead. [Section 7.1, ORD]]
- **ALARA Standard.** The system shall be designed, constructed, and operated in compliance with the as low as reasonably achievable (ALARA) requirements of 10 CFR 835. [Section 8.1.3.1.1, ORD]
- **Radiation Exposure to Workers.** Radiation exposure to workers shall be maintained ALARA, economic factors being taken into account, and no exposure shall be authorized without the expectation of a net positive benefit from the activity. [Section 8.1.3.1.1, ORD]

5 Design Standardization

RLD design is standardized by the use of standard industrial equipment for the vessels and ancillary equipment. Standard industrial practices are used in the design, sizing, material selection, and component selection.

The items below are examples of standardized equipment concepts for which standard designs exist in the RLD system.

- Cell equipment: Process valves, vessels, piping, and materials of construction of RLD vessels
- Out-cell process equipment: instrumentation
- Plant items performing similar duties will be standardized, as possible, so that one make, model, and size can be used in all similar applications. This philosophy will reduce and simplify operational spares inventory.
- Consumable items (for example, fasteners, pipe fittings, and gaskets) will be standardized, as possible, with regard to thread standards and material selection (especially gasket material). This will reduce stock holding and the risk of installation of incorrect material.

6 Description

The LAB RLD collects liquid effluents from throughout the LAB and provides interim storage before transfer. The RLD is the last collection point in the LAB for liquid effluent before it is transferred to PTF, BOF NLD tank (C2 vessel only), or a tanker truck (optionally prior to hot commissioning). A

simplified flow diagram of liquid effluent in the RLD is in Figure A-1. Major equipment in the LAB RLD is described in Sections 6.1.1 through 6.2.8, below.

6.1 Process Description

6.1.1 Floor Drain Collection Vessel (RLD-VSL-00163)

The floor drain collection vessel (RLD-VSL-00163) functions include collection, containment, sampling, staging, and transfer of typically non-contaminated liquid effluent. The floor drain collection vessel is located in a cell underneath the C2/C3 filter/fan room (Room A-0160) in the LAB. The vessel and cell are large enough to handle anticipated upset events. In the event of a fire, the contents of the vessel may overflow into the vessel cell.

Sampling capability for RLD-VSL-00163 is provided by a grab sample from a tap off the discharge of the floor drain collection vessel pumps (RLD-PMP-00190A/B). After development of an initial waste profile, the contents of RLD-VSL-00163 will be allowed to transfer to the NLD storage tank (NLD-TK-00001), if radioactive screening analysis shows that the contents of the C2 vessel are not contaminated. Periodic samples receive full analysis to ensure Treated Effluent Disposal Facility (TEDF) criteria are met.

During routine operations, the C2 liquid effluent is transferred to the laboratory area sink drain collection vessel (RLD-VSL-00164), the hotcell drain collection vessel (RLD-VSL-00165), or the NLD storage tank in BOF (NLD-TK-00001). Prior to hot commissioning, it may be transferred to a tanker truck. There is an air gap or backflow preventer at the tanker truck.

The cell area provides buffer volume and the associated sump is equipped with leak detection. The cell area is used to collect any vessel overflow or leakage from the RLD.

Vessel RLD-VSL-00163 is vented to the C2 ventilation system. An airflow velocity is maintained through the C2 drain collection network, RLD-VSL-00163, and into the HVAC C2 exhaust system to minimize potential cross-contamination between C2 areas without the use of loopseals.

A floor drain collection vessel pump (RLD-PMP-00190A) is installed for discharging vessel and sump contents, and sampling vessel contents. An additional floor drain collection vessel pump (RLD-PMP-00190B) is installed for redundancy.

When required, vessel washings are transferred to the hotcell drain collection vessel (RLD-VSL-00165) during normal operations. A manual hose station is located in the vicinity of the C2 vessel for vessel washing.

6.1.2 Laboratory Area Sink Drain Collection Vessel (RLD-VSL-00164)

The laboratory area sink drain collection vessel (RLD-VSL-00164) functions include collection, containment, staging, and transfer of radioactive liquid streams. The laboratory area sink drain collection vessel (RLD-VSL-00164) is designed in accordance with applicable sections of ASME VIII, Div. 1. Similarly, the RLD-VSL-00164 vessel system is designed to meet applicable secondary containment, leak detection, integrity, and other criteria defined in WAC 173-303-640. The laboratory area sink drain collection vessel is located in a stainless steel lined cell underneath the C2/C3 filter/fan room (Room A-0160) in the LAB. The cell is designed as a C3 area. There is no cell access during normal operations.

The vessel is large enough to handle anticipated upset events. In the event of a fire, the contents of the vessel may overflow into the vessel cell.

During routine operations, vessel RLD-VSL-00164 discharges to the hotcell drain collection vessel (RLD-VSL-00165). The space to accommodate an alternate destination of the C3 effluent is available. This possible future connection would require the installation of a new spool piece to allow the transfer to the PTF plant wash vessel (PWD-VSL-00044). Prior to hot commissioning, it may be transferred to a tanker truck. There is an air gap or backflow preventer at the tanker truck.

The maximum (bounding) inventory of RLD-VSL-00164 is 3500 - 40 mL LCP01 stream sample equivalents. This LCP01 LAW material has the maximum radioactivity level operationally acceptable for entry into the Rad Labs. Due to the amount of water generated from analyzing a sample it is not likely that RLD-VSL-00164 will ever contain 3500 sample equivalents based on the logic described in *Volume of Aqueous Waste Generated by WTP Laboratory Operations* (24590-LAB-M0C-RLD-00005). Although this calculation is not specifically written for RLD-VSL-00164, the same methodology applies.

The partially stainless steel lined cell area provides secondary containment and the associated sump is equipped with leak detection. The cell area is used to collect any vessel overflow or leakage from the RLD. Areas above the liner are bare concrete and exposed steel that are not designed to support decontamination or allow manned entry.

The laboratory area sink drain collection vessel (RLD-VSL-00164) and drain traps are vented to the C3 ventilation system.

A laboratory area sink drain collection vessel pump (RLD-PMP-00182A) recirculates vessel contents through eductors for mixing. An additional laboratory area sink drain collection vessel pump (RLD-PMP-00182B) is installed for redundancy. Secondary containment with leak detection is provided for the pumps and valves by the pump pit and the pump pit sump.

Washrings are provided for both vessel and vessel cell rinsing to support maintenance activities or decontamination in the event of a spill. When required, vessel washings are discharged to the hotcell drain collection vessel (RLD-VSL-00165) during normal operations. In addition, the C3-to-C5 transfer line will be flushed following transfers with two pipeline volumes of demineralized water (24590-WTP-RPT-PR-02-001). The DIW is capable of supplying 120 % of the design flow for this flushing. The requirement to flush the transfer line following each transfer is based on engineering judgment and is intended to satisfy assumptions made during the corrosion evaluations of the LAB RLD vessels and the associated piping. Although a C3-to-C5 transfer line flush is discretionary (24590-WTP-RPT-PR-02-001), flushing following transfers is deemed to be necessary because the contents of the laboratory area sink drain collection vessel (RLD-VSL-00164) have the potential to contain concentrations of halides that could result in pitting of the piping. Based on a typical Analytical Laboratory conceptional flow rate of 51 gpm, a transfer line length of approximately 200 ft, and limiting the flush flow rate to a maximum of 72 gpm, the flush operation is anticipated to take approximately 2 minutes (pending Calculation 24590-LAB-M6C-DIW-00003).

6.1.3 Hotcell Drain Collection Vessel (RLD-VSL-00165)

The hotcell drain collection vessel (RLD-VSL-00165) functions include collection, containment, staging, and transfer of radioactive liquid streams. The hotcell drain collection vessel (RLD-VSL-00165) is designed in accordance with applicable sections of ASME VIII, Div. 1. Similarly, the RLD-VSL-00165

vessel system is designed to meet applicable secondary containment, leak detection, integrity, and other criteria defined in WAC 173-303-640. The hotcell drain collection vessel is located in a partially stainless steel lined cell under the C5 pump maintenance room (Room A-0167) in the LAB. The cell is designated as a C5 area. There is no cell access during normal operations. The vessel is large enough to handle anticipated upset events. In the event of a fire, the contents of the vessel may overflow into the vessel cell.

During routine operations, the hotcell drain collection vessel discharges to the PTF plant wash vessel (PWD-VSL-00044). Prior to hot commissioning, the contents of the vessel may be transferred to a tanker truck. There is an airgap or backflow preventer at the tanker truck.

The maximum (bounding) inventory of the C5 Vessel is 1500 - 20 mL FRP01 (DOE Feed Material) stream sample equivalents. This sample inventory includes up to 12 L (= 600 - 20 mL samples) of sample material to support diagnotics of process upsets, optimization and improvements to limited technology, and other unscheduled samples. This 12 L of sample material may be located in the hotcells or in the C5 vessel (RLD-VSL-00165) or a combination of these two locations. All the samples will contain liquid material. This FRP01 material conservatively represents the radioactivity level of samples entering the laboratory hotcells. Due to the amount of water generated from analyzing a sample, it is not likely that RLD-VSL-00165 will ever contain 1500 sample equivalents based on the logic described in *Volume of Aqueous Waste Generated by WTP Laboratory Operations* (24590-LAB-M0C-RLD-00005).

The partially stainless steel lined cell area provides secondary containment and the associated sump is equipped with leak detection. The cell area is used to collect any vessel overflow or leakage from the RLD. Areas above the liner are bare concrete and exposed steel that are not designed to support decontamination or allow manned entry.

Vessel RLD-VSL-00165 is vented to the C5 ventilation system. An airflow velocity is maintained through the C5 drain collection network, RLD-VSL-00165, and into the HVAC C5 exhaust system to minimize cross contamination between the hotcells without the need for loopseals.

A hotcell drain collection vessel pump (RLD-PMP-00183A) recirculates vessel contents through eductors for mixing. An additional hotcell drain collection vessel pump (RLD-PMP-00183B) is installed for redundancy. Secondary containment with leak detection is provided for the pumps and valves by the pump and piping pits and the respective sumps.

Washrings are provided for both vessel and vessel cell rinsing to support maintenance activities, or in the event of a spill. When required, vessel washings are transferred to the PTF plant wash vessel (PWD-VSL-00044) during normal operations. The transfer lines will be flushed following transfers with two pipeline volumes of demineralized water (24590-WTP-RPT-PR-02-001). The DIW is capable of supplying 120 % of the design flow for flushing. The requirement to flush the transfer line following each transfer is based on engineering judgment and is intended to satisfy assumptions made during the corrosion evaluations of the LAB RLD vessels and the associated piping. Flushing following transfers is deemed to be necessary because the contents of the hotcell drain collection vessel (RLD-VSL-00165) have the potential to contain concentrations of halides that could result in pitting of the piping. Based on a typical Analytical Laboratory conceptional flow rate of 51 gpm, a transfer line length of approximately 1500 ft, and limiting the flush flow rate to a maximum of 72 gpm, the flush operation is anticipated to take approximately 16 minutes (pending Calculation 24590-LAB-M6C-DIW-00003).

6.2 Equipment Description

6.2.1 Floor Drain Collection Vessel (RLD-VSL-00163) and associated pumps

Design documents associated with the floor drain collection vessel (RLD-VSL-00163) are listed in Table 6-2. The floor drain collection vessel (RLD-VSL-00163) is made of 316L SS to ensure containment for a 40 year life (24590-LAB-MVD-RLD-00163). The vessel is equipped with level instrumentation used to maintain the vessel level within the acceptable operating range.

The floor drain collection vessel pumps (RLD-PMP-00190A/B), which are self-priming, magnetic-drive, centrifugal pumps, are installed to recirculate the contents of vessel RLD-VSL-00163 for agitation and sampling purposes, and to transfer the vessel contents. The pumps are also used to empty the contents of the sump (RLD-SUMP-00040) in the non-routine event that the sump fills with fluid. The pumps are located on a platform in the cell containing the floor drain collection vessel. Design documents associated with the floor drain collection vessel pumps (RLD-PMP-00190A/B) are listed in Table 6-2. Based on engineering judgment, contents of the vessel should be turned over 3 times to mix the contents prior to transferring. The contents of RLD-VSL-00163 are expected to be mostly water. Therefore, turning the contents of the vessel over 3 times should adequately mix the vessel contents. Based on an anticipated pump flow rate of approximately 60 gpm for the aforementioned mode of operation and a vessel high-alarm volume of 1050 gal, the operation is anticipated to require approximately one hour.

6.2.2 Laboratory Area Sink Drain Collection Vessel (RLD-VSL-00164) and associated pumps

Design documents associated with the laboratory area sink drain collection vessel (RLD-VSL-00164) are listed in Table 6-2. The laboratory area sink drain collection vessel (RLD-VSL-00164) is made of a 6 % molybdenum alloy to ensure containment for a 40 year life (24590-LAB-MVD-RLD-00164). The vessel is equipped with level instrumentation used to maintain the vessel level within the acceptable operating range and detect primary containment leakage. The vessel is also equipped with washrings for vessel washdown and three tank mixing eductors (TMEs). The TMEs are venturi jet devices that use pressurized liquid to entrain solids and mix the vessel contents.

The laboratory area sink drain collection vessel pumps (RLD-PMP-00182A/B), which are self-priming, magnetic-drive, centrifugal pumps, are installed to discharge the contents of vessel RLD-VSL-00164 during routine operations and to discharge the contents of the sump (RLD-SUMP-00041) in the non-routine event that the sump fills with fluid. The laboratory area sink drain collection vessel pumps are located in a pit. Clamp (Grayloc) connections on the connecting piping and special fasteners for anchorage of the pump baseplate facilitate rapid hands-on removal of the pumps. Design documents associated with the laboratory area sink drain collection vessel pumps (RLD-PMP-00182A/B) are listed in Table 6-2. Based on engineering judgment, contents of the vessel should be turned over 1.5 times to mix the contents prior to transferring. Because of the low level of solids expected in RLD-VSL-00164 and the entrainment characteristics of the TMEs, turning the contents of the vessel over 1.5 times should adequately mix the vessel contents. Based on an anticipated pump flow rate of approximately 140 gpm for the aforementioned mode of operation and a vessel high-alarm volume of 1484 gal, the operation is anticipated to require approximately 16 minutes.

6.2.3 Hotcell Drain Collection Vessel (RLD-VSL-00165) and associated pumps

Design documents associated with the hotcell drain collection vessel (RLD-VSL-00165) are listed in Table 6-2. The hotcell drain collection vessel (RLD-VSL-00165) is made of a 6 % molybdenum alloy to ensure containment for a 40 year life (24590-LAB-MVD-RLD-00165). The vessel is equipped with level instrumentation used to maintain the vessel level within the acceptable operating range and detect primary containment leakage. The vessel is also equipped with washrings for vessel washdown and eight TMEs (venturi jet devices that use pressurized liquid to entrain solids and mix the vessel contents).

The hotcell drain collection vessel pumps (RLD-PMP-00183A/B), which are self-priming, magnetic-drive, centrifugal pumps, are installed to discharge the contents of vessel RLD-VSL-00165 during routine operations and to discharge the contents of sump RLD-SUMP-00042 in the off-normal event that the sump fills with fluid. The hotcell drain collection vessel pumps (RLD-PMP-00183A/B) are located in pits. Pumps RLD-PMP-00183A/B and valves are located in separate pits due to ALARA considerations during postulated maintenance activities. Clamp (Grayloc) connections on the connecting piping and special fasteners for anchorage of the pump baseplate facilitate rapid hands-on removal of the pumps. Design documents associated with the hotcell drain collection vessel pumps (RLD-PMP-00183A/B) are listed in Table 6-2. Based on engineering judgment, contents of the vessel should be turned over 1.5 times to mix the contents prior to transferring. Because of the low level of solids expected in RLD-VSL-00165 and the entrainment characteristics of the TMEs, turning the contents of the vessel over 1.5 times should adequately mix the vessel contents. Based on an anticipated pump flow rate of approximately 90 gpm for the aforementioned mode of operation, one-pump recirculation, and a vessel high-alarm volume of 5408 gal, the operation is anticipated to require approximately 1.5 hours.

6.2.4 Cells

There are three cells associated with the RLD System:

C2 fire water vault (C2 cell)	A-B001
C3 effluent vessel cell (C3 cell)	A-B003
C5 effluent vessel cell (C5 cell)	A-B004.

The cells are structural compartments that house the respective RLD vessels. The C2 Cell is also referred to as the "C2 Vault" or the "C2 Fire Water Vault". All three cells are sized to accommodate the volume of the associated vessel, the associated vessel piping, and the associated fire water overflow volume.

In the C3 and C5 Cells, the floors and the perimeter walls, up to the maximum height of the fire water (24590-LAB-M6C-RLD-00016) overflow volume, are covered by a stainless steel liner. The walls above the overflow volume are concrete sealed by a special-protective coating. Similarly, the floor and walls of the C2 Cell are concrete sealed by special-protective coating.

Each cell includes a sump and the floors of the cells are sloped to direct potential leakage to their respective sumps as discussed below:

- C2 vessel cell sump (RLD-SUMP-00040) collects leakage from the floor drain collection vessel (RLD-VSL-00163)
- C3 vessel cell sump (RLD-SUMP-00041) collects leakage from the laboratory area sink drain collection vessel (RLD-VSL-00164)

- C3 pump pit sump (RLD-SUMP-00045) collects leakage from the pipes, valves, and pumps (RLD-PMP-00182A/B) for the laboratory area sink drain collection vessel
- C5 vessel cell sump (RLD-SUMP-00042) collects leakage from the hotcell drain collection vessel (RLD-VSL-00165)
- Two C5 pump pit sumps (RLD-SUMP-00043A/B) collect leakage from the pipes and pumps (RLD-PMP-00183A/B) for the hotcell drain collection vessel
- C5 piping pit sump (RLD-SUMP-00044) collects leakage from the pipes and valves for the hotcell drain collection vessel.

The sumps collect potential leakage from the respective waste vessel in the area. Instrumentation associated with each sump monitors the sumps for signs of accumulated leakage from the respective cell area.

As mentioned previously, the cells are provided with a wash station (C2) or washrings (C3 and C5) to support maintenance activities or facilitate decontamination in the event of a spill. The washwater is collected in the respective cell sump.

With the exception of the C5 Cell, the cell sumps can be emptied by the respective RLD pumps. In the case of the C5 Cell, the C5 vessel cell sump (RLD-SUMP-00042) is emptied by RLD-PMP-00183A. The sumps are a component of the secondary containment system for the regulated-waste vessels. Therefore, wastes collected in the cell areas of the laboratory area sink drain collection vessel and hotcell drain collection vessel are emptied within 24 hours or as practical. The floor drain collection vessel sump, as a sump for a non-regulated vessel, will be emptied to meet operational needs.

The C2 Cell is designed for regular human access. Conversely, the C3 and C5 Cells have access-plug openings for human access. However, planned human entries in these areas will be restricted.

6.2.5 Pits

There are four pits associated with the RLD System:

C3 Pump Pit	A-B002
C5 Pump Pit (south)	A-B007
C5 Pipe Pit	A-B006
C5 Pump Pit (north)	A-B005.

The pits are structural compartments that house maintainable equipment in segregated locations were the equipment is readily accessible for maintenance and remote manual operation, the area can be readily decontaminated to support maintenance activities, and the equipment is shielded from high radiation fields emanating from the vessels.

The pits are lined with stainless steel for secondary containment and ease of decontamination prior to anticipated maintenance activities in the area. Each pit includes a sump and the floors of the pits are sloped to direct potential leakage to their respective sumps. The sumps collect potential leakage from the pumps, valves, or piping in the area. Instrumentation associated with each sump monitors the sumps for signs of accumulated leakage from the respective pit area.

Each sump is plugged by a removable weir. With the weir installed, a detectable level is formed in the sump to allow the level detection instrumentation to sense potential leaks. Persistent leakage spills over the weir and returns to the respective vessel. In the event that leakage is detected, an operator manually withdraws the weir from the sump via an extended drive spindle and allows the sump to drain. The operator then diagnoses the source of the leak. The weir may also be withdrawn during maintenance to preclude the accumulation of a residual volume of washwater in the sump.

The pits are provided with washrings to support maintenance activities or facilitate decontamination in the event of a spill. The drainlines from the pit sumps to the vessels are sized to handle the anticipated washwater flow. This capacity is anticipated to bound postulated moderated-energy cracks of the regularly-pressurized pump discharge piping.

Access to the pits is achieved via the removal of the pit covers. The pit covers for the C5 pump pits and the C5 piping pit are concrete panels covered by a stainless steel lining. The concrete provides the bulk of the radiation shield, while the lining facilities decontamination of the covers. The C5 pump pit covers include an opening for the lifting and removal of a weir. The C5 pump pit cover includes openings for the removable weir, automated valves, manual valves, and instrumentation. The valve sleeve design and the instrumentation layout, combined with the openings in the pit cover allows for maintenance of the valves and instrumentation without the removal of the pit cover. The pit cover for the C2 and C3 pits consists of a number of removable panels designed to remain within the lifting weight of the available forklift capacity. Each panel consists of checkered plate fastened above metal decking. Each panel is designed to accommodate the wheel loads of the anticipated vehicular traffic in the area. One of the panels of the C3 pit cover includes an access lid for lifting of the removable weir for the C3 pit sump.

6.2.6 Piping and Materials

System piping is generally 316L stainless steel. Piping from the AHL and ARL process drains up to and including the respective collection vessel is typically a higher-grade alloy due to the goal of achieving a 40-year design life without concerns for operational upset (e.g., failure to properly flush after disposal of a sample) - (CCN 080543). In these cases, the piping is typically hastelloy C-22 (N06022) and the vessels are 6% moldbdenum alloy (N08367).

Pipe that conveys dangerous wastes from one containment area to another is double-walled. The jackets of the double-wall piping are typically carbon steel. In areas where ease of decontamination of the pipe exterior is important, the jacket is stainless steel. The double-wall pipe is sloped to ensure that the jacket drains to its corresponding leak detection box or to a pit that is monitored for leakage. The slope for double-wall pipe is sufficient to ensure that applicable leak detection criteria are satisfied. The transfer line from RLD-VSL-00165 to PWD-VSL-00044 is double walled and has been classified as SS.

The drain collection piping generally includes cleanouts at changes of direction greater than 45 degrees and at maximum intervals of greater than 100 feet based on conventional sanitary drainage system practices. Cleanouts have been omitted where there is the potential for establishing communications between C5 and C2 areas or between the C5 cell boundary and the balance of the LAB facility.

The system piping has been evaluated to allow for hot water flushing for purposes of decontamination and dose rate reduction. Infrequent temperature excursions up to temperatures of 165 °F were considered in these evaluations.

System piping is sloped to be self-draining and arranged with falls so that liquids drain to vessels or into lines that can be drained. Non-regulated service lines located outside of cell areas may drain to low-point drains when drainage to a vessel is impractical.

System flushing for RLD piping will be performed to meet NQA-2, category D cleanliness criteria.

6.2.7 Special Secondary Containment Features

The RLD System collects dangerous wastes from the Rad Lab, Sample Receiving/Shipping, the Decon Shower, the Decon Sink, the C3 Maintenance Sink, and the PVA Skid areas. In the first five areas, the RLD design includes drain pans and leak test plugs for the double-wall piping annuli. These features are located in cabinets or stands under each fixture. The drain pans direct potential leaks under the sinks to the annuli of the waste collection headers so that these areas are monitored for leakage along with the associated collection piping. Machine-screw holes tapped in the test plugs allow communication with the drain pan and allow for periodic pneumatic pressure tests of the collection pipe annuli.

The PVA Skid area is surrounded by a dike and the area within the dike is sealed by a special-protective coating. Daily operator rounds in the area will monitor the PVA Skid for signs of potential leakage.

6.2.8 Leak Detection

The LAB has leak detection boxes connected to the headers draining into the hotcell drain collection vessel (RLD-VSL-00165) and the laboratory area sink drain collection vessel (RLD-VSL-00164). The C3 transfer line between RLD-VSL-00164 and RLD-VSL-00165 is also monitored for leakage by a leak detection box. The leak detection boxes are designed to detect a leak in the annular space between the double-walled piping. Each box is installed with a drain plug in the closed position to facilitate collecting a detectable volume of leaked waste. Upon detection of a leak, the control system alarms, the operator can lift the plug to drain the leak detection box. An overflow plug installed can be installed in the overflow drain to allow secondary containment pneumatic testing. The leak detection boxes for the C3 drain collection headers drain to the C3 vessel cell sump (RLD-SUMP-00041). The leak detection boxes for the C5 drain collection headers and the C3 transfer line for the laboratory area sink drain collection vessel (RLD-VSL-00164) drain to the C5 vessel cell sump (RLD-SUMP-00042). The sumps associated with the cells containing RLD-VSL-00163, RLD-VSL-00164, and RLD-VSL-00165 are also provided with leak detection. Additionally, the cell and pump and piping pit sumps associated with RLD-VSL-00164 and RLD-VSL-00165 are provided with leak detection.

6.3 Mechanical Handling Description

A permanently installed bridge crane will be used to support pump replacement and piping pit maintenance in the C5 pump maintenance area. Forklifts and other portable rigging will be used to support maintenance in the C2/C3 systems. No maintenance is anticipated in the C3/C5 vessel cells.

6.4 Electrical Description

Power for the pump motors will be provided by the Low Voltage Electrical (480/208/120 V) System (LVE) via non-ITS, 480V AC motor control centers. Power for the instrumentation and controls will be provided by the plant Uninterruptible Power Electrical System (UPE).

6.5 Instrumentation and Controls

The RLD vessels and associated sumps are equipped with instrumentations as show in **Table 6-1**. The data is collected by the sensing elements, which are located in the vessels, pits, or adjacent operating areas. The signal is sent to transmitters, which are located in sump cells, pump pits, piping pits, or instrument racks

The PCJ system is a plant-wide system for monitoring and control of the process, ventilation, and services across the WTP. The PCJ is an integral part of the Integrated Control Network and provides the following functions:

- Monitoring of independent protection trips
- Device interlocks

The PCJ also provides startup initiation, status monitoring, and shutdown initiation of independently controlled services and utilities.

The LAB has a C&I room from which operators can monitor the facility and make vessel transfers. However, the main control room in the Pretreatment Facility will be the primary control location for the LAB.

Table 6-1 Major Process Instrumentation

Location	Instrument	Function
RLD-VSL-00163	TI-6510	Temperature indicator for effluent.
	PI-6507	Pressure indicator for pump.
	LI-6501	Level indicator for vessel.
RLD-VSL-00164	TI-6213	Temperature indicator for effluent.
	PI-6204	Pressure indicator for pump.
	LI-6202	Level indicator for vessel.
RLD-VSL-00165	TI-6127/6112	Temperature indicator for effluent.
	PI-6128/6106	Pressure indicator for pump.
	LI-6104	Level indicator for vessel.

6.6 Special Features

All six pumps in the RLD System are fitted with conical startup strainers to prevent construction debris from being entrained by the pumps during commissioning. The startup strainers will be removed prior to the start of cold commission. Whenever possible, the strainers have been located between the remotely-operated clamp (Grayloc) connections to facilitate their removal and to permit the future installation of a solid spool-piece (jumper) section.

The C3 and C5 vessel are each fitted with a nozzle designated for future use. The nozzles are fitted with a shield plug located at grade elevation. The nozzles and plugs provide direct vertical access to the vessel contents and vessel internals from an accessible area. The shield plug design satisfies applicable requirements for radiation shielding, C5 cell boundary confinement, ALARA, and maintainability.

A backflow preventer is installed to check backflows, prevent backsiphonage, and mitigate the migration of radioactive material into the DIW from the PTF transfer line. The backflow preventer is a

conventional, reduced pressure zone, backflow preventer with minor modifications for use in a radioactive system.

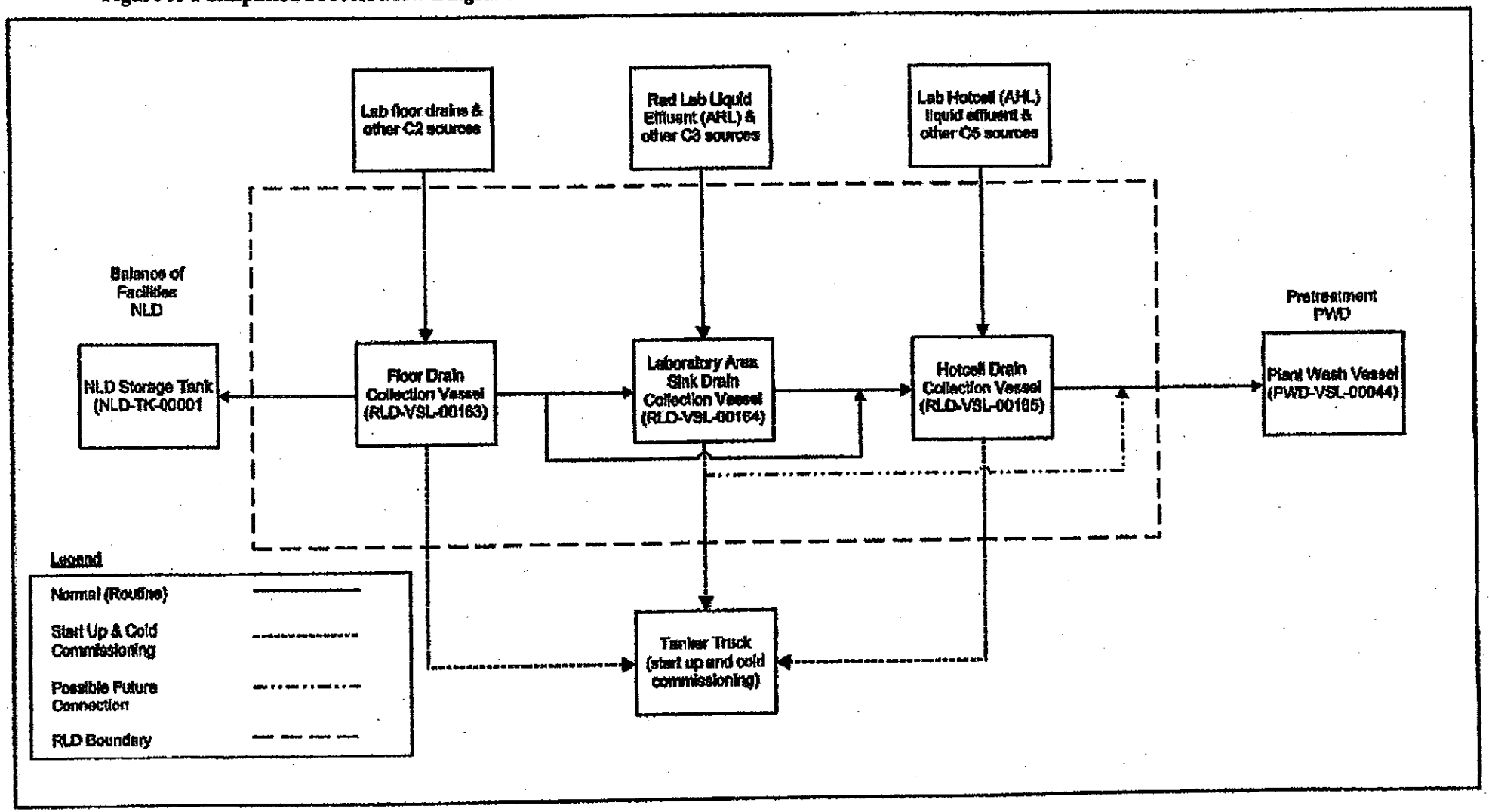
Portions of the LAB's cascading airflow stream are directed to the equipment pits and effluent cells to provide ventilation and heat removal. The in-bleed air to these areas flows through HEPA filter housings that were specified as part of the RLD System design, but are operationally associated with the building's HVAC systems. The housings are designed to permit ventilation system airflow while maintaining pit or cell boundary confinement in the event of a postulated spill or other accident event postulated by the ISM process. The filters are of a rectangular-type design and arranged in a single-stage configuration. The HEPA filters are designed and acceptance tested to comply with the requirements of ASME AG-1 prior to installation. A pre-filter section is included in the housing to reduce dust loading on the HEPA filters and therefore extend their useful life. The housing features bag in/bag out capabilities to facilitate HEPA filter replacement.

Table 6-2 Equipment Design Documents

Plant Item No.	Process Calc. # *	Mechanical Calc. # *	Equipment Drawing # *	P&ID #*	GA Drawing #*	Corrosion Evaluation #*
	(LAB-MVC-RLD-)	(LAB-M6C-RLD-)	(LAB-MV-RLD-)	(LAB-M6-RLD-)	(LAB-P1-60-)	(LAB-N1D-RLD-)
RLD-VSL-00163	00001	00003	00004	00005	00007	00001
RLD-VSL-00164	00002	00004	00001	00002	00007	00002
RLD-VSL-00165	00003	00005	00003	00001	00007	00003
RLD-PMP-00190A/B	Not Required	00001	CM-POA-MPC0-00005-03-00004	00005	00007	Not Applicable
RLD-PMP-00182A/B	Not Required	00001	CM-POA-MPC0-00005-03-00003	00002	00007	TBD
RLD-PMP-00183A/B	Not Required	00001	CM-POA-MPC0-00005-03-00002	00001	00007	TBD
RLD-SUMP-00040	Not Required	N/A	LAB-DB-S13T-00020/21	00005	00007	Not Applicable
RLD-SUMP-00041	Not Required	00027	LAB-DB-S13T-00020/21	00002	00007	Not Applicable
RLD-SUMP-00042	Not Required	00027	LAB-DB-S13T-00018/19	00001	00007	Not Applicable
RLD-SUMP-00043A/B	Not Required	00027	LAB-DB-S13T-00018/19	00001	00007	Not Applicable
RLD-SUMP-00044	Not Required	00027	LAB-DB-S13T-00018/19	00001	00007	Not Applicable
RLD-SUMP-00045	Not Required	00027	LAB-DB-S13T-00020/21	00002	00007	Not Applicable
RLD-LDB-00005	Not Required	00027	LAB-MX-RLD-00001	00007	00007	Not Applicable
RLD-LDB-00008	Not Required	00027	LAB-MX-RLD-00001	00007	00007	Not Applicable
RLD-LDB-00007	Not Required	00027	LAB-MX-RLD-00001	00007	00007	Not Applicable
RLD-LDB-00006	Not Required	00027	LAB-MX-RLD-00001	00007	00007	Not Applicable
RLD-LDB-00004	Not Required	00027	LAB-MX-RLD-00001	00008	00007	Not Applicable
RLD-LDB-00011	Not Required	00027	LAB-MX-RLD-00001	00007	00007	Not Applicable
RLD-LDB-00009	Not Required	00027	LAB-MX-RLD-00001	00008	00007	Not Applicable
RLD-LDB-00002	Not Required	00027	LAB-MX-RLD-00001	00008	00007	Not Applicable
RLD-BFP-00001	Not Required	TBD	TBD	00008	00007	Not Applicable
RLD-HEPA-00015	Not Required	00029	LAB-MKD-RLD-00001	00001	00007	Not Applicable
RLD-HEPA-00018	Not Required	00029	LAB-MKD-RLD-00002	00002	00007	Not Applicable

*Each document and drawing number includes 24590 followed by the prefix shown in parentheses below the column heading unless shown otherwise.

Figure A-1 Simplified Process Flow Diagram



7 Operations

The RLD collects intermittent liquid effluent flows from the LAB and transfers batch volumes of liquid effluent to PTF during normal operations and the NLD storage tank (NLD-TK-00001) in BOF. Other destinations during non-routine operations include a tanker truck to support effluent removal disposal during cold commissioning.

7.1 Routine Normal Operations

A heel may be maintained in the floor drain collection vessel (RLD-VSL-00163). Non-condensable vapors and gases are vented to the C2 ventilation system. Any liquid effluent collected in this vessel will be transferred to the laboratory area sink drain collection vessel (RLD-VSL-00164), the hotcell drain collection vessel (RLD-VSL-00165), or the NLD storage tank in BOF (NLD-TK-00001) at a pre-determined level. Transfers are coordinated to ensure there is sufficient capacity in the receiving vessel for the transfer volume.

The laboratory area sink drain collection vessel (RLD-VSL-00164) collects liquid effluents. The liquid effluent is mixed to suspend any solid particles. Mixing is accomplished by recirculating one of two self-priming, horizontal centrifugal pumps in combination with eductors. The liquid effluent is transferred to the hotcell drain collection vessel (RLD-VSL-00165). Non-condensable vapors and gases are vented to the C3 ventilation system. Transfers are coordinated to ensure there is sufficient capacity in the receiving vessel for the transfer volume.

The hotcell drain collection vessel (RLD-VSL-00165) collects liquid effluents. The liquid effluent is mixed to suspend any solid particles. Mixing is accomplished by recirculating one of two self-priming, horizontal centrifugal pumps in combination with eductors. Alternatively, for more rigorous agitation of larger vessel operating volumes, the capability is provided to operate both pumps simultaneously. Noncondensable vapors and gases are vented to the C5 ventilation system. The liquid effluent collected and held in the hotcell drain collection vessel (RLD-VSL-00165) is transferred to PTF plant wash vessel (PWD-VSL-00044). Transfers are coordinated to ensure there is sufficient capacity in the receiving vessel for the transfer volume.

7.1.1 Transfer Operations

The following information details the transfer of liquid from any vessels in the RLD to the applicable receiving vessel. Figure A-1 is a simplified listing of liquid effluent sources. When the low-level setpoint is reached, the transfer is stopped. RLD vessels collect liquid effluent intermittently.

The following operational prechecks are required before transfer:

- Starting volume of the vessel contents and estimated transfer volume of the contents are established before transfer.
- Verify manual valve path is set properly.
- Flush volume for post-transfer is estimated if applicable.
- Verify that the receiving vessel can receive the estimated transfer volume and flush volume.
- Verify DIW system pressure is nominal.

- Before transfer, obtain confirmation from BOF or PTF that the transfer may occur (if applicable).

Permissives for transfer:

- The output display from level indicator for the transferring vessel is sufficient to transfer volume to receiving vessel.
- The control valve path is set properly.

Trips for transfer:

- The level for the transferring vessel is below low setpoint.
- The level for the receiving vessel is above high setpoint.
- The valve line-up has not been maintained.
- The pump discharge pressure is outside the normal range.
- DIW pressure is low.

The alarms and trips for the system are listed in **Table 7-1.**

Operator running checks for transfer:

- The level indicator for the transferring vessel indicates a decrease in level.
- The level indicator for the receiving vessel indicates an increase in level.
- The pump associated with the transferring vessel is operating.
- Discharge pressure is nominal.

System running checks for transfer:

- The level transmitter for the transferring vessel records a decrease in level.
- The level transmitter for the receiving vessel records an increase in level.
- Discharge pressure is nominal.

Upon completion of a transfer to PTF and the consequent flush, the valves will be aligned such that the transfer line will be allowed to drain into either the sending or receiving vessel until a natural equilibrium level is achieved in the transfer line. This step in the operation alleviates pressure on the DIW check valve (RLD-V-11074), and thus reduces the chances of contaminating the DIW system. Drainback from the PTF transfer line returns to the C5 vessels via the RLD pumps. The pumps are designed to accommodate this reverse flow from the transfer line.

7.1.2 Transfer Operations to Tanker Truck

The following information details the transfer operations to the tanker truck, which occurs prior to hot commissioning. Figure A-1 is the simplified listing of liquid effluent sources. When low-level setpoint is reached, the transfer is stopped.

The following operational prechecks are required before operation of this sequence:

- Starting volume of the vessel contents and estimated transfer volume of the contents are established before transfer and the volume does not exceed the tanker truck available volume.
- Verify manual valve path is set properly.

Permissives for this sequence:

- The output display from level indicator for the transferring vessel is sufficient to transfer volume to receiving tanker truck.
- Control valve path is set properly.

Trips for transfer:

- The level for the transferring vessel is below low setpoint.
- The valve line-up has not been maintained.
- The pump discharge pressure is outside the normal range.

The alarms and trips for the system are listed in **Table 7-1.**

Operator running checks for transfer:

- The level indicator for the transferring vessel indicates a decrease in level.
- The pump associated with the transferring vessel is operating.
- The operator at the truck monitors tanker instrumentation and is in direct communication with the control room operator.
- Discharge pressure is nominal.

System running checks for transfer:

- The level transmitter for the transferring vessel records a decrease in level.
- The level transmitter for the tanker truck indicates an increase in level.
- Discharge pressure is nominal.

7.1.3 Sampling Operations for RLD-VSL-00163

The following information details the sampling operations for RLD-VSL-00163. The sample for RLD-VSL-00163 is provided by a grab sample from a tap off the discharge of the floor drain collection vessel pumps (RLD-PMP-00190A/B). The sample is taken following the operations described below.

The following operational prechecks are required before sampling:

- Volume of the vessel contents is established before recirculation.
- Verify manual valve path is set properly.

Permissives for sampling:

- The output display from the level indicator for the vessel is sufficient to recycle effluent.
- The control valve path is set properly.

Trips for sampling:

- The level for the vessel is below low setpoint.
- The valve line-up has not been maintained.
- The pump discharge pressure is outside the normal range.

The alarms and trips for the system are listed in **Table** 7-1.

Operator running checks for sampling:

- The pump is constantly running.
- The level indicator for the vessel indicates an approximately constant volume.
- Discharge pressure is nominal.

System running checks for sampling:

- The level transmitter indicates an approximately constant volume.
- Discharge pressure is nominal.

7.1.4 Agitation Operations for RLD-VSL-00164/165

The following information details the agitation operations for RLD-VSL-00164/165. Pumps operate in recirculation mode. Agitation operations should occur before transfer.

The following operational prechecks are required before agitation:

- Volume of the vessel contents is established before agitation.
- Verify manual valve path is set properly.

Permissives for agitation:

- The output display from the level indicator for the vessel is sufficient to recycle effluent.
- The control valve path is set properly.

Trips for agitation:

- The level for the vessel is above low setpoint.
- The level for the vessel is below high setpoint.

- The valve line-up has not been maintained.
- The pump discharge pressure is outside the normal range.

The alarms and trips for the system are listed in **Table 7-1**.

Operator running checks for agitation:

- The pump is constantly running.
- The level indicator for the vessel indicates an approximately constant volume.
- Discharge pressure is nominal.

System running checks for agitation:

- The level transmitter indicates an approximately constant volume.
- Discharge pressure is nominal.

7.1.5 Flushing Operations for Transfer Lines

The following information details the flushing operations for the transfer lines. When the desired volume of flush water is reached, the transfer line is allowed to gravity drain.

The following operational prechecks are required before flushing:

- Transfer operations are complete.
- Verify manual valve path is set properly.
- Flush volume is established.
- Verify that the receiving vessel can receive the estimated flush volume.
- Verify DIW available.

Permissives for flushing:

- The control valve path is set properly.
- DIW pressure is nominal.

Trips for flushing:

- The level for the receiving vessel is above high setpoint.

The alarms and trips for the system are listed in **Table 7-1**.

Operator running checks for flushing:

- Receiving vessel level indicator indicates an increase in volume.
- The valve line-up has not been maintained.

System running checks for flushing:

- Receiving vessel level transmitter indicates an increase in volume.
- DIW indicates above normal flowrates.

Upon completion of a transfer to PTF and the consequent flush, the valves will be aligned such that the transfer line will be allowed to drain into either the sending or receiving vessel until a natural equilibrium level is achieved in the transfer line. This step in the operation alleviates pressure on the DIW check valve (RLD-V-11074), and thus reduces the chances of contaminating the DIW system. Drainback from the PTF transfer line returns to the C5 vessels via the RLD pumps. The pumps are designed to accommodate this reverse flow from the transfer line.

7.2 Non-Routine Normal Operations

In the infrequent event that the operations discussed below are required, they will occur in the following manner.

7.2.1 Washing RLD-VSL-00163

Vessel RLD-VSL-00163 is cleaned by filling the vessel with demineralized water and then draining the vessel a predetermined number of times or by opening the manway and manually washing the vessel. A sampling capability is provided at RLD-VSL-00163 to verify the effectiveness of the cleaning efforts, if required.

7.2.2 Washing RLD-VSL-00164 and RLD-VSL-00165

The laboratory area sink drain collection vessel (RLD-VSL-00164) and the hotcell drain collection vessel (RLD-VSL-00165) are equipped with internal washrings for vessel washdown.

7.2.3 Rigorous Mixing and Solid Suspension

In the event that rigorous mixing or solid suspension is required, the hotcell drain collection vessel pumps (RLD-PMP-00183A/B) can be aligned such that they operate simultaneously. Alternatively, one pump can be aligned to support transfer operations while the second pump continues to mix the vessel contents during the transfer operation.

7.3 Off-Normal Operations

In the event of the failures discussed below or of the loss of the normal transfer path, the recovery responses for the LAB RLD are outlined in the following sections.

7.3.1 Vessel Overflow

A high level alarm in an RLD vessel during a transfer will send a trip to the isolation valve on the line transferring to the vessel (if applicable). A trip will also be sent to stop any inflow of demineralized water and to close the pump recirculation valves. Upon detection of the high level alarm, the contents of the

vessel will be transferred to the appropriate downstream vessel per the normal transfer operations. Upon level detection in the sump, the contents will be transferred to the appropriate vessel.

7.3.2 Loss of Vessel Integrity

In the event of a loss of vessel integrity, the vessel contents will be collected in the vessel cell and associated sump. Upon level detection in the sump, the contents will be transferred to the appropriate downstream vessel.

The C2 vessel cell sump (RLD-SUMP-00040) and associated cell will collect the contents of the floor drain collection vessel (RLD-VSL-00163) in the event that vessel integrity is lost. The sump contents will be transferred via RLD-PMP-00190A/B to the the laboratory area sink drain collection vessel (RLD-VSL-00164), the hotcell drain collection vessel (RLD-VSL-00165), or the NLD storage tank in BOF (NLD-TK-00001).

The C3 vessel cell sump (RLD-SUMP-00041) and associated cell will collect the contents of the laboratory area sink drain collection vessel (RLD-VSL-00164) in the event that vessel integrity is lost. The sump contents will be transferred via RLD-PMP-00182A/B to the hotcell drain collection vessel (RLD-VSL-00165).

The C5 vessel cell sump (RLD-SUMP-00042) and associated cell will collect the contents of the hotcell drain collection vessel (RLD-VSL-00165) in the event that vessel integrity is lost. The sump contents will be transferred via RLD-PMP-00183A/B to the plant wash vessel (PWD-VSL-00044).

7.3.3 Loss of Level Indicator

Upon the loss of a level indicator, the instrument will be repaired or replaced, and recalibrated.

7.3.4 Cell Sump Level Alarm

A sump level alarm in an effluent vessel cell is likely caused by a leak from one of the associated vessels or from a process line in the cell. All transfers and other operations with the exception of sump pumping and vessel deinventory will be stopped until the source of the leak is determined. Once the origin of the leak is determined, the leak will be isolated or repaired and operations may resume.

7.3.5 Pit Sump Level Alarm

A sump level in the equipment pits is likely caused by a leak of a process line in the area or by transfer lines that drain to the pit. If level is detected, the contents of the sump will be drained to the associated effluent vessel and the source of the leak will be diagnosed. Sump alarms are expected during pit washdown.

7.3.6 High-Level Alarm

A high-level alarm in an RLD vessel during a transfer will send a trip to the isolation valve on the line transferring to the vessel (if applicable). A trip will also be sent to stop any inflow of demineralized water and to close the pump recirculation valves. Upon detection of the high level alarm, the contents of the vessel will be transferred to the appropriate downstream vessel per the normal transfer operations.

7.3.7 Low-Level Alarm

A low-level alarm during a transfer will send a trip to shut off the associated pump.

7.3.8 Loss of Ventilation

Loss of ventilation will result in the loss of negative pressure on the vessel and possible cross communication between compartments. Transfers to and from the vessels will be stopped until the ventilation can be restored.

7.3.9 Leak Detection

A leak detection box (LDB) level alarm is caused by an unlikely breach of the carrier pipe in one of the transfer or drain collection lines. If level is detected, the transfer will be terminated and the contents of the LDB will be drained to the associated sump in the effluent vessel cell and the source of the leak will be diagnosed.

7.3.10 Post-Fire Recovery

In the event of a fire, transfer operations will be terminated. Appropriate recovery actions will be taken.

7.4 Operating Trips, Alarms, and Setpoint Control

The operating trips, alarms, and setpoint control required for the RLD are detailed in **Table 7-1**.

Table 7-1 Operating Trips, Alarms, and Setpoint Control

System Equipment	Instrument	Setpoint Control	Alarms and Trips	Reference
RLD-VSL-00163	RLD-LT-6501	None	Low - Alarm (operator response level) Process Setpoint: 1.46 ft • Stop transfer pump RLD-PMP-00190A/B	24590-LAB-M6C-RLD-00003
			High - Alarm (operator response level) Process Setpoint: 4.45 ft	24590-LAB-M6C-RLD-00003
RLD-PMP-00190A/B	RLD-PT-6507	None	High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-PT-6504	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-PT-6509	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-TT-6510	None	High - Alarm Process Setpoint: 115 °F	24590-LAB-M6C-RLD-00022 (5° below design temperature)
RLD-SUMP-00040	RLD-LT-6506	None	High- Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027

Table 7-1 Operating Trips, Alarms, and Setpoint Control				
RLD-VSL-00164	RLD-LT-6202	None	Low - Alarm (operator response level) Process Setpoint: 2.81 ft • Stop transfer pump RLD-PMP-00182A/B	24590-LAB-M6C-RLD-00004
	RLD-LT-6202	None	High - Alarm Setpoint: 4.1 ft • Close RLD-YV-6216, RLD-YV-6220, RLD-YV-6210, and RLD-YV-6511.	24590-LAB-M6C-RLD-00004 (Figure 2)
RLD-PMP-00182A/B	RLD-PT-6204	None	High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-PT-6207	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-TT-6213	None	High - Alarm Process Setpoint: 150 °F	24590-LAB-M6C-RLD-00022 (5° below design temperature)
	RLD-PT-6219	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-FE-6214	None	Low - Alarm Process Setpoint: 90 gal/min	24590-LAB-M6C-RLD-00022 (and engineering judgment)
			High - Alarm Process Setpoint: 160 gal/min	24590-LAB-M6C-RLD-00022 (and engineering judgment)

Table 7-1 Operating Trips, Alarms, and Setpoint Control				
RLD-SUMP-00041	RLD-LT-6211	None	High - Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-SUMP-00045	RLD-LT-6212	None	High- Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-HEPA-00018	RLD-PDT-6201	None	High - Alarm Process Setpoint: To be addressed by HVAC	N/A
RLD-VSL-00165	RLD-LT-6104	None	Low- Alarm Setpoint: 1.61 ft • Stop transfer pump RLD-PMP-00183A/B	24590-LAB-M6C-RLD-00005 (Figure 2)
			High - Alarm Setpoint: 4.66 ft • Stop transfer pump(s) RLD-PMP-00182A/B and/or RLD-PMP-00190A/B • Close valves RLD-YV-6102, RLD-YV-6511, and closes RLD-YV-6802 to isolate vessel	24590-LAB-M6C-RLD-00005 (Figure 2)
RLD-PMP-00183A	RLD-PT-6106	None	High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-PT-6109	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-TT-6112	None	High - Alarm Process Setpoint: 150 °F	24590-LAB-M6C-RLD-00022 (5° below design temperature)

Table 7-1 Operating Trips, Alarms, and Setpoint Control				
RLD-PMP-00183B	RLD-PT-6128	None	High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-PT-6127	None	Low - Alarm (if pump is operating) Process Setpoint: TBD	N/A
			High - Alarm (if pump is operating) Process Setpoint: TBD	N/A
	RLD-TT-6129	None	High - Alarm Process Setpoint: 150 °F	24590-LAB-M6C-RLD-00022 (5° below design temperature)
RLD-SUMP-00042	RLD-LT-6115	None	High - Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-SUMP-00043A	RLD-LT-6116	None	High - Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-SUMP-00043B	RLD-LT-6124	None	High - Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-SUMP-00044	RLD-LT-6123	None	High - Alarm Process Setpoint: 0.39 in	24590-LAB-M6C-RLD-00027
RLD-HEPA-00015	RLD-PDT-6121	None	High - Alarm Process Setpoint: To be addressed by HVAC	N/A
RLD-LDB-00005	RLD-LSH-6215	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00008	RLD-LSH-6703	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027

Table 7-1 Operating Trips, Alarms, and Setpoint Control				
RLD-LDB-00007	RLD-LSH-6702	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00006	RLD-LSH-6701	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00004	RLD-LSH-6118	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00011	RLD-LSH-6704	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00009	RLD-LSH-6801	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027
RLD-LDB-00002	RLD-LSH-6120	None	High - Alarm Process Setpoint: 0.45 in	24590-LAB-M6C-RLD-00027

Figure 7-1 State Diagrams for RLD-VSL-00163

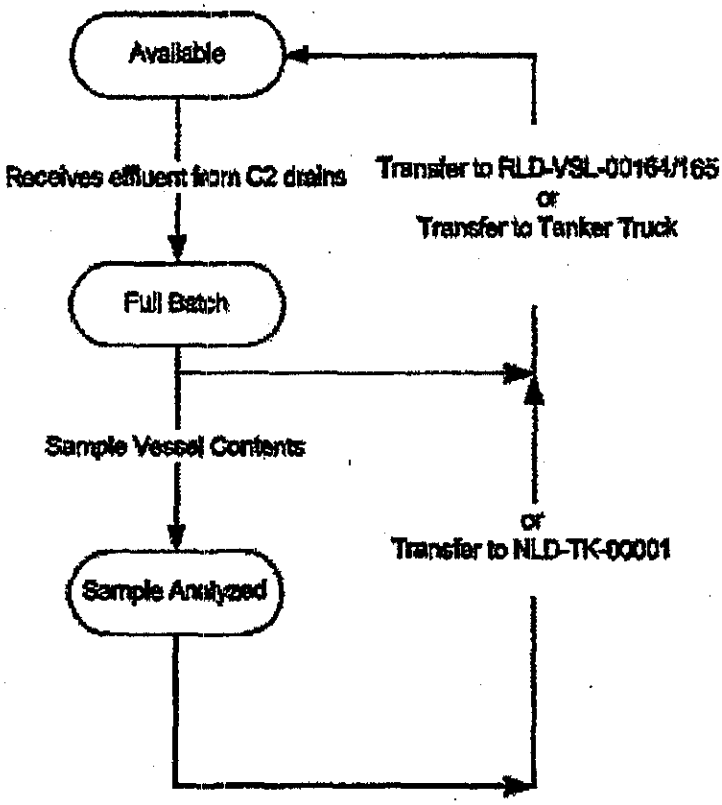


Figure 7-2 State Diagrams for RLD-VSL-00164

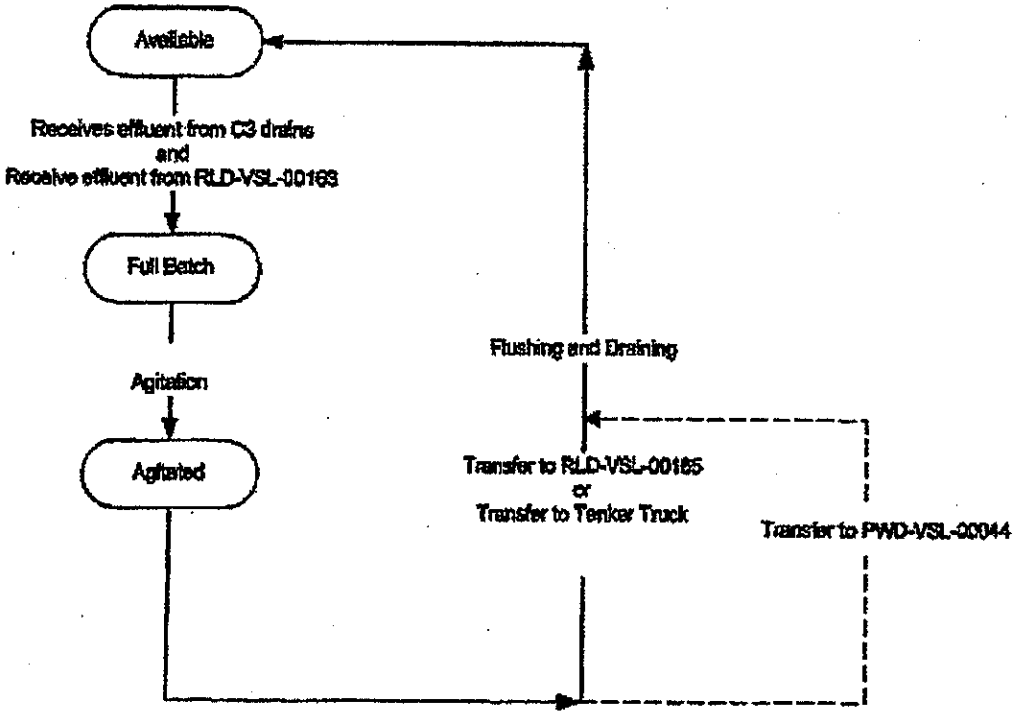
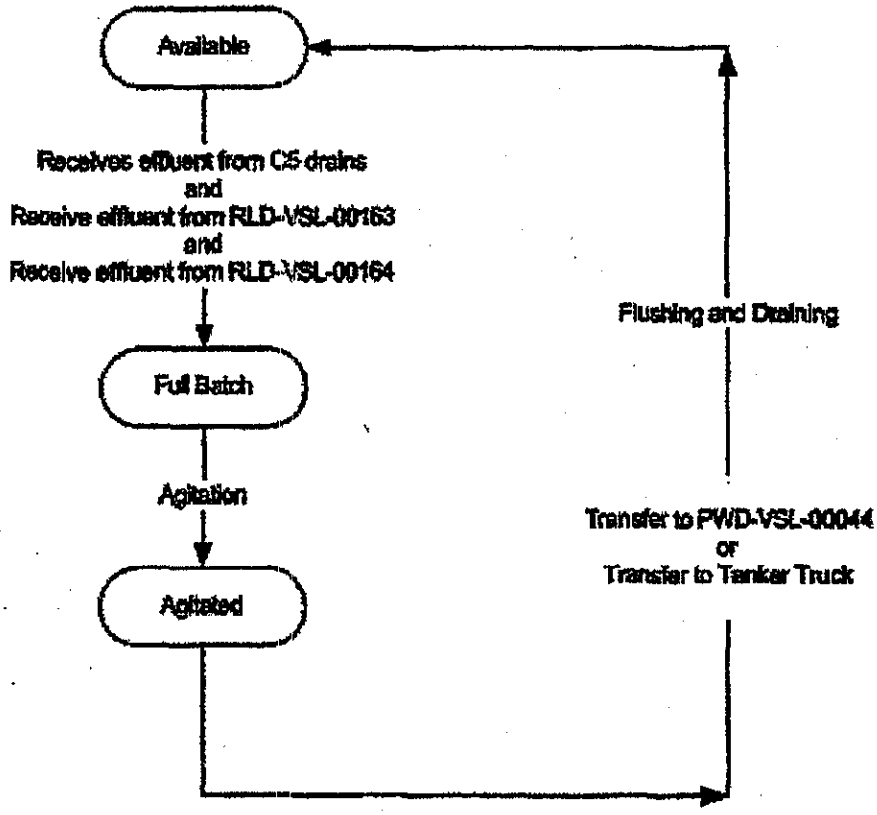


Figure 7-3 State Diagrams for RLD-VSL-00165



8 Maintenance

The RLD consists of equipment that requires routine and non-routine maintenance. Maintenance strategies are developed in accordance with the *Operations Requirements Document* (24590-WTP-RPT-OP-01-001).

The horizontal, centrifugal pumps are self-priming, and will be replaced when the pumps wear out. Redundant pumps are provided to allow operations to continue in the event of a pump failure. The pump and pipe pits are equipped with camera inspection ports.

The laboratory area sink drain collection vessel (RLD-VSL-00164) and the hotcell drain collection vessel (RLD-VSL-00165) are equipped with internal washrings for vessel maintenance. Each vessel will be capable of receiving a dilute acid solution to clean vessel internals. If needed, a cleaning agent (e.g., a dilute acid) can be poured down the drain to clean vessel internals. Each vessel has a recirculation line to mix the liquids and suspend solids via tank mixing eductors (i.e., clean the vessel). Each vessel is also capable of being rinsed after it has been cleaned. Vessel RLD-VSL-00163 is cleaned by filling the vessel with demineralized water and then draining the vessel a predetermined number of times. A sampling capability is provided at RLD-VSL-00163 to verify the effectiveness of the cleaning efforts, if required. Limited cell access is provided for external vessel inspection.

9 Interfacing Systems

This section lists all interfacing systems by system number and identifies the nature of the interface. Interfaces include items supplied to other systems and items received from other systems.

The ARL and AHL will send non-organic liquid waste to the RLD. This material will be neutralized before it is transferred to the RLD, but there is the possibility that either concentrated acid or caustic could enter the RLD system. Moreover, the material transferred to the RLD could have a solids content of as much as 60 wt% if the material is not diluted. Normally every sample/aliquot transferred to the RLD will be flushed with half a gallon of water.

Table 9-1 System Interfaces

System Locator and Name	Nature of RLD Interface
AHL – Analytical Hotcell Laboratory Equipment System	RLD-VSL-00165 receives effluent from the AHL.
ARL – Analytical Radiological Laboratory Equipment System	RLD-VSL-00164 receives effluent from ARL fumehood sinks.
ASX – Autosampling System	RLD-VSL-00164 receives effluent from ASX equipment drains.
C2V – C2 Ventilation System	C2V vents vessel RLD-VSL-00163.
C3V – C3 Ventilation System	C3V vents vessel RLD-VSL-00164.
C5V – C5 Ventilation System	C5V vents vessel RLD-VSL-00165 and prevents "crosstalk" between hotcells. RLD-VSL-00163 receives coil condensate from the C5 in-bleed coils.
DIW – Demineralized Water System	RLD-VSL-00164 and RLD-VSL-00165 are connected to the DIW for washing. DIW also provides transfer line flushing and maintenance wash down.
DOW – Domestic Water System	DOW eyewash/safety shower and heater equipment drain to RLD-VSL-00163 or RLD-VSL-00164.
FPW – Fire Protection Water System	RLD-VSL-00163/4/5 receive FPW discharges.
LIH – Laboratory In-cell Handling System	An LIH import/export glovebox drains to RLD-VSL-00165.
LVE – Low Voltage Electrical (480/208/120V) System	Each pump receives electrical power.
NLD – Non-Radioactive Liquid Waste Disposal System	NLD-TK-00001 receives liquid effluent from the Floor Drain Collection Vessel during non-routine operations.
PCJ – Process Control System	Controls and monitors vessels, pumps, and valves.
PSA – Plant Service Air System	The PSA provides motive-force for control valve actuators.
PVA – Plant Vacuum Air System	PVA equipment drains are routed to RLD-VSL-00164.
PWD – Plant Wash and Disposal System	The hotcell drain collection vessel transfers liquid effluent and flush water to the PTF plant wash vessel PWD-VSL-00044. The capability of RLD-VSL-00164 to discharge directly to PWD in the future is also provided.
UPE – Uninterruptible Power Electrical System	Provides power for controls and instrumentation.
WTJ – Waste Tracking and Inventory System	WTJ interfaces with PCJ to provide near-real-time status monitoring of vessel contents.
C2 and C3 Maintenance Shops	The C3 decon booth, and the C2 and C3 maintenance sinks drain to the RLD.

10 Applicable Documents

10.1 Project Documents

10.1.1 Authorization Basis Documents

24590-WTP-PSAR-ESH-01-002-06, Rev 0, *Preliminary Safety Analysis Report to Support Construction Authorization; Lab Facility Specific Information.*

24590-WTP-SRD-ESH-01-001-02, Rev 3M, *Safety Requirements Document, Volume II.*

10.1.2 Design Criteria Database Source Documents

24590-WTP-RPT-OP-01-001, Rev 2, *Operations Requirements Document.*

24590-WTP-DB-ENG-01-001, Rev 1C, *Basis of Design.*

24590-WTP-ICD-MG-01-005, Rev 3, *ICD 05 - Interface Control Document for Nonradioactive, Nondangerous Liquid Effluents.*

24590-WTP-SED-ENS-04-002-06, Rev A, *Safety Envelope Document; Lab Facility Specific Information.*

DE-AC27-01RV14136, as amended, *Contract to Design, Construct, and Commission the Hanford Tank Waste Treatment and Immobilization Plant.*

10.1.3 Process Flow Diagrams

24590-LAB-M5-V17T-00029, Rev 2, *WTP Analytical Laboratory Process Flow Diagram Radioactive Liquid Disposal.*

10.1.4 Calculations

24590-LAB-MVC-RLD-00001, Rev 1, *Process Data for Floor Drain Collection Vessel (RLD-VSL-00163).*

24590-LAB-MVC-RLD-00002, Rev A, *Process and Materials Selection Data forLaboratory Area Sink Drain Collection Vessel (RLD-VSL-00164).*

24590-LAB-MVC-RLD-00003, Rev A, *Process and Materials Selection Data for Hotcell Drain Collection Vessel (RLD-VSL-00165).*

24590-LAB-M6C-RLD-00001, Rev B, *Lab RLD Pump and Line Sizing.*

24590-LAB-M6C-RLD-00003, Rev A, *Sizing of Lab Floor Drain Collection Vessel - RLD-VSL-00163.*

24590-LAB-M6C-RLD-00004, Rev A, *Sizing of Lab Area Sink Drain Collection Vessel - RLD-VSL-00164.*

24590-LAB-M6C-RLD-00005, Rev A, *Sizing of Lab Hotcell Drain Collection Vessel - RLD-VSL-00165.*

24590-LAB-M0C-RLD-00005, Rev A, *Volume of Aqueous Waste Generated by WTP Laboratory Operations.*

24590-LAB-M6C-RLD-00016, Rev A, *DWP Change Submittal Data & Flooding Calculation for LAB below-grade cells.*

24590-LAB-M6C-RLD-00022, Rev C, *LAB RLD- System Line Pressure and Temperature Conditions.*

24590-LAB-M6C-RLD-00027, Rev A, *Lab Minimum Leak Rate Detection Capabilities for Cell Sumps and Leak Detection Boxes.*

10.1.5 Piping and Instrumentation Diagrams

See InfoWorks (the electronic data management system for the WTP project) for a listing of Drawing Change Notices against the following drawings.

24590-LAB-M6-RLD-00001, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System C5 Collection and Transfer.*

24590-LAB-M6-RLD-00002, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System C3 Collection and Transfer.*

24590-LAB-M6-RLD-00003, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System C2 Drain Collection.*

24590-LAB-M6-RLD-00004, Rev 2, *P&ID - Lab Radioactive Liquid Waste Disposal System C2 Drain Collection.*

24590-LAB-M6-RLD-00005, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System C2 Collection & Transfer.*

24590-LAB-M6-RLD-00006, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System C3 Rad Lab Collection.*

24590-LAB-M6-RLD-00007, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System - C3 Collection & Leak Detection.*

24590-LAB-M6-RLD-00008, Rev 1, *P&ID - Lab Radioactive Liquid Waste Disposal System - C5 Collection & Leak Detection.*

10.1.6 General Arrangement

See InfoWorks (the electronic data management system for the WTP project) for a listing of Drawing Change Notices against the following drawings.

24590-LAB-P1-60-00007, Rev 2, *Analytical Laboratory General Arrangement Plan at El (-) 19'-2" Sections E-E, F-F & G-G.*

24590-LAB-P1-60-00008, Rev 2, *Analytical Laboratory General Arrangement Plan at El 0'-0".*

24590-LAB-DB-S13T-00018, Rev 2, *Analytical Laboratory C5 Cell Structural Concrete Forming Plans and Sections.*

24590-LAB-DB-S13T-00019, Rev 1, *Analytical Laboratory C5 Cell Structural Concrete Forming Sections and Details.*

24590-LAB-DB-S13T-00020, Rev 2, *Analytical Laboratory C2 Vault and C3 Cell Structural Concrete Forming Plans and Sections.*

24590-LAB-DB-S13T-00021, Rev 1, *Analytical Laboratory C2 Vault and C3 Cell Structural Concrete Forming Sections and Details.*

10.1.7 Studies/Reports

24590-WTP-RPT-PR-02-001, Rev 0, *Plant Wash Philosophy.*

24590-LAB-N1D-RLD-00001, Rev 0, *RLD-VSL-00163 (Lab) - Floor Drain Collection Vessel (RLD C2 Vessel).*

24590-LAB-N1D-RLD-00002, Rev 0, *RLD-VSL-00164 (Lab) - Lab Area Sink Drain Collection Vessel (RLD C3 Vessel).*

24590-LAB-N1D-RLD-00003, Rev 1, *RLD-VSL-00165 (Lab) - Lab Area Sink Drain Collection Vessel (RLD C5 Vessel).* (Note: The name of this document is incorrect; the vessel is actually Hotcell Drain Collection Vessel.)

10.1.8 Equipment Drawings

24590-LAB-MV-RLD-00001, Rev 1, *Equipment Assembly Lab Area Sink Drain Collection Vessel RLD-VSL-00164.*

24590-LAB-MV-RLD-00003, Rev 0, *Equipment Assembly Analytical Lab Hotcell Drain Collection Vessel RLD-VSL-00165.*

24590-LAB-MV-RLD-00004, Rev 0, *Equipment Assembly Floor Drain Collection Vessel - RLD-VSL-00163.*

24590-LAB-MX-RLD-00001, Rev 1, *Equipment Assembly - Lab Radioactive Liquid Waste Disposal System Secondary Containment Leak Detection Box.*

24590-CM-POA-MPC0-00005-03-00002, Rev B, *Drawing - Outline Drawing - SPGS Pump Range - NEMA MTRS. STIFF'ND & Groutable Sub-Base.*

24590-CM-POA-MPC0-00005-03-00003, Rev B, *Drawing - Outline Drawing - SPGS Pump Range - NEMA MTRS. STIFF'ND & Groutable Sub-Base.*

24590-CM-POA-MPC0-00005-03-00004, Rev B, *Drawing - Outline Drawing - SPGS Pump Range - NEMA MTRS. STIFF'ND & Groutable Sub-Base.*

24590-LAB-MKD-RLD-00001, Rev A, *24590-LAB-MK-RLD-HEPA-00015 - C5 Equipment Pit & Vessel Cell In-Bleed Filter Housing Complete with Prefilters, HEPA Filters & Local Instrumentation.*

24590-LAB-MKD-RLD-00002, Rev A, *24590-LAB-MK-RLD-HEPA-00018 - C3 Equipment Pump Pit & Vessel Cell In-Bleed Filter Housing Complete with Prefilters, HEPA Filters & Local Instrumentation.*

10.1.9 Specifications

24590-WTP-3PS-JQ07-T0001, Rev 1, *Engineering Specification for Instrumentation for Package Systems.*

24590-WTP-3PS-MV00-T0001, Rev. 2, *Engineering Specification for Pressure Vessel Design and Fabrication.*

24590-WTP-3PS-MPC0-TP002, Rev. 1, *Engineering Specification for General Centrifugal Pumps to Meet Requirements of ASME B73.1M-1991 and ASME B73.2M-1991 for Commercial (CM) Components.*

24590-WTP-3PS-P000-T0001, Rev. 4, *Engineering Specification for Piping Material Classes General Description and Summary.*

10.1.10 Miscellaneous Documents

24590-WTP-GPP-SRAD-007, Rev 2, *Classification of Areas.*

24590-WTP-RPT-PR-02-001, Rev 0, *Plant Wash Philosophy.*

CCN 028172. *Disposition of Waste Treatment and Immobilization Plant (WTP) Laboratory Optimization Study (OS).*

CCN 052452. *Additional Guidance on Facility Design Features to Support Decontamination and Decommissioning (D&D).*

24590-LAB-PER-M-02-002, Rev 0, *Sump Data for Lab Facility.*

24590-LAB-PER-M-02-001, Rev 0, *Flooding Volume for Lab Facility.*

24590-LAB-PER-M-04-0001, Rev 0, *Lab Minimum Leak Rate Detection Capabilities for Leak Detection Boxes, Cell Sumps, and Pit Sumps.*

24590-LAB-PER-M-02-0002, Rev 0, *Lab Waste Removal Capability for the Effluent Vessel Cells.*

24590-LAB-PER-J-03-001, Rev 0, *System Logic Description for Analytical Laboratory- Radioactive Liquid Waste System.*

24590-LAB-MVD-RLD-00163, Rev 0, *24590-LAB-MV-RLD-VSL-00163 - Floor Drain Collection Vessel.*

24590-LAB-MVD-RLD-00164, Rev 0, *24590-LAB-MV-RLD-VSL-00164 - Lab Area Sink Drain Collection Vessel.*

24590-LAB-MVD-RLD-00165, Rev 0, *24590-LAB-MV-RLD-VSL-00164 - Hotcell Drain Collection Vessel.*

24590-LAB-PVD-RLD-00001, Rev 0, *RLD-BFP-00001 - Reduced Pressure Backflow Assembly (Complete with Isolation Valves and Test Cocks).*

10.2 Codes and Standards/Regulations

ASME VIII Div 1. *Rules for Construction of Pressure Vessels.*

ASME B31.3. *Process Piping.*

ASME AG-1. *Code on Nuclear Air and Gas Treatment.*

ANSI/ASME NQA-2. *Quality Assurance Program Requirements for Nuclear facilities.*

NFPA 801, 2003. *Standard for fire Protection for Facilities Handling Radioactive Materials*, Section 5.10, "Single Failure Criterion."

WAC 173-303-640. *Dangerous Waste Regulations*. "Tank Systems". March 13, 2003.

10.3 Other Documents

WA7890008967. *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit For The Treatment, Storage and Disposal of Dangerous Waste, Hanford Waste Treatment and Immobilization Plant*, 9 March 2003. Washington State Department of Ecology, Kennewick, Washington.

Appendix A: Sequence Diagrams for Normal Operations

Appendix A: Sequence Diagrams for Normal Operations

Figure A-1 Transfer Operations	See Section 7.1.1 and 7.1.2 for more information.
Figure A-2 Sample Operations	See Section 7.1.3 for more information.
Figure A-3 Agitation Operations	See Section 7.1.4 for more information.
Figure A-4 Flushing Operations	See Section 7.1.5 for more information.

Figure A-1 Transfer Operations

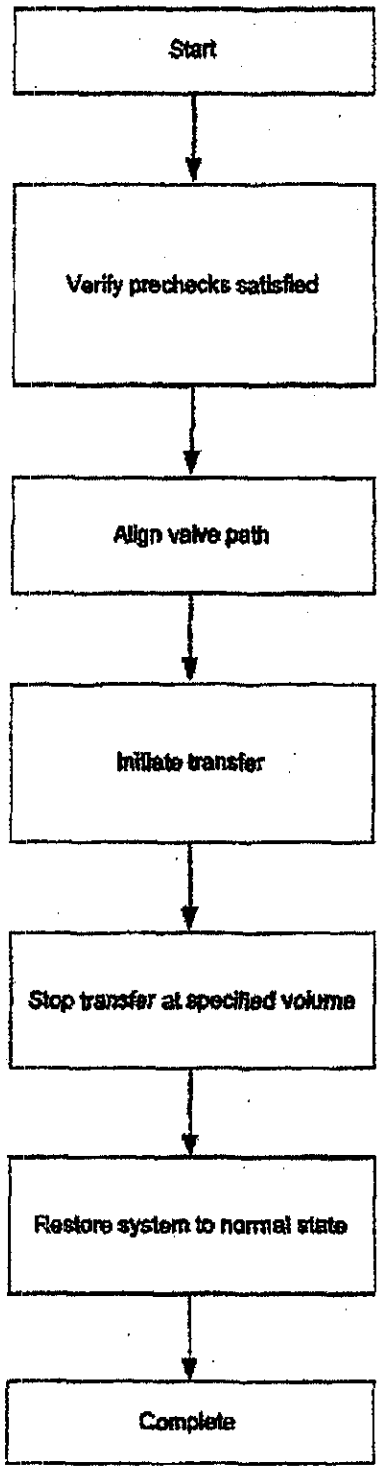


Figure A-2 Sampling Operations

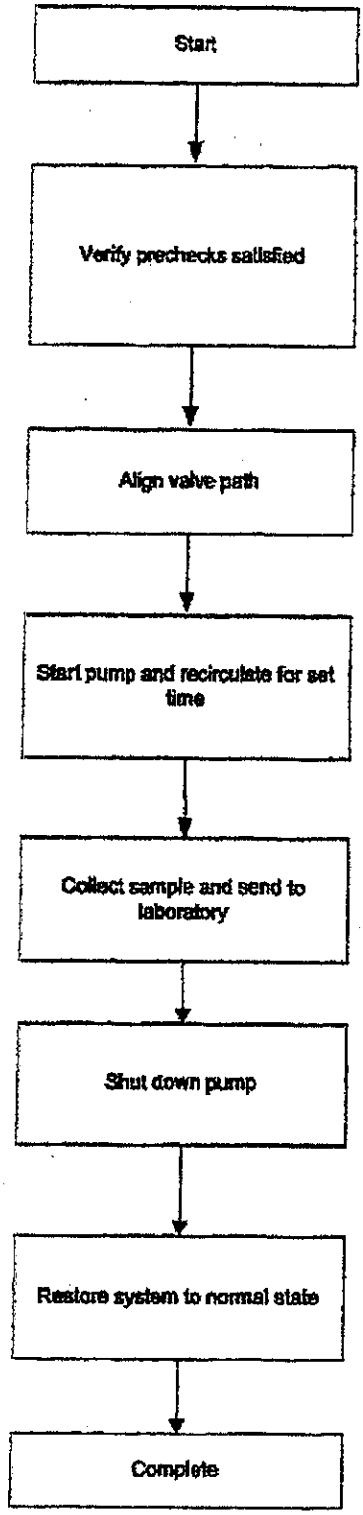


Figure A-3 Agitation Operations

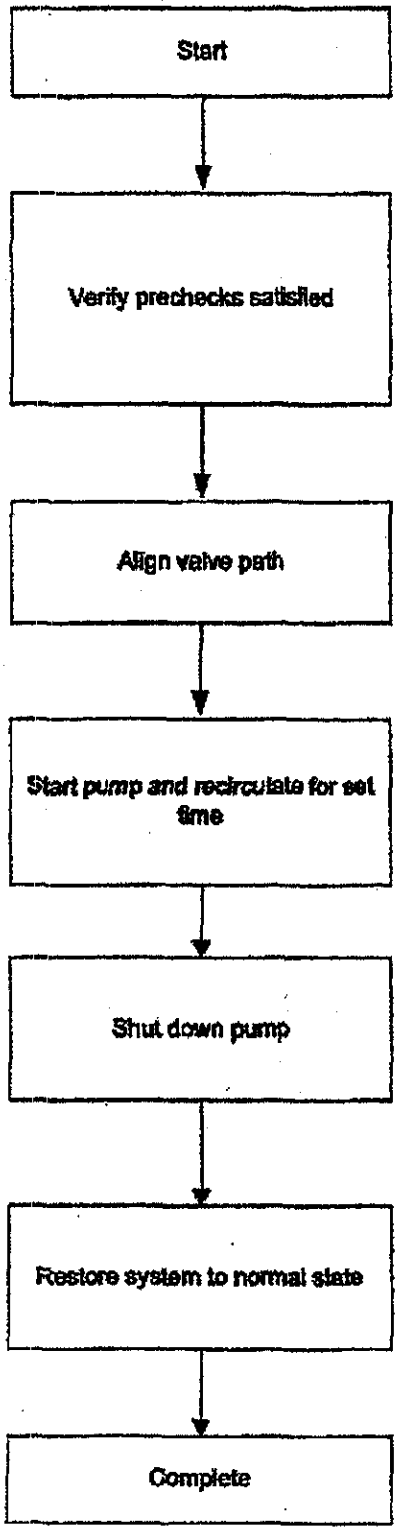
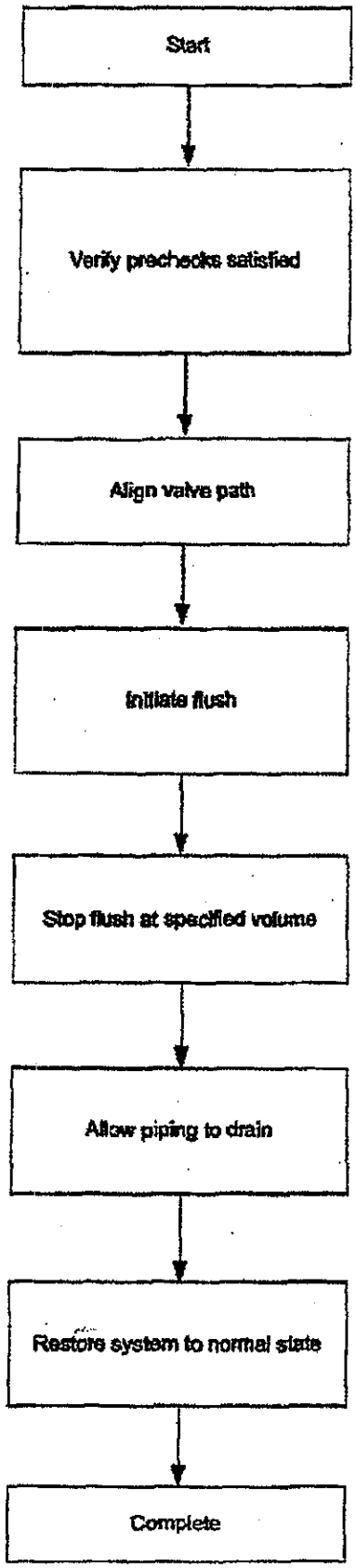


Figure A-4 Flushing Operations



Appendix B: Test Acceptance Criteria

Test Acceptance Criteria System: Radioactive Liquid Waste Disposal System (RLD)

1.0 Purpose

The purpose of this appendix is to identify the system functions (and related requirements if applicable) that will be tested and the acceptance criteria associated with the tests.

This appendix also identifies the baseline operating data that need to be collected.

2.0 Scope

The scope of these criteria are limited to a demonstration of the major functions of the system. Major functions are defined as those important to safety (safety class and safety significant), product quality, or the environment, in addition to fluid and material transfers. This testing will be performed using complete assemblies including the same components and operator interfaces that will be used for production.

Component testing is described elsewhere. Plant and facility tests are included in the criteria if they can be used to validate the functionality of the system.

3.0 System Description

These criteria are associated with the *System Description for the Radioactive Liquid Waste Disposal System for the Analytical Laboratory*, 24590-LAB-3YD-RLD-00001, Rev 2.

4.0 Support Systems

Support systems required for testing are as follows:

C5V – C5 Ventilation System	C5V vents vessel RLD-VSL-00165 and prevents "crosstalk" between hotcells.
LVE – Low Voltage Electrical (480/208/120V) System	Each pump receives electrical power.
NLD – Non-Radioactive Liquid Waste Disposal System	NLD-TK-00001 receives liquid effluent from the Floor Drain Collection Vessel during non-routine operations.
PCJ – Process Control System	Controls and monitors vessels, pumps, and valves.
PSA – Plant Service Air System	The PSA provides motive-force for control valve actuators.
PTF PWD – Plant Wash and Disposal System	The hotcell drain collection vessel transfers liquid effluent and flush water to the PTF plant wash vessel PWD-VSL-00044.
UPE – Uninterruptible Power Electrical System	Provides power for controls and instrumentation.
WTJ – Waste Tracking and Inventory System	WTJ interfaces with PCJ to provide near-real-time status monitoring of vessel contents.

5.0 General

These criteria are based on the listed revisions of the source documents identified in the table below. Commissioning and Training (C&T) will verify that these source documents are the latest revision and notify the design authority of changes that should be evaluated for incorporation.

LAB RLD Test Acceptance Criteria

Function/Performance Requirement (F&Rs) (requiring testing)	Source Documents	Acceptance Criteria for Pass/Fail	Notes/Comments	Test Conditions
Mix Liquid Effluents	24590-WTP-DB-ENG-01-001, BOD, Section 6.6.3	Baseline operating data.	Record the temperature increase of the process fluid during mixing every hour for 8 hours. – Both pumps running – Terminate test if pump beings to cavitate	Integrated water run. Special configurations: RLD vessels contain batch volume of water at ambient temperature. Support systems: DIW, CSV
Mix Liquid Effluents	24590-WTP-DB-ENG-01-001, BOD, Section 6.6.3	Flowrate of pumps is as follows (minimum): RLD-PMP-00190A/B: 10 gpm RLD-PMP-00182A/B: 74 gpm RLD-PMP-00183A/B: 84 gpm	Record flowrate for system mixing. – One pump running	Integrated water run. Special configurations: RLD vessels contain batch volume of water. Support systems: DIW, CSV

Quarter Ending 3/05 24590-WTP-PCN-ENV-05-002

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

For F. Beranek 3/23/05

F. Beranek Date

Reviewed by ORP Program Office:

V by J. Schepens 4/5/05

R. J. Schepens Date

Quarter Ending 3/05

24590-WTP-PCN-ENV-05-002

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

Analytical Laboratory General Arrangement Plan at Elevation 0'-0" has been modified to reflect the expansion of the effluent collection trench in the WTP Laboratory Waste Drum Management Area (Room A-0139) a permitted container storage area. The collection trench has been expanded to run the entire length of the containment area where there is a roll-up door and personnel door and is designed to prevent precipitation run-on into the containment system per WAC 173-303-630(7)(b).

Additionally a small collection trench between Room A-0139 and the internal airlock (Room A-0139B) has been removed because the trench potentially interfered with the effectiveness of the airlock. This trench did not provide secondary containment or prevent precipitation run-on in the Laboratory waste drum management areas. Commercially available drum spill pallets are used to provide secondary containment in each of the waste drum management areas. Thus, the removal of this internal collection trench is not part of this modification request, and has been included in this description for completeness.

Attachment 51

Appendix 11.4

Replace Revision 1 of Analytical Laboratory General Arrangement Plan at Elevation 0'-0", with the attached Revision 2 of the Analytical Laboratory General Arrangement Plan at Elevation 0'-0"

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:	X			

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: A3

Enter wording of WAC 173-303-830, Appendix I Modification citation: Equipment replacement or upgrading with functionally equivalent components (e.g. pipes, valves, pumps, conveyors, controls)

Modification Approved: ☒ Yes ☐ No (state reason for denial)

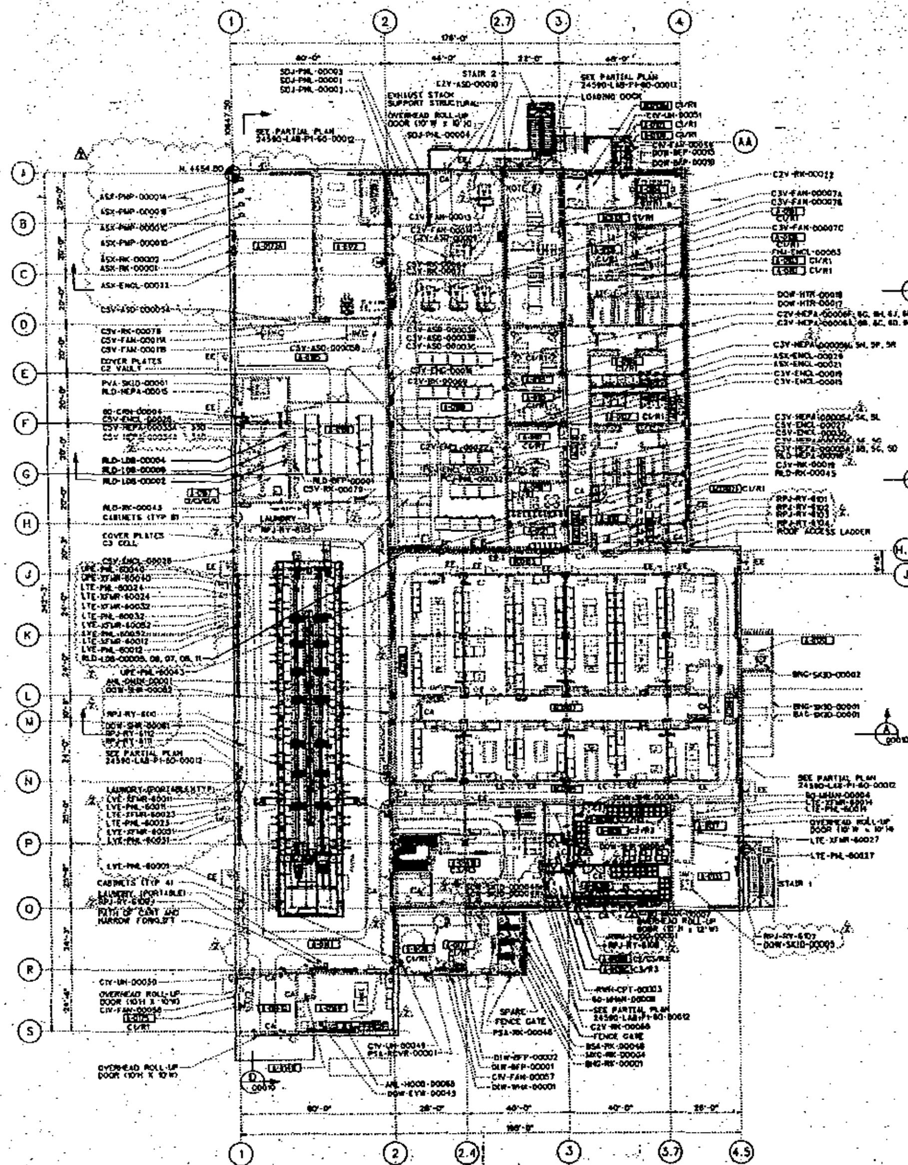
Reason for denial:

Reviewed by Ecology:

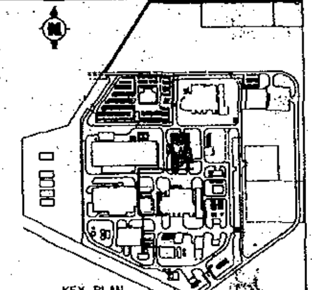
S. Dahl — Date: Apr. 1 2005

[1] Class 1 modifications requiring prior Agency approval.

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



PLAN AT EL 0'-0"



KEY PLAN
NOT TO SCALE

NOTES:

1. REFER TO DRAWING 24590-LAB-P1-60-P0010 SECTION "A" FOR CONVERSIONS FROM LAB FACILITY ELEVATIONS TO SITE ELEVATIONS (LAB FACILITY ELEVATION 0'-0" = SITE ELEVATION 677'-0" MSL).
2. FOR SITE REFERENCE SEE PLOT PLAN DRAWING 24590-BOF-P1-50-00001.
3. FOR LEGEND SEE DRAWING 24590-LAB-P1-60-P0007
4. CONTENTS OF THIS DOCUMENT ARE DANGEROUS WASTE PERMIT AFFECTING.
5. ALL OPERATING AREAS ARE DESIGNATED C2/R2 UNLESS NOTED OTHERWISE.
6. FOR ROOM NUMBERS AND DESCRIPTION SEE DRAWINGS 24590-LAB-AS-A10T-05200001, 24590-LAB-AS-A1T-05200002
7. DELETED
8. DELETED
9. REMOVABLE SIDING PANELS FOR EQUIPMENT REPLACEMENT - C2V-FAN-00013/C2V-ASD-00010.
10. REVISE DRUM SKID TO CORRECT OVERLAP IN ROOM A-0139D.

REVISE FAN/ASD EQUIPMENT AND LOCATIONS IN ROOM A-0160.

REVISE C5 PUMP PIT/PIPING PIT COVERS.

RELOCATE FOLLOWING EQUIPMENT/LABELS:

LVE-XFMR-80052	LTE-PNL-60032
LVE-PNL-60052	LTE-XFMR-60012
UPE-XFMR-80040	LTE-PNL-60012
UPE-PNL-60040	LVE-XFMR-80011
LTE-XFMR-80024	LVE-PNL-60011
LTE-PNL-60024	LTE-XFMR-80023
LVE-PNL-60051	LTE-PNL-60023
RLD-LDB-00005	LVE-XFMR-80051
RLD-LDB-00006	LVE-PNL-60001
RLD-LDB-00007	ASX-PMP-00001A
RLD-LDB-00008	ASX-PMP-00001B
RLD-LDB-00011	ASX-PMP-00001C
LTE-XFMR-60032	ASX-PMP-00001D
ASX-RK-00001	ASX-RK-00002
ASX-ENCL-00022	DOW-SHR-00082
DOW-SHR-00081	

ADD FOLLOWING EQUIPMENT/LABELS:

SCW-SKID-00004A	DIW-BFP-00002
SCW-SKID-00004B	DIW-BFP-00001
DOW-SKID-00005	DIW-WHA-00001
C3V-RK-00046	RPJ-RY-6112
RPJ-RY-6101	RPJ-RY-6113
RPJ-RY-6102	PCJ-ENCL-00437
RPJ-RY-6103	RPJ-RY-6109
RPJ-RY-6104	RPJ-RY-6110
RPJ-RY-6107	RPJ-RY-6111
RPJ-RY-6108	

DELETE FOLLOWING EQUIPMENT/LABELS:

DOW-SKID-00001	C5V-ENCL-00015
SCW-PMP-00019	FNJ-ENCL-00082
ASJ-CHSL-00001	
RCM-001	
RLD-SHLD-00001A/00001B/00002 (TOTAL 3)	
C3 FILTER (TYP) (TOTAL 4)	

REMOVE HOLD 1

REVISE CABINETS IN ROOM A-0149

UPDATE HEPA FILTER LABELS TO REFLECT FIVE DIGIT NUMERICAL COMPONENT NUMBER. PREVIOUS ISSUE REFLECTED A INCORRECT FOUR DIGIT NUMBER.

INCORPORATED DCN 24590-LAB-PIN-60-00019.

11. THE PORTIONS OF THIS DRAWING SHOWN IN PHANTOM ARE CONSIDERED NON-PERMIT AFFECTING AND ARE NOT SUBJECT TO THE REGULATORY REQUIREMENTS OF THE WAC CODE FOR THE DANGEROUS WASTE PERMIT TO THE EXTENT THAT THOSE PORTIONS DO NOT IMPACT DANGEROUS WASTE AREAS/OPERATIONS.

REFERENCE DRAWINGS

DWG NO	TITLE
24590-BOF-P1-50-00001	RPP - WTP PLOT PLAN
24590-LAB-P1-60-P0007	ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT EL (-)10'-2" SECTIONS E-E, F-F, G-G
24590-LAB-P1-60-P0008	ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT EL 17'-0"
24590-LAB-P1-60-P0010	ANALYTICAL LABORATORY GENERAL ARRANGEMENT SECTIONS A-A, B-B, C-C & D-D
24590-LAB-P1-60-P0011	ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT ROOF
24590-LAB-P1-60-P0012	ANALYTICAL LABORATORY GENERAL ARRANGEMENT PARTIAL PLANS AT EL 0'-0"
24590-LAB-AS-A10T-05200001	ANALYTICAL LABORATORY ARCHITECTURAL ROOM FINISH SCHEDULE
24590-LAB-AS-A10T-05200002	ANALYTICAL LABORATORY ARCHITECTURAL ROOM FINISH SCHEDULE

REVISION HISTORY

REV	DESCRIPTION	ORG	CHKD	REVWD	APPR	DATE
2	ISSUED FOR PERMITTING USE					
1	ISSUED FOR PERMITTING USE					7/28/04
0	ISSUED FOR PERMITTING USE					10-28-03

[redacted]

RIVER PROTECTION PROJECT
WASTE TREATMENT PLANT
2435 STEVENS CENTER PLACE
RICHLAND, WA 99352

CONTRACT No. DE-AC27-01RV14136

ANALYTICAL LABORATORY GENERAL ARRANGEMENT PLAN AT EL 0'-0"

SCALE 1/16" = 1'-0"

DWG NO. 24590-LAB-P1-60-P0006 REV 2

[redacted]

Quarter Ending 6/05 24590-WTP-PCN-ENV-05-003

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

for F. Beranek 4/25/05

F. Beranek Date

Reviewed by ORP Program Office:

R. J. Schepens 5/25/05

R. J. Schepens Date

Quarter Ending 6/05

24590-WTP-PCN-ENV-05-003

Hanford Facility RCRA Permit Modification Notification Form

Unit:	Permit Part & Chapter:
Waste Treatment and Immobilization Plant	**Part III, Chapter 10 and Attachment 51**

Description of Modification:

This modification provides for tailoring of ASME B31.3 per *Safety Requirement Document* (24590-WTP-SRD-ESH-01-001) in *Installation of Tank Systems and Miscellaneous Unit Systems* (24590-WTP-PER-CON-02-001). The approval of this modification by Ecology will close Ecology Issue and Involvement Log Waste Treatment Plant issue number 7, Vacuum Box Leak Testing.

Attachment 51, Appendix 7.12

Replace Revision 3 of *Installation of Tank Systems and Miscellaneous Unit Systems* (24590-WTP-PER-CON-02-001), with the attached Revision 5 of this document.

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: N/A

Enter wording of WAC 173-303-830, Appendix I Modification citation: N/A

In accordance with WAC 173-303-830(4)(d)(i), this modification notification is requested to be reviewed and approved as a Class [1]1 modification. WAC 173-303-830(4)(d)(ii)(A) states, "Class 1 modifications apply to minor changes that keep the permit current with routine changes to the facility or its operation. These changes do not substantially alter the permit conditions or reduce the capacity of the facility to protect human health or the environment. In the case of Class 1 modifications, the director may require prior approval."

Modification Approved: ☒ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl — June 17 2005 — Date

[1] Class 1 modifications requiring prior Agency approval.

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

Attachment A to 24590-WTP-PCN-ENV-05-003

Installation of Tank Systems and Miscellaneous Unit Systems, 24590-WTP-PER-CON-02-001, Revision 5

Document title: **Installation of Tank Systems and Miscellaneous Unit Systems**

Contract number: DE-AC27-01RV14136

Department: Construction

Author(s): W Melvin

Principal author signature: W. T. Melvin

Document number: 24590-WTP-PER-CON-02-001, Rev 5

Checked by: Simon Wright

Checker signature: S Wright

Date of issue: 4/6/05

Issue status: Approved

Approved by: James T. Minor

Approver's position: Field Engineering Manager

Approver signature: James T Minor PE 4/19/05

JAMES T. MINOR
STATE OF WASHINGTON
14880
REGISTERED
PROFESSIONAL ENGINEER

4/19/05

EXPIRES 5/5/06

This bound document contains a total of 11 sheets

James T Minor 4/19/05
Signature Date

River Protection Project
Waste Treatment Plant
2435 Stevens Center Place
Richland, WA 99352
United States of America
Tel: 509 371 2000

History Sheet

Rev	Date	Reason for revision	Revised by
0	9 Aug 2002	Initial issue; Issued For Permitting Use	W Melvin
1	13 March 2003	Incorporation of Washington State Department of Ecology Comments, CCN 048713	W Melvin
2	10 Dec 2003	Incorporation of miscellaneous treatment equipment	W Melvin
3	10 Nov 2004	Incorporate vacuum box testing; Replaced MRI with MAP for receipt inspection; Miscellaneous non-technical changes for clarity. Replaced WAC references with the appropriate permit condition references.	W Melvin
4	1/2705	Incorporate Washington Department of Ecology Comments	W Melvin
5	5 April 2005	Referenced DOE documents that affect ASME B31.3	W Melvin

Acronyms and Abbreviations

ASME	American Society of Mechanical Engineers
AWS	American Welding Society
CDR	Construction Deficiency Report
CM	Commercial Grade
IQRPE	Independent, Qualified, Registered, Professional Engineer
MAP	Material Acceptance Plan
MRI	Material Receipt Instruction
NCR	Nonconformance Report
NDE	Non-Destructive Examination
PADC	Project Archives and Document Control
QL	Quality Program Applicable
WTP	Hanford Tank Waste Treatment and Immobilization Plant

Contents

1 Introduction

This document describes how the Hanford Tank Waste Treatment and Immobilization Plant (WTP) will satisfy the following Permit Conditions:

Note: Miscellaneous unit systems are defined in Permit Conditions III.10.G., III.10.H., III.10.I., III.10.J., and III.10.K.

- Permit Condition III.10.E.3.a. for the installation of secondary containment of tank systems
- Permit Conditions III.10.E.3.a. through c. and e. for the installation of tanks
- Permit Conditions III.10.E.3.a. through e. for the installation and testing of tank system ancillary equipment
- Permit Conditions III.10.E.5.b. and III.10.E.9.d.x. for the installation and testing of tank system process, control and leak detection instrumentation

- Permit Conditions III.10.G.3.a., III.10.H.1.a.iv. and III.10.J.1.a.iv. for the installation of secondary containment of miscellaneous unit systems
- Permit Conditions III.10.G.3.a. through c. and e., III.10.H.1.a.iv. through vi. and viii., and III.10.J.1.a.iv. through vi. and viii. for the installation of miscellaneous units/sub-systems
- Permit Conditions III.10.G.3.a. through e., III.10.H.1.a.iv. through viii. and III.10.J.1.a.iv. through viii. for the installation and testing of miscellaneous unit system equipment/sub-system equipment
- Permit Conditions III.10.G.5.b., III.10.G.10.d.x., III.10.H.1.a.xiv., III.10.H.5.d.x., III.10.I.1.a.viii., III.10.J.1.a.xiv., III.10.J.5.d.x., and III.10.K.1.a.viii. for the installation and testing of miscellaneous unit system process, control and leak detection instrumentation

Miscellaneous unit systems and tank systems are heretofore referred to as *regulated plant items*.

1.1 Applicable Documents

ASME Section VIII, *Pressure Vessels.*

ASME B 31.3 –, *Process Piping. (As tailored in 24590-WTP-SRD-ESH-01-001-02, Safety Requirement Document, Volume II, as amended, Appendix, C , Section C.26, which is not a permit affecting document.)*

ASME Section IX, *Qualification Standard for Welding and Brazing Procedures, Welders and Brazers and Welding and Brazing Operators.*

AWS D1.1, *Structural Welding Code – Steel.*

WAC, Chapter 173-303, *Dangerous Waste Regulations.*

2 Description

2.1 Receipt Inspection, Rigging, and Installation

The following is a list of activities that prevent defects in regulated plant items during receiving, installation, and testing. Construction installation and inspection records are generated in accordance with project or vendors' procedures to document work processes. For the purpose of this document, they are referred to as the *Field Installation Report*. This term is consistent with the permit.

2.1.1 Receipt Inspection

A material acceptance plan (MAP) is generated based on key attributes that require independent verification. The MAP is developed from approved technical requirements taken from applicable codes, specifications, drawings, standards and other similar sources specific to the specific material requisition/ purchase order. Examples of requirements that may be found in a MAP include the following:

- specific attributes/activities that require independent verification
  - material type/grade/class/color/finish
  - equipment type/rating/class/capacity/manufacturer
  - manufacturing methods/process/controls
  - size/shape dimensions.
- identify hold/witness points
- identify specific acceptance criteria for defined attributes/activities directly or by reference
- proper identification of materials and regulated plant Items
- storage levels and any special requirements or conditions associated with receiving, handling and storage

2.1.2 Rigging:

- rigging instructions are generated, when applicable, and ensure the following requirements are met:
  - rigging equipment is of sufficient rating to perform the lift
  - regulated plant items are lifted in accordance with manufacturer's instructions when provided. When the vendor does not provide specific rigging instructions BNI standard rigging practices are employed.
- rigging equipment is examined periodically and required maintenance is performed to ensure proper function.

2.1.3 Installation

Installation of regulated plant items and materials are documented on field installation/inspector reports. Activities that will have field installation/inspector reports generated include the following:

- concrete placement, cure and finishing
- equipment installation/alignment
- installation of pipe/pipe supports
- welding activities
- bolt torquing
- coating system installation
- sub-grade and foundation materials and compaction
- rebar, embed, and anchor placement
- installation of liner plate
- installation of corrosion protection systems
- placement of shop and field fabricated tanks and miscellaneous units
- regulated plant items support installation
- instrument sensing lines and support installation
- regulated plant items and instrument identification

Regulated plant items and materials are inspected for physical damage at the time of installation.

Protective boxes, welding blankets, and access control are used, as necessary, to protect regulated plant items and materials from damage during construction and testing.

2.2 Inspection

Inspections of regulated plant item installations are performed by persons qualified to perform the inspections. Inspections are performed prior to the work being covered, enclosed, or placed in use. Inspections are documented on the field installation reports. The inspector's signature indicates compliance with the requirements.

Inspections are performed and documented to the current design at the time of inspection. Current design is constituted by documents issued for construction; these include, but are not limited to the following:

- BNI approved vendor drawings
- BNI approved vendor installation manuals
- BNI approved vendor rigging instructions
- piping isometric drawings
- support drawings
- equipment location drawings
- concrete placement drawings
- embedded plate detail and location drawings
- instrument installation details
- approved interim design changes

Installation activities that are inspected include, but are not limited to, the following:

- sub-grade and foundation materials and compaction
- rebar, embed, and anchor placement
- concrete placement, cure, and finishing
- installation of liner plate
- installation of corrosion protection systems
- placement of shop and field fabricated tanks and miscellaneous units
- welding activities
- bolt torquing
- regulated plant items support installation
- instrument sensing lines and support installation
- regulated plant items and instrument identification
- equipment installation/alignment
- coating system installation
- installation of pipe/pipe supports

Field installation reports are reviewed for accuracy and completeness. Retention of field installation reports is performed in accordance with Project Archives and Document Control (PADC) controls and procedures.

2.3 Control of Discrepancies

Discrepancies found during receipt, installation, and test inspections are documented in a *nonconformance report* (NCR) for items identified as QL (Quality Program Applicable) and a *construction deficiency report* (CDR) for items identified as Commercial Grade (CM). An NCR/CDR provides the following:

- a detailed description of the discrepancy
- a description of the requirement
- a disposition to correct the discrepancy
- appropriate approvals of the disposition
- confirmation that the disposition has been completed

Hold tags are applied when appropriate to the discrepant item to prevent it from being covered, enclosed, or placed in use until the discrepancy has been remedied. Any discrepancies will be remedied prior to the regulated plant item being covered, enclosed, or placed in use. [Permit Conditions III.10.E.3.a. and c., III.10.G.3.a. and c., III.10.H.1.a.iv. and vi., and III.10.J.1.a.iv. and vi.].

NCRs/CDRs with a final disposition of "Use As Is" or "Repair" that affect critical systems are provided to the Washington Department of Ecology within five (5) calendar days in accordance with Permit Condition III.10.C.9.d.

Closed NCRs/CDRs are retained in PADC.

2.4 Testing

Tightness testing is performed in accordance with the design and installation code applicable to the regulated plant item. Testing is performed and inspected by persons competent in the performance of the applicable test (e.g. hydrostatic, pneumatic or vacuum box testing). Testing is documented to provide a record that the system or regulated plant item was tested for the prescribed period and fully inspected for leakage.

Process and control instrumentation for WTP regulated plant items will be commissioned after installation. Commissioning will be performed using procedures that implement vendor technical guidance. Calibration procedures are written, reviewed, and approved to satisfy the program controls contained in WTP administrative procedures. If required, a loop calibration check will be performed to verify the proper instrument output to the WTP distributed control system. Similar to instrument calibrations, the instrument loop calibration check procedures will satisfy vendor guidance and WTP administrative controls.

2.5 Certification of Construction

2.5.1 Independent Inspector

Prior to covering, enclosing, or placing new regulated plant item(s) in use, an independent, qualified, installation inspector or and independent, qualified, registered professional engineer (IQRPE), either of whom is trained and experienced in the proper installation of regulated plant items, shall have inspected the system for the presence of any of the following items [Permit Conditions III.10.E.3.a. and c., III.10.G.3.a. and c., III.10.H.1.a.iv. and vi., and III.10.J.1.a.iv. and vi].

- weld breaks
- punctures
- scrapes of protective coatings
- cracks
- corrosion
- other structural damage or inadequate construction/installation

The following documentation (available in PADC) is considered by the independent qualified installation inspector, or IQRPE, in certifying proper installation of regulated plant items [Permit Conditions III.10.E.3.g., III.10.G.3.g., III.10.H.1.a.x., and III.10.J.1.a.x.]:

- field installation reports (previously listed Section 2.1)
- approved welding procedures
- welder qualifications and certifications
- tightness test reports in accordance with the codes specified by design
- tester credentials

- inspector credentials
- field inspector reports (previously listed in Section 2.1)
- field waiver reports (i.e.,NCRs, CDRs),
- non-compliance reports, corrective action and repair reports (i.e., NCRs, CDRs)

Procedures for excavation and backfill, concrete placement and system turnover to commissioning and test will have controls to ensure that the independent qualified installation inspector or IQRPE has performed installation inspections and inspections to confirm that discrepancies have been remedied before the regulated plant item is covered, enclosed or placed in use.

2.5.2 Corrosion Protection Inspection

Installation of the field fabricated cathodic protection system for the underground transfer piping will be supervised by a independent corrosion expert to ensure proper installation [Permit condition III.10.E.3.e].

2.5.3 Certification of Construction

Certified written statements from the independent qualified installation inspector or IQRPE and from the independent corrosion expert will be obtained attesting that the regulated plant items and field fabricated cathodic protection system were properly installed and any repairs were performed [Permit Conditions III.10.E.1.d, III.10.G.1.d., III.10.H.1.a.iii., III.10.I.1.a.iv., III.10.J.1.a.iii., and III.10.K.1.a.iv.].

The written statements will be maintained and available in the WTP Unit Operating Record [Permit Conditions III.10.E.3.f., III.10.G.3.f., III.10.H.1.a.ix., and III.10.J.1.a.ix.].

3 Summary

Tank systems and miscellaneous unit systems are installed in accordance with the applicable engineering documents and manufacturer's installation instructions. Special instructions for installation requirements that are not skill of the craft will be provided in a field installation report developed from the engineering documents or manufacturer's instructions or BNI standard practices or a combination of all. Field installation/inspectors reports, when completed, document the inspections necessary to ensure the quality installation of the regulated plant items.

Installation and/or process instructions will include the following, where applicable:

- rigging instructions
- step-by-step assembly instructions
- welding procedures and conditions

- coatings system installation
- tightness testing
- instructions to prevent damage to the regulated plant item during construction and startup

Installation activities ensure that required inspections by construction inspectors and the independent qualified installation inspector, or IQRPE, are performed before the regulated plant item to be inspected becomes covered, enclosed, or placed in use.

Attachment 2
05-ED-036

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of the Hanford Facility Resource Conservation and Recovery Act permit modification notification form 24590-WTP-PCN-ENV-05-003.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

4/28/05
Date

Quarter Ending 6/30/2005

24590-WTP-PCN-ENV-05-004

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

Index

Submitted by Co-Operator:

for F. Beranek 5/3/05

F. Beranek Date

Reviewed by ORP Program Office:

R. J. Schepens 6/1/05

R.J. Schepens Date

Hanford Facility RCRA Permit Modification Notification Form	
Unit: **Waste Treatment and Immobilization Plant**	Permit Part & Chapter: **Part III, Chapter 10 and Attachment 51**

Description of Modification:

The purpose of this modification is to change the interim compliance dates for those items scheduled for completion in 2005. Completion dates of the selected items are being extended by one year. Additionally, item 33, 2005 Report of Progress, has been added to satisfy Dangerous Waste Regulations, WAC-173-303-815, Condition 3.a.ii.B.

Appendix 1.0
WTP Interim Compliance Schedule

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	**Interim Compliance Date**
	PRETREATMENT PLANT MISC. UNITS SYSTEMS	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	~~10/30/05~~ 10/30/06
	LAW SHORT TERM MELTER UNIT	
23.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit sub-system	~~08/18/05~~ 08/18/06
24.	Submit engineering information for equipment for each LAW Vitrification Miscellaneous Treatment Unit sub-system	~~06/02/05~~ 06/02/06
	HLW SHORT TERM MELTER UNIT	
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system	~~06/18/05~~ 6/18/06
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system	~~06/18/05~~ 6/18/06
	REPORT OF PROGRESS	
33.	Submit 2005 Report of Progress	9/31/05

WAC 173-303-830 Modification Class: [1] [2]	Class 1	Class [1]1	Class 2	Class 3
Please mark the Modification Class:		X		

Enter Relevant WAC 173-303-830, Appendix I Modification citation number: A.5.a

Enter wording of WAC 173-303-830, Appendix I Modification citation: Change in interim compliance dates, with prior approval of the director.

Modification Approved: ☒ Yes ☐ No (state reason for denial)

Reason for denial:

Reviewed by Ecology:

S. Dahl June 17 2005 Date

[1] Class 1 modifications requiring prior Agency approval.

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

Attachment 2
05-ED-039

Bechtel National, Inc. Certification Statement

Bechtel National, Inc. Certification

The following certification statement is provided consistent with Contract No. DE-AC27-01RV14136, Section H.26, Environmental Permits, paragraph (g) for the submittal of Hanford Facility Resource Conservation and Recovery Act Permit Modification Notification Form (24590-WTP-PCN-ENV-05-004) to update Compliance Schedule Items and Add Submittal of 2005 Progress Report in Appendix 10.0 of the Dangerous Waste Permit.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

J. P. Henschel
Project Director

5/17/05
Date

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Hanford Facility RCRA Permit Modification Notification

List of Attachments, Attachment 4
DOE/RL-94-02, Hanford Emergency Management Plan

Replacement Index

Attachment 4, Appendix C

APPENDIX C

HANFORD FIRE DEPARTMENT EQUIPMENT LIST

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Engines 4 pumpers 3 ladders 1 aerial ladder	Examples of equipment contained on engines: • 1,500-2,000 gal/min (5,678.1-7,570.8 L/min) pump; • 300-500 gal (1,135.6-1,892.7 L) water tank; • 1 – 85' aerial ladder platform; • 3 – telescoping 65'-75' ladder trucks with nozzle; and • Jaws of Life.	1 pumper at Station 91, 92, 93, and 94 1 ladder at Station 91 1 ladder at Station 93 1 ladder at Station 94 Aerial at Station 92
Brush Fire Trucks 6 each	Examples of equipment contained on brush fire trucks: • 500 gal/min (1,892.7 L/min) pump; • 1,500 gal (5,678.1 L)-2,500 gal (9463.5 L) water tank; • 6x6 with 2,000 gal (7,570.8 L)-2,500 gal (9463.5 L) porti-tank; and • hose, nozzles, fittings, and tools.	1 at Station 91 2 at Station 92 2 at Station 93 1 at Station 94
Water Tenders 1 each	Examples of equipment contained on water tenders: • 1000 gal/min (3785.4 L/min) pump; • 2 - 2,500 gal (9463.5 L) porti-tanks; • 4,500 gal (17,034.3 L) water tank; and • hose, nozzles, fittings, and tools.	Station 92
Grass Fire Units 4 each	Examples of equipment contained on grass fire units: • 100 gal/min (378.5 L/min) pump; • 250 - 400 gal (946.3 – 1514.2 L) water tank; • 4-wheel drive; and • hose, nozzles, fittings, and tools.	1 at each station
Ambulances 6 each	Examples of equipment contained on ambulances: • life support systems; and • medical and emergency response supplies.	1 at Station 91 2 at Station 92 1 at Station 93 2 at Station 94
Command Vehicles 3 each	Contains communications equipment and protective equipment for commander.	Station 92

EQUIPMENT	DESCRIPTION	*NORMALLY LOCATED
Mobile Incident Command Vehicle 1 each	Examples of equipment contained on mobile incident command vehicle: • communications equipment; • radio communications in Tri-County area; • cell phones (including satellite); • 10,000 watt generator; and • copier, fax.	Station 92
Attack Vehicles 1 each	Examples of equipment contained on attack vehicles: • 450 lb (204.1 kg) of purple-K; • 300 gal (1,1335.6 L) aqueous film-forming foam concentrate; • 300 gal (1,135.6 L) of aqueous film-forming foam pre-mix solution; and • hose, nozzles, fittings, and tools.	Station 91
Hazardous Materials Vehicle 2 each	Examples of equipment contained on hazardous materials vehicle: • protective clothing for Hazardous Materials Response Team; • breathing apparatus for Hazardous Materials Response Team; • diking, plugging, and damming equipment; • detection instruments for Hazardous Materials Response Team; • tools for plugging and repairing leaking containers; • overpack containers for leaking containers; • command module with material safety data sheets, software, and portable meteorological station; and • tools and communications devices necessary to provide communications during emergency response activities.	1 at Station 92 1 at Station 93
Metal Fire Response Vehicle 1 each	Examples of equipment contained on metal fire response vehicle: • equipment for response to special metals fire; • 500 lb (226.8 kg) of extinguishing powder; and • 1,000 lb (453.6 kg) of carbon microspheroids.	Station 94
Rescue Truck 1 each	Examples of equipment contained on rescue truck: • heavy and light rescue; • water rescue; • hi/lo angle rescue; and • trench rescue.	Station 92
Mobile Air Vehicle 1 each	Examples of equipment contained on mobile air vehicle: • mobile air compressor, recharges self-contained breathing apparatus cylinders; and • tools and fittings for operation of vehicle and spare cylinders.	Station 91

*The Hanford Fire Department Chief has the authority to: 1) direct the placement of equipment as needed to control emergency events; and 2) take proactive action and assign different vehicle locations based on conditions such as fuel moisture content, area fire history, work in progress, or other conditions that could arise.

Hanford Facility RCRA Permit Modification Notification

Part III, Chapter 4 and Attachment 34
Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

Replacement Index

Attachment 34, Chapter 11.0

Chapter 11.0 **Closure and Financial Assurance**

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11.0 CLOSURE AND FINANCIAL ASSURANCE [I]

This chapter describes the planned activities and performance standards for closing LERF and ETF.

11.1 CLOSURE PLAN/FINANCIAL ASSURANCE FOR CLOSURE [I-1]

The LERF and ETF will be clean closed with respect to dangerous waste contamination that resulted from operation as TSD units, with closure of LERF occurring first. To facilitate closure, the LERF retention basins are being viewed as consisting of seven components: the covers and primary liner, drainage layer system/bentonite carpet liner, secondary liner, soil bentonite, internal and/or external piping, ancillary equipment, and concrete basins. To facilitate closure of ETF, ETF is being viewed as consisting of six components: tanks, internal and/or external piping, ancillary equipment, concrete floors/dikes/ encasements, structures, and soil directly beneath the structure. It is anticipated that closure of LERF and ETF will begin after the projected 30-year active life of LERF and ETF. If it is determined that clean closure is not possible, the closure plan will be modified to address required postclosure activities.

Uncontaminated structures will be left for future use or disassembled, dismantled, and removed for disposal. Uncontaminated equipment and structures could include aqueous makeup, HVAC and piping, steam condensate and cooling water piping, and the control room and office areas.

Clean closure requires decontamination or removal and disposal of all dangerous waste, waste residues, contaminated equipment, soil, or other material established in accordance with the clean closure performance standards of WAC 173-303-610(2). This and future closure plan revisions will provide for compliance with these performance standards.

11.2 CLOSURE PERFORMANCE STANDARD [I-1a]

Clean closure, as provided for in this plan, and in accordance with WAC 173-303-610(2), will eliminate future maintenance and will be protective of human health and the environment by removing or reducing chemical contamination at LERF and ETF to levels that eliminate the threat of contaminant escape to the environment.

After closure, the appearance of the land where the LERF and ETF are located will be consistent with the appearance and future use of its surrounding land areas. This plan proposes to leave clean structures and equipment in place after closure for potential use in future operations. This need will be evaluated at the time of closure.

11.2.1 Closure Standards for Metal Surfaces, Rubber, Tanks, and Concrete

This closure plan proposes use of a 'clean debris surface' (defined in the following paragraph) as the clean closure performance standard for the metal surfaces, rubber (i.e., basin covers, liners, etc.), tanks, and concrete that will remain after closure. This approach is consistent with Ecology guidance (Ecology 1994a) for achievement of clean closure. Additionally, adherence to this guidance ensures that all residues have been removed as required by WAC 173-303-640 for clean closure of the ETF tank systems. The ETF verification tanks will be considered "clean" if the delisting limits were not exceeded for the effluent in the tanks. If the delisting limits were exceeded, closure activities will be as described in Section 11.3.4.3.

The clean debris surface standard is verified visually. "A clean debris surface means the surface, when viewed without magnification, shall be free of all visible contaminated soil and hazardous waste except residual staining from soil and waste consisting of light shadows, slight streaks, or minor discolorations and soil and waste in cracks, crevices, and pits may be present provided that such staining and waste and

soil in cracks, crevices, and pits shall be limited to no more than 5% of each square inch of surface area" (40 CFR 268.45). When a physical extraction method is used on concrete, the performance standard is based on removal of the contaminated layer of debris. The physical extraction performance standard for concrete is removal of 0.6 centimeter of the surface layer and treatment to a clean debris surface. Inspections to verify achievement of a clean debris surface will be performed and documented.

11.2.2 Closure Standards for Internal and External Piping

The internal and external piping of both LERF and ETF will be flushed and drained as part of closure. For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 incorporated by reference and can be declared non-dangerous in accordance with WAC 173-303-071(3)(qq). If it is not possible to inspect the contaminated surfaces or meet the clean debris surface performance standard, the particular piping of concern will be removed, designated, and disposed of accordingly.

Dangerous and/or mixed-waste materials generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

11.2.3 Closure Standards for Ancillary Equipment

Ancillary equipment is defined as pumps and other miscellaneous equipment not otherwise specified in this closure plan. Ancillary equipment will be removed and disposed.

11.2.4 Closure Standards for Underlying Soils

The LERF retention basins have a leachate collection system for leaks or spills that channels the liquid to drains or sumps. The collected liquid is pumped back into the basins, thereby preventing spills from reaching the soil. The soil only could be contaminated if the secondary liner had failed. To determine if failure occurred, the primary liner will be inspected for leaks, holes, or punctures and the drainage gravel and bentonite carpet liner underneath the primary liner will be sampled and analyzed for contamination. If the drainage gravel analytical results determine that the constituents of concern are at or below agreed to regulatory cleanup levels (i.e., Hanford Site soil background levels (DOE-RL 1993) and/or residential exposure assumptions), the gravel will be considered clean for closure. Only if contamination is found in the drainage gravel/bentonite carpet liner will the secondary liner surfaces be inspected for leaks, holes, or punctures, which (if existing) could have provided a pathway to soil for contamination (refer to Chapter 4.0, Figure 4-3 for basin diagram). If no leaks, holes, or punctures are found in the primary liner or if the drainage gravel/bentonite carpet liner is found not to be contaminated, the soil will be considered to be clean closed. However, if leaks, holes, or punctures are found in the primary liner or the gravel is contaminated, the secondary liner surfaces will be inspected. If no leaks, holes, or punctures are found in the secondary liner surfaces, the soil will be considered clean closed. If such leaks, holes, or punctures are identified, potential soil contamination will be investigated. Soil will be sampled and analyzed for constituents of concerns. If the soil analytical results determine that, the constituents of concern are at or below agreed to regulatory cleanup levels, the soil will be considered clean closed.

Clean closure of soil under the ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated. Soils will be sampled and analyzed for constituents of concern. If the soil analytical results determine that the constituents of concern are at or below agreed to regulatory clean up levels, the soil will be considered clean closed. The

Hanford Facility RCRA Permit Condition II.K defines regulatory cleanup levels. If verification sampling is required, a sampling analysis plan will be prepared before closure in a manner consistent with Ecology guidance (Ecology 1994a) for achievement of clean closure.

11.3 CLOSURE ACTIVITIES [I-1b]

The LERF and ETF were designed for a 30-year active life. At the time of closure, the closure plan will be modified as necessary to reflect current regulation or informational revisions. If it is determined that clean closure is not possible, the closure plan will be modified to address required postclosure activities.

11.3.1 General Closure Activities

The approach to LERF closure is to dispose of accumulated basin aqueous waste by processing the waste through ETF. Primary basin liners and covers will be decontaminated or disposed of as appropriate. Any remaining solids (residue) within basins will be removed, designated, and disposed of accordingly. Piping associated with LERF closure is intended to be decontaminated and left in place. Rinsate generated during decontamination also will be disposed of through ETF. Sampling will assess whether contamination beneath the primary liner has occurred. Contamination, if present, will be managed in compliance with regulatory requirements.

The approach to ETF closure is to process any aqueous waste through the effluent treatment system. Any containerized dangerous waste and/or mixed waste will be transferred to other TSD units. All structures and equipment will be decontaminated and/or disposed. Piping associated with ETF closure is intended to be decontaminated and left in place. Contamination, if present, will be managed in compliance with regulatory requirements.

Equipment or materials used in performing closure activities will be decontaminated or disposed at a permitted facility.

11.3.2 Constituents of Concern for Closure for the Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility

Using the list of dangerous waste numbers in the Part A, (Chapter 1.0) process knowledge and the risk to human health and the environment, the constituents of concern for closure will be determined through the data quality objective process.

11.3.3 Removing Dangerous Waste [I-1b(2)]

At the start of LERF closure, aqueous waste will be transferred sequentially from each basin to ETF for treatment. At a treatment rate of about 284 liters per minute, it will take approximately 60 days to empty a full basin. Basin covers will remain in place to prevent possible wind dispersion of waste until all basin waste has been removed.

All of the aqueous waste inventory at the ETF will be processed before closure. Any residue remaining in piping, equipment, or the LERF liner will be removed to an appropriate disposal unit. All containerized waste will be dispositioned. All secondary waste in containers will be transferred to an appropriate TSD unit.

11.3.4 Decontaminating Structures, Equipment, and Soils [I-1b(3)]

This section discusses the activities necessary to implement a clean closure strategy for the LERF and ETF. Before closure activities begin, any waste inventory stored will be removed. After the waste inventory is removed, clean closure of the LERF covers and primary liner, drainage layer/leachate collection system/bentonite carpet liner, secondary liner, soil bentonite, the internal piping, ancillary equipment, and the concrete catch basins will be accomplished by decontaminating the components as

necessary, and demonstrating that clean closure performance standards are met (Section 11.1.1). To facilitate closure of ETF, tanks, internal piping, external piping, ancillary equipment, concrete floors/dikes/encasements, structures, and soil directly beneath the structure will be decontaminated, as necessary, to demonstrate that the clean closure performance standards are met.

Removal and disposal of most of the components will be determined at time of closure. Clean closure of the soil will be accomplished by demonstrating that the concrete kept contaminants from reaching the soil.

11.3.4.1 Covers and Liners

After all pumpable waste has been removed from a given basin at LERF; the cover for that basin will be removed. The cover either will be decontaminated or disposed of appropriately. If the cover is disposed of, the cover will be cut up within the basin and loaded into a lined dump truck for transport and disposal. If the covers are to be reused, an initial decontamination effort will be made by spraying the underside of the cover while in place over a basin. The intent of preremoval spraying is to minimize subsequent decontamination efforts and to use the basin as a wash water catchment. Each cover will be inspected visually for physical damage in the same manner as the primary liners. Visible signs of damage to the cover will be repaired as specified by the cover manufacturer. The cover decontamination procedure will be to position a cover into its basin and wash the cover. Any openings, such as for vents, will be sealed temporarily so that rinsate cannot seep through. The method and degree of washing will be the same as necessary for the respective basin liner. The generated rinsate will be transferred from the basin to the ETF or appropriate TSD unit.

The primary liner will be inspected visually for physical damage and surveyed before any decontamination efforts. Physical damage will be defined as tears, holes, or punctures such that the liner would not hold water. A description and location of any physical damage found will be noted in an inspection record. Visible signs of damage to the liner will be repaired per procedures specified by the manufacturer before decontamination to prevent liquid solutions from driving potential contamination down into the drainage gravel. The purpose of the inspection will be twofold: to identify and map any physical damage in the primary liner that might have allowed contaminants a pathway to the drainage gravel below; and to identify areas that potentially are contaminated with dangerous waste or dangerous waste residues. The inspection standard for the liner will be a clean debris surface as defined in Section 11.1.1.1. The inspection of the liner for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard can be clean closed as is, based on Ecology acceptance of the completed record.

Those potentially contaminated areas will undergo decontamination to meet the clean closure standard of a clean debris surface. Plastic surfaces indicated by visual examination as being potentially contaminated will be decontaminated through use of physical extraction technologies such as high-pressure steam and water sprays coupled with a detergent wash.

Achievement of a clean debris surface will be documented on an inspection record. Decontamination rinsate will be transferred directly to the ETF or transferred to another basin before ultimate disposal. If it is not possible to meet the clean closure performance standard, or there is no further need for the liner, the primary liner could be removed, designated, and disposed of accordingly. The inspections for a clean debris surface will be documented on an inspection record.

11.3.4.2 Drainage Layer/Bentonite Carpet Liner/Secondary Liner

Assessment of contamination beneath the LERF's primary liner will be performed within each basin by sampling the drainage gravel. Biased rather than random location selection will be used to increase the probability of detecting leachate contamination. Sampling points will be chosen where physical damage was noted during the inspection of the primary liner or areas where the underlying material porosity and

permeability and the hydraulic head would most likely drive any leachate. The leakage rate through the liner would increase toward the bottom of the liner as hydraulic head increases. Any leakage that did occur in the sloped sides could be expected to travel down slope through the geotextile between the primary and secondary liner until reaching the bottom of the liner. Therefore, the most likely area of contamination would be the drainage gravel.

Gravel samples will be collected by removing the bentonite carpet liner and making an incision in the geotextile. Sampling will be performed in accordance with existing procedures at the time of sampling. Special care will be needed in sampling for volatiles. To aid in ensuring sample integrity, the initial removal of gravel to create the gravel profile will not be done unless the samples can be collected immediately.

Sample collection will occur immediately after profile exposure. If no constituents of concern are found above soil closure performance standards (Section 11.1.1), no further analysis will be done. If the initial sample analysis indicates liner leakage, analysis of the bottom sample will be performed to determine the depth of contamination. Additional gravel samples from different locations will be taken to determine the spatial extent of contamination.

A visual assessment of the underlying basin integrity will be made at the bottom of each sampled location and wherever else gravel is removed. If the basin is perceived to be damaged such that leakage could have occurred beneath the secondary liner, an amendment to the closure plan will be submitted to allow time for additional sampling and possible gravel removal. Sampling beneath the secondary liner, if necessary, will be attempted in accordance with sampling procedures for beneath the primary liner. Sampling beneath the secondary liner has not been extensively addressed because of the remote probability of its occurrence. The drainage gravel will be the preferred flow path even if minor leaks exist in the secondary liner. The secondary liner is resting on a soil/bentonite bed, which would tend to seal any punctures in the secondary liner as hydraulic head built up.

Sampling and disposal objectives will be determined at the time of closure activities through the data quality objectives process.

11.3.4.3 Tanks

After all pumpable waste has been removed from the tanks at ETF, the interior of the tanks, including the internal components such as the agitator, will be washed down by adding or spraying with steam, a water-soluble cleaner, or other approved method. The tanks will be emptied and the interiors visually examined.

After rinsing, the tanks will be inspected visually for compliance with the performance standard. Visual inspection might be made remotely using a camera or other device that allows verification of meeting the standard. If any areas are found not meeting the clean debris surface performance standard, these areas will be decontaminated in-place. Per the debris rule, only removal of contaminants from the surface layer is necessary for metal surfaces. Contamination will be removed from the surface layer using either high-pressure water blasting (a physical extraction method) or by hand or remote wiping, washing, brushing, or scrubbing using an approved cleaner, and rinsing with water or by other appropriate methods.

The outside of the tanks also will be inspected for compliance to the performance standard. Any areas found not to meet this performance standard will be decontaminated in-place. Contamination will be removed from the surface layer using any of the methods described for internal tank decontamination or another appropriate method. Before using decontamination solutions on the outside of the tanks, the floor will be inspected for cracks or other openings that could provide a pathway to soil. This inspection will be performed as described in Section 11.1.4.6 in conjunction with mapping of potential through-thickness cracks. Any such cracks will be mapped. The cracks will be sealed before beginning treatment or other

engineered containment devices (e.g., portable catch basins, liners) will be used to collect and contain solutions.

Decontamination residues will be collected, designated, and managed as appropriate. If it is not possible to meet the clean closure performance standard, contaminated portions of the tanks could be removed, designated, and disposed of accordingly. The inspections for a clean debris surface will be documented on an inspection record.

11.3.4.4 Internal and External Piping and Ancillary Equipment

The internal piping and ancillary equipment for both LERF and ETF will be flushed and drained as part of closure. For piping where the contaminated surfaces can be inspected, an inspection will be performed to see if the piping meets the clean debris surface standard in 40 CFR 268.45 and can be declared non-dangerous. If it is not possible to meet the clean debris surface standard or the piping cannot be inspected, portions of the internal piping will be removed, designated, and disposed of accordingly.

External piping (transfer lines) and ancillary equipment associated with LERF and ETF consist of below grade and above grade piping. Below grade piping, will be dispositioned at closure consistent with the practices for below grade piping in the 200 Areas at the time of closure. For above grade piping, it will be dispositioned consistent with the provisions for internal piping.

Rinsate from the external piping and LERF internal piping will be processed through ETF. Rinsate from closure of the ETF that cannot be treated at ETF will be managed in accordance with WAC 173-303-610(5). Detail regarding the process for rinsing any internal and external piping and ancillary equipment will be provided in the closure plan in accordance with WAC 173-303-610(3)(a)(v) upon modification as stated in Section 11.6.

Dangerous and/or mixed-waste materials generated during closure activities will be managed in accordance with WAC 173-303-610(5). Removal of any dangerous wastes or dangerous constituents during partial or final closure will be handled in accordance with applicable requirements of WAC 173-303-610(5).

11.3.4.5 Concrete

At LERF, the concrete catch basins are located at the northeast corner of each retention basin, where inlet pipes, leachate risers, and transfer pipe risers emerge for the basin. The concrete catch basin is curbed, and coated with a chemical resistant epoxy sealant. The concrete catch basin is sloped so that any leaks or spills from the piping or connections will drain into the basin. At the ETF, the coated concrete floor and berm provides secondary containment for all the tanks and process piping.

At LERF and ETF, all concrete will be inspected visually and surveyed before any decontamination. The purpose of the inspection will be twofold: to identify and map any cracks in the concrete that might have allowed contaminants a pathway to the soil below (Section 11.1.2.3.), and to identify areas that potentially are contaminated with dangerous waste or dangerous waste residues. The inspection standard will be a clean debris surface as defined in Section 11.1.1. The inspection of the concrete for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard can be clean closed as is.

Those potentially contaminated areas will undergo decontamination to meet the clean closure standard of a clean debris surface. The concrete will be washed down, the rinsate collected, designated, and disposed of accordingly. The concrete will be reinspected for a clean debris surface. Concrete surfaces indicated by visual examination, as still being potentially contaminated will have the surface layer removed to a depth of 0.6 centimeter by scabbling or other approved methods. This will not threaten the environment, even if potential through-thickness cracks had been found during the inspection, because concrete

decontamination (scabbling) will not employ liquid solutions that could enter cracks and because scabbling residues will be vacuumed away from cracks as any residue is generated.

Achievement of a clean debris surface will be documented on an inspection record. Decontamination residues will be collected, designated, and managed as appropriate.

11.3.4.6 Structures

If contaminated with either dangerous or mixed waste constituents, the ETF structures will be decontaminated and/or disassembled, if necessary, packaged, and disposed of in accordance with existing land disposal restrictions (WAC 173-303-140).

Closure steps could include the following activities.

- Containerize (as necessary and practicable) and remove any remaining waste.
- Review operating records for spillage incidents and visually inspect storage area surfaces for evidence of contamination or for cracks that could harbor contamination or allow the escape of decontamination solutions. Inspect storage area surfaces for visible evidence of contamination (e.g., discoloration, material degradation, wetness, and odor). If contamination is evident, the affected area(s) will be decontaminated.
- Decontaminate ETF walls and floors to minimize the potential for loose contamination and facilitate any required surveys and/or chemical field screening. The structures could be cleaned by water rinse or high-pressure, low-volume steam cleaning coupled with a detergent wash. After decontamination, the walls and floors will be compared to closure performance standards.
- Collect rinsate and manage as dangerous waste for appropriate disposal.
- Secure (lock) personnel entries into building and post doors with appropriate warning signs.

Clean closure of structures will occur in accordance with WAC 173-303-610. Remediation of soil contamination beneath or around containment buildings will be performed in conjunction with soil closure requirements.

11.3.4.7 Underlying Soils

Clean closure of soil under LERF's secondary liner will be accomplished by demonstrating that the liners and leak detection system kept contaminants from reaching the soil. The secondary liner provided secondary containment for the LERF basins. Unless inspections identify potential leaks, punctures, cracks, or tears indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such leaks, punctures, etc., potential soil contamination will be investigated.

Clean closure of soil under ETF will be accomplished by demonstrating that the coated concrete floor kept contaminants from reaching the soil. The coated concrete floor and bermed area provided secondary containment for all the tanks and process piping. Unless inspections identify potential through-thickness cracks indicating containment failure and a subsequent potential for soil contamination from TSD unit operations, the soil will be considered clean closed. However, if inspections identify such cracks and there have been documented spills in the vicinity, potential soil contamination will be investigated.

Where it is possible visually to inspect directly beneath the tanks, a visual inspection will be performed. Where it is not possible visually to inspect beneath the tanks, an evaluation of the tank integrity will be made. The condition of the tank will be evaluated to determine if there was any potential for leakage. If no cracks, severe corrosion, or evidence of leaks is observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

External piping (transfer lines) between the 242-A Evaporator and LERF and LERF and ETF are double-lined with a leak detection system. If records indicate that no leaks from the primary piping occurred, the soil will be considered clean with respect to RCRA closure.

11.4 MAXIMUM WASTE INVENTORY [I-1c]

The maximum waste inventory for ETF/LERF is in Chapter 1.0.

11.5 CLOSURE OF CONTAINERS, TANKS, AND SURFACE IMPOUNDMENTS [I-1d]

The following sections cover closure of containers, closure of tanks, and closure of surface impoundments.

11.5.1 Closure of Containers [I-1d(1)]

Containers at ETF will be used to contain dangerous waste in the event of a spill, unexpected release, or equipment failure. Containers will be used to accumulate nonradioactive dangerous waste and/or mixed waste. Any containers used to contain dangerous and/or mixed waste at the ETF will be disposed of in the appropriate manner. Containers of dangerous and/or mixed waste will not be left in the ETF after closure.

11.5.2 Closure of Tanks [I-1d(2)]

Clean closure of ETF will consist of the removal and disposal of all dangerous waste and the decontamination and/or removal and disposal of contaminated equipment, including tanks. The ETF was designed to incorporate removable components. This design facilitates closure by allowing complete removal of equipment contaminated with dangerous and mixed waste.

11.5.3 Closure of Surface Impoundments [I-1d(4)]

At closure, all of LERF that received regulated waste will be closed in accordance with the requirements of WAC 173-303-650(6)(a)(i). All equipment, structures, and other material associated with closure of LERF will be decontaminated or removed in accordance with WAC 173-303-610(2). All basin waste and decontamination rinsate will be transferred to ETF. Sampling and testing will be conducted.

11.6 SCHEDULE FOR CLOSURE [I-1f]

Closure of LERF and ETF is not anticipated to occur within the next 30 years. The actual year of closure will depend on the time required for current waste to be processed and what role the LERF and ETF will play in processing additional waste generated during future activities in the 200 Areas. Other factors affecting the year of closure include changes in operational requirements, lifetime extension upgrades, and unforeseen factors. When a definite closure date is established, a revised closure plan will be submitted to Ecology.

The activities required to complete closure are planned to be accomplished within 180 days in accordance with WAC 173-303-610(4)(b). Should a modified schedule be necessary, a revised schedule will be presented and agreed to before closure in accordance with WAC 173-303-610(4)(c).

Hanford Facility RCRA Permit Modification Notification

Part III, Chapter 6
325 Hazardous Waste Treatment Units

Replacement Index

Chapter 2.0 Facility Description and General Provisions

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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS

2.1 DESCRIPTION OF 325 HAZARDOUS WASTE TREATMENT UNITS

The 325 HWTUs are located within the 325 Building, located in the 300 Area on the Hanford Facility. The 325 Building (known as the Radiochemical Processing Laboratory (RPL)) includes the following: (1) a central portion (completed in 1953) that consists of three floors (basement, ground, and second) containing offices and general purpose laboratories, provided with special ventilation and work enclosures, designed for radiochemical work; (2) a south (front) wing containing office space, locker rooms, and a lunch room; and (3) east and west wings containing shielded "hot cells" with remote manipulators. Non-Treatment, Storage, and Disposal (non-TSD) activities within the 325 Building include radiochemistry research, radioanalytical service, and radiochemical process development activities.

Please note that source, special nuclear, and by-product materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at DOE facilities exclusively by DOE acting pursuant to its AEA authority. These materials are not subject to regulation by the State of Washington. All information contained herein and related to, or describing AEA-regulated materials and processes in any manner may not be used to create conditions or other restrictions set forth in any permit, license, order, or any other enforceable instrument. DOE asserts that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and by-product materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

The 325 HWTUs include two subunits located in portions of the basement and ground floors. The Shielded Analytical Laboratory (SAL) is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, 524, and 528.

The 325 HWTUs receive, store, and treat dangerous waste generated by Hanford programs (primarily from research activities in the 325 Building and other Pacific Northwest National Laboratory [PNNL] facilities). Storage and treatment of dangerous waste in containers occurs in the HWTU. At the SAL, dangerous waste is stored and treated in a tank and in containers. As detailed in Chapter 4.0, containers are managed in accordance with WAC 173-303-630, and the tank systems are managed and operated in accordance with WAC 173-303-640. A more detailed discussion of the waste types treated and stored and the identification of processes and equipment are provided in Chapters 3.0 and 4.0, respectively.

Container and tank storage limits, and annual and daily treatment limits are listed in Chapter 1.0. Waste treatment processes could include pH adjustment, ion exchange, carbon absorption, oxidation, reduction, and waste concentration by evaporation, precipitation, filtration, solvent extraction, phase separation, solids washing, catalytic destruction, and solidification and/or stabilization. These waste treatments are conducted on small quantities of diverse dangerous waste generated from research and development and analytical chemistry activities.

2.1.1 Shielded Analytical Laboratory

The west wing of the 325 Building houses a hot cell area (completed in 1963 and upgraded in the mid-1970s) known as the Shielded Analytical Laboratory (SAL). The SAL consists of five rooms: basement level Room 32 and ground floor level Rooms 200, 201, 202, and 203. Chapter 1.0 provides a drawing of Room 32 showing the location of the SAL tank.

The SAL is designed as a high-level radiation analytical chemistry area where activities are integrated with the operations of other analytical chemistry laboratories in the 325 Building. The SAL is divided into four distinct areas: the front face (Room 201), the hot cells, the back face (Rooms 200, 202, and 203), and Room 32.

The SAL includes eight hot cells, six of which are interconnected and situated side by side. Two hot cells located in Room 203 are used for work with highly radioactive materials, and not for treating or storing dangerous waste. The six interconnected hot cells are designed to handle samples with high radiation dose rates. The east side of each compartment, which faces into Room 201, is equipped with two manipulators and with high-density lead-glass viewing windows having the same shielding effect as the walls. These compartments are used for analytical chemistry operations as well as for TSD operations. An interconnected stainless steel trough runs along the front of all the hot cells. The trough is the means by which liquid dangerous waste flows by gravity through stainless steel piping to the SAL tank.

The back face of the SAL is divided into three rooms (Rooms 200, 202, and 203). For ALARA reasons, a special storage area exists in Room 202 is used to store containers of mixed waste with high radiological dose rate material.

The SAL hazardous waste tank system is located in Room 32, which is in the basement of the 325 Building. This tank system consists of the tank; associated piping, valves and pumps; and the secondary containment. The SAL tank is a double-walled tank constructed of stainless steel with a capacity of 1,218 liters. The tank is placed within a cylindrical stainless steel containment structure that provides tertiary containment. The liquid dangerous waste drains by gravity from the trough in the SAL hot cells to the SAL tank via stainless steel drain lines. The RLW system piping is a 316L stainless steel single pipeline inside the basement. A pressurized transfer line allows the tank contents to be transferred back up to the hot cells for treatment prior to disposal. The SAL tank utilizes a remote video monitoring system and three tank-level monitoring devices.

The SAL serves two purposes: (1) sample preparation and analyses of mixed waste and highly radioactive materials for various clients and (2) treatment of dangerous waste generated during analytical work within the SAL and potentially from other onsite and/or offsite facilities. Dangerous waste treatment could include pH adjustment, ion exchange, and waste concentration by evaporation, precipitation and/or filtration and solvent extraction, solids washing, and solidification and/or stabilization. Operations are conducted by manipulator or other remote equipment.

2.1.2 Hazardous Waste Treatment Unit

The HWTU consists of three rooms (Rooms 520, 524 and 528) located in the northeast corner of the main floor of the 325 Building. The rooms are multipurpose laboratory space that has been adapted to hazardous waste management. The three rooms together occupy an area approximately 69'x32'. Containerized dangerous and mixed waste is stored and/or treated in these rooms. The storage of containers in the HWTU for greater than 90 days is conducted in compliance with WAC 173-303-630.

Container storage takes place in cabinets, drums, and other devices in these rooms. Engineered devices (such as pans and containment pallets) are used where necessary to store drums and other large containers requiring secondary containment.

The treatment processes used in the unit are bench-scale operations that are portable and can be conducted at various locations within the HWTU. Routine treatments that could be conducted in the HWTU include pH adjustment, ion exchange, carbon absorption, oxidation, reduction, and waste concentration by evaporation, precipitation, filtration, phase separation, catalytic destruction, and solidification and/or stabilization.

2.2 TOPOGRAPHIC MAP

Topographic map, H-13-000197, shows a distance of at least 305 meters around the 325 HWTUs. The map contains the following information:

- Map scale
- Date
- Prevailing wind speed
- Sewer systems
- Loading/unloading areas
- Fire control
- Access road location
- Access control
- 100-year flood plain
- Injection and withdrawal wells and direction
- A north arrow
- Surrounding land use
- Buildings

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Chapter 3.0 **Waste Analysis Plan**

Figures

Tables

Glossary

325 HWTUs	325 Hazardous Waste Treatment Units consists of the HWTU, SAL, and RLWS tank system subunits)
AA	atomic absorption
ALARA	as low as reasonably achievable
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
BED	Building Emergency Director
CFR	Code of Federal Regulations
COLIWASA	Composite Liquid-Waste Sampler
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
DOT	U.S. Department of Transportation
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
g	gram
gal	gallon
GC/MS	gas chromatography/mass spectroscopy
h	hour
HWTU	Hazardous Waste Treatment Unit
ICP	inductively coupled plasma
in.	inch
kg	kilogram
LDR	land-disposal restriction
MSDS	material safety data sheet
NFPA	National Fire Protection Association
OSHA	Occupational Safety and Health Administration
PCB	polychlorinated biphenyl
PNL	Pacific Northwest Laboratory
PNNL	Pacific Northwest National Laboratory (PNL, above, was renamed to Pacific Northwest National Laboratory in October 1995)
psf	pounds per square foot
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SAL	Shielded Analytical Laboratory
TCLP	toxicity characteristic leaching procedure
TSD	treatment, storage, and disposal
UFC	Uniform Fire Code
WAC	Washington Administrative Code

Acceptable Knowledge
Information collected by the generator to meet waste-management requirements and determined to be adequate by the TSD unit. According to EPA, the generator may use process knowledge, waste-analysis data, and records of analysis performed before the effective date of regulation. Process knowledge is acceptable for assigning appropriate waste codes.

Analysis
The process that the generator completes to characterize the waste properly. This analysis must provide the information necessary to manage the waste in accordance with the requirements of WAC 173-303. The analysis may include or consist of a review of existing published or documented data on the dangerous waste, or on waste generated from similar processes, or data obtained by testing, if necessary. The information must include detailed information pertaining to the chemical, physical, and/or biological nature of a dangerous waste, or nondangerous wastes if applicable under WAC 173-303-610(4)(d) [WAC 173-303-300(2)].

Bulk Waste Stream
Large volumes of homogeneous waste from a single generating event, e.g., soil remediation from a single location.

Certification
Refer to Land Disposal Restrictions LDR Certification

Characterize (characterization)
The steps the generator or TSD unit takes to describe the contents of the waste to ensure proper management adequately and accurately. This characterization information is required to provide for compliant treatment, storage, or disposal of a dangerous waste and includes waste designation, TSD unit waste-acceptance criteria, or land-disposal restriction information (to facilitate discussions on characterization, we use the terms characterize for storage, characterize for treatment, or characterize for disposal).

Characterize for Disposal
The minimum information required to demonstrate that a waste was not LDR or no longer LDR. This information consists of analytical data as described in the federal regulations (i.e., 40 CFR 268), which demonstrate the waste meets any concentration-based standards. To demonstrate that a specified technology was used to meet federal treatment standards (i.e., 40 CFR 268.42 or 268.45), acceptable knowledge must be obtained from the customer or by the disposal unit. For state-only land-disposal restrictions, the disposal unit will either test the waste, use process knowledge, or the two to confirm that the customer properly treated the waste, if applicable, to state land disposal restriction standards. Information must also be provided to demonstrate that the waste meets the operational parameters of the disposal facility, such as liner compatibility information.

Characterize for Storage
At a minimum, the information necessary to manage the waste appropriately at a TSD storage unit. Acceptable knowledge may be required for any operational parameters of the TSD unit, TSCA information (i.e., regulated for PCBs), and characteristics which may present a management concern (i.e., waste regulated for ignitability, corrosivity, and/or reactivity).

Characterize for Treatment
The minimum information for a waste to be shipped to a treatment unit and successfully treated. This includes a complete designation, land-disposal restriction determination information including underlying hazardous constituent information (if applicable), and treatment unit operational parameters.

Confirm (confirmation)
The confirmation process includes completing appropriate pre-shipment review and verification steps and/or parameters. The requirement to confirm appears twice in WAC 173-303-300 and applies to two different scenarios.

Scenario 1: The process that an owner or operator uses to ensure knowledge supplied by the generator or TSD unit is acceptable knowledge to ensure that the waste is managed properly [WAC 173-303-300(1)].

Scenario 2: The process that a facility owner or operator receiving off-site facility shipments uses to determine, by analysis if necessary, that each waste received at the facility matches the identity of the waste specified on the accompanying manifest or shipping paper [WAC 173-303-300(3)].

Conformance Issue
Any issue, which, if left unresolved, prevents acceptance of waste. This includes manifest discrepancies and inconsistencies.

Container Failure
A waste container for which a manifest discrepancy has been identified.

Container Receipt Inspection
The process a TSD unit uses to examine an incoming container and will include, but is not limited to, inspecting labels, checking the condition of the container, checking the piece count of the shipment, and checking the shipping papers associated with the container.

Corroborative Testing
Sampling and analysis performed by both the treater and disposer of an LDR waste to meet federal land-disposal restriction concentration-based treatment standards. The frequency of testing is determined on a case-by-case basis by the permit writer, 55 FR 22669.

Customer
The generator or TSD unit who ships waste to another TSD unit, the current custodian of the waste.

Designation
The process of determining if a solid waste is a mixed waste, resulting in the assignment of proper federal and state waste codes.

Disposal Unit
A TSD unit on the Hanford Facility permitted to dispose of mixed waste that meets all applicable state-only and federal land disposal restrictions (i.e., Low-Level Burial Grounds).

Effective Date of Regulation
The date when mixed waste became subject to regulation in Washington State (August 19, 1987).

Equivalent Test Method
A laboratory or field-testing method used to determine characteristics or composition of a waste that has been approved by Ecology in accordance with WAC 173-303 rule-making procedures, in lieu of using a laboratory- or field-testing method required by regulation. A generator or owner/operator must submit a rule-making petition to Ecology in accordance with WAC 173-303-110(5) and WAC 173-303-910(2).

Facility
All contiguous land, structures, other appurtenances, and improvements on the land used for recycling, reusing, reclaiming, transferring, storing, treating, or disposing of dangerous waste. The legal and physical description of the Hanford Facility is set forth in Permit Attachment 2, *Hanford Facility Legal Description.*

Fingerprint Analysis
Sampling and analysis of several key chemical and physical parameters of a waste to substantiate or verify the composition of a waste as determined previously during characterization. Fingerprint analysis typically is used by generators to substantiate waste characterization of frequently generated wastes. TSD units may use fingerprint analysis for verification. Parameters for sampling and analysis may be a subset of the parameters used during characterization, or they may be parameters that are not normally present in the waste to verify the absence of certain constituents.

General Waste Stream
Waste from a single customer and Waste-Management Group.

Generator
Any person, by site, whose act or process produces dangerous waste or whose act first causes a dangerous waste to become subject to regulation, WAC 173-303-040. The generator on the Hanford Facility is the U.S. Department of Energy Richland Operations Office and its contractors. A generator may accumulate (store or treat) a dangerous waste under the provisions in WAC 173-303-170 and -200.

Hanford Facility
Refer to Facility.

Inconsistencies
Any other discrepancies which are not manifest discrepancies.

Independent Authorized Agent
A group or organization that is functionally independent from the waste-generating function.

Land-Disposal Restrictions (federal)
Federal requirements pertaining to dangerous wastes designated under 40 CFR Part 261 that were generated on or after the effective date of regulation. State-only dangerous wastes are not subject to the federal LDR requirements.

Land-Disposal Restrictions (state-only)
State-only mixed-waste requirements pertaining to dangerous waste designated solely under WAC 173-303 and not 40 CFR 261 that were generated on or after the effective date of regulation.

LDR Certification
A written statement of professional opinion and intent signed by an authorized representative that acknowledges an owner's or operator's and/or generator's compliance with applicable LDR requirements.

Manifest Discrepancy
Significant discrepancies between the quantity or type of the dangerous waste designated on the manifest or shipping paper and the quantity or type of dangerous waste a facility actually receives, WAC 173-303-370(4)(a).

Pre-Shipment Review
The process used by the TSD unit to obtain and evaluate the generator's analysis of waste to be received by the TSD unit and to document acceptable knowledge on the waste profile.

Process Knowledge
Knowledge the generator applies to a solid waste to determine if it is a dangerous waste in light of the materials or the process used when such knowledge can be demonstrated to be sufficient for determining whether a solid waste is designated properly, WAC 173-303-070(3)(c)(ii). Process knowledge includes information on wastes obtained from existing published or documented waste-analysis data or studies conducted on mixed wastes generated by processes similar to that which generated the waste. Process knowledge for dangerous waste may also include information obtained from surrogate material.

QA/QC
Quality assurance (QA) is the process for ensuring that all data and the decisions based on that data are technically sound, statistically valid, and properly documented. Quality control (QC) procedures are the tools employed to measure the degree to which these quality-assurance objectives are fulfilled.

Re-Characterization
A process which occurs when an unsafe condition arises and/or when a waste is removed from a storage unit to meet acceptance criteria for the receiving treatment unit or disposal unit.

Repeat and Review Frequency
The frequency specified in a WAP on a TSD-unit basis that the owner/operator will ensure the knowledge maintained on a specific waste stream is still acceptable knowledge and/or adequate analysis. Repeat and review frequency provisions do not apply to corroborative testing.

Sampling and Analysis (Sampling and Laboratory Analysis)
The process of obtaining a representative sample(s) from a dangerous waste to determine the accuracy of characteristics or composition of the sample through laboratory or field testing.

Shipment Failure
A maximum of two container failures within the first verification sample set or combined first and second verification sample set. If only one container fails, it is considered an anomaly and corrected. It is understood that if the shipment consists of one or two drums, the shipment fails if one drum fails verification.

Significant Discrepancy
A discrepancy with regard to a manifest or shipping paper means a discrepancy between the quantity or type of dangerous waste designated on the manifest or shipping paper and the quantity or type of dangerous waste a TSD unit actually receives. A significant discrepancy in quantity is a variation greater than ten (10) percent in weight for bulk quantities (e.g., tanker trucks, railroad tank cars, etc.) or any variation in piece count for nonbulk quantities (i.e., any missing container or package would be a significant discrepancy). A significant discrepancy in type is an obvious physical or chemical difference which can be discovered by inspection or waste analysis (e.g., waste solvent substituted for waste acid. This also includes a discrepancy in the number of inner containers in a labpack.

Storage Unit
A TSD unit on the Hanford Facility permitted to store dangerous waste.

Treatment Unit
A TSD unit on the Hanford Facility permitted to treat dangerous waste.

TSD Unit
Refer to Unit.

Unit
The term unit (or TSD unit), as used in Parts I through VI of the Hanford Facility RCRA permit, means the contiguous area of land on or in which dangerous waste is placed, or the largest area where there is a significant likelihood of mixing dangerous-waste constituents in the same area. A TSD unit, for the purposes of this Permit, is a subgroup of the Facility which has been identified in the Hanford Facility Dangerous Waste Part A.

Verify (Verification)
An assessment the receiving TSD unit performs to substantiate the analysis acquired by the TSD unit before acceptance. Verification must be performed by TSD unit personnel or an authorized agent on wastes received by the TSD unit. Verification may occur at the receiving TSD unit or at the generator's location, depending on many dangerous-waste shipment and packaging configuration factors. Verification activities include container receipt inspection, and as applicable, physical screening, and/or chemical screening/fingerprint analysis.

Waste-Acceptance Criteria
The minimum requirements imposed by a TSD unit to ensure that a dangerous waste is managed properly.

Waste Analysis
Refer to Analysis. .

Waste Profile
A mechanism used by the receiving TSD unit to document the generator's acceptable knowledge to meet the owner or operator's analysis obligation in WAC 173-303-300(2). Example forms or documents typically used by the TSD unit to maintain analysis information are included in the WAP as attachments. For offsite facilities, the waste profile will include the waste analysis which dangerous-waste generators have agreed to supply in accordance with WAC 173-303-300(5)(g).

Waste Stream
Per or each waste stream refers to individual waste streams, each with an individual point of generation. Individual waste streams include wastes that are physically or chemically different from each other; wastes that are generated from different types of processes; and wastes that are the same type, but are generated at different points along the same process or at different process locations. For information, the Hanford Facility uses the following factors in determining a waste stream: (1) the Department of Transportation requirements pertaining to the waste materials; (2) the waste designation of the waste materials; (3) the order of events pertaining to the process which generates the waste materials, (4) impermissible dilution concerns based on WAC 173-303-150 and 40 CFR 268.3; and (5) any future treatment- and disposal-management pathways available to the waste materials.

Metric Conversion Chart

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

If you know	Multiply by	to get	If you know	Multiply by	to get
Length			Length		
Inches	25.40	Millimeters	Millimeters	0.0393	inches
Inches	2.54	Centimeters	Centimeters	0.393	inches
Feet	0.3048	Meters	Meters	3.2808	feet
Yards	0.914	Meters	Meters	1.09	yards
Miles	1.609	Kilometers	Kilometers	0.62	miles
Area			Area		
Square inches	6.4516	square centimeters	square centimeters	0.155	square inches
Square feet	0.092	square meters	square meters	10.7639	square feet
Square yards	0.836	square meters	square meters	1.20	square yards
Square miles	2.59	square kilometers	square kilometers	0.39	square miles
Acres	0.404	Hectares	Hectares	2.471	acres
Mass (weight)			Mass (weight)		
Ounces	28.35	Grams	Grams	0.0352	ounces
Pounds	0.453	Kilograms	Kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	Milliliters	Milliliters	0.03	fluid ounces
Quarts	0.95	Liters	Liters	1.057	quarts
Gallons	3.79	Liters	Liters	0.26	gallons
cubic feet	0.03	Cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	Cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

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

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3.0 WASTE ANALYSIS PLAN

This chapter provides information on the chemical, biological, and physical characteristics of the waste treated and stored in the 325 HWTUs, including waste descriptions, designations, and a waste-analysis plan.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste managed at the 325 HWTUs can be categorized as originating from the following general sources:

- listed waste from specific and nonspecific sources
- laboratory waste resulting from analysis of samples
- discarded commercial chemical products
- hazardous or mixed waste from chemicals synthesized or created in research activities using radioactive isotopes
- discarded commercial chemical products exhibiting dangerous-waste characteristics and/or criteria.

Each of these waste categories is discussed in the following sections, including waste descriptions, hazard characteristics, and basis for hazard designations. This information includes data that must be known to treat, store, or dispose of the waste as required under WAC 173-303-806(4)(a)(ii). Process information is provided in Chapter 4.0.

3.1.1 Listed Waste from Specific and Nonspecific Sources

Waste from specific and nonspecific sources consists of listed waste identified in WAC 173-303-9904. Chapter 1.0, for the 325 HWTUs identifies the following waste from this category:

- F001 – Spent halogenated degreasing solvents and sludges
- F002 – Spent halogenated solvents and still bottoms
- F003 – Spent nonhalogenated solvents and still bottoms
- F004 – Spent nonhalogenated solvents and still bottoms
- F005 – Spent nonhalogenated solvents and still bottoms
- F006 – Wastewater-treatment sludges from electroplating operations
- F007 – Spent cyanide-plating-bath solutions from electroplating operations
- F009 – Spent stripping- and cleaning-bath solutions from electroplating operations where cyanides are used in the process
- F027 – Discarded polychlorinated phenol formulations
- F039 – Leachate resulting from the disposal of more than one restricted waste classified as hazardous
- K011 – Bottom stream from the wastewater stripper in the production of acrylonitrile
- K013 – Bottom stream from acrylonitrile column in the production of acrylonitrile
- K048 – Dissolved air flotation (DAF) float from petroleum-refining industry
- K049 – Slop oil-emulsion solids from the petroleum-refining industry
- K050 – Heat exchange, bundle-cleaning sludge from petroleum-refining industry
- K051 – American Petroleum Institute separator sludge from the petroleum-refining industry
- K052 – Tank bottoms (leaded) from the petroleum-refining industry.

These halogenated and nonhalogenated solvents are in the form of spent solvents; no still bottoms are managed. These listed solvents are managed in containers and in the SAL tank system. Degreasing solvents (F001) as well as spent halogenated solvents (F002) are generated primarily in research and analytical processes. Spent nonhalogenated solvents (F003, F004, and F005) also come primarily from research laboratories. Much of the waste to be treated in the 325 HWTUs results from analyses of waste samples from sources already designated as F001 through F005. Manufacturing activities are not

performed on the Hanford Facility; therefore, dangerous waste from specific sources (WAC 173-303-9904 K-listed waste) is not generated at PNNL. Small quantities of K-listed waste, however, have been generated from treatability studies at PNNL in the past; the residues from these tests could be treated at the 325 HWTUs.

The F-listed waste is designated on the basis of the process knowledge (e.g., information from container labels, material safety data sheets [MSDS], or process information). Sampling might be performed if additional information is needed to document the composition and characteristics of the waste. The generator is responsible for specifying the characteristics of the waste, based on knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process that generated the waste. The F001- and F002-listed waste types are designated according to WAC 173-303-70 through WAC 173-303-100.

The K-listed waste in Chapter 1.0, is designated based on the source of the process generating the original waste. These waste types are designated as dangerous waste, unless the waste is mixed with other constituents that require the mixture to be designated as extremely hazardous waste.

3.1.2 Laboratory Waste Resulting from Analysis of Samples

Laboratory waste resulting from analyzing samples makes up the largest volume of waste to be treated or stored in the 325 HWTUs. These waste types include those designated from the dangerous-waste source list as described in WAC 173-303-082, designated as characteristic dangerous waste under WAC 173-303-090, and designated as dangerous waste by the criteria set forth under WAC 173-303-100. These waste types are designated based on process knowledge (i.e., project requirements, client-supplied information, and process information) as well as analytical results. Currently, much of this waste is designated as listed waste from the dangerous-waste source list based on information provided by the generator. The waste is designated as dangerous waste unless constituent concentrations in the waste require the designation to be extremely hazardous waste.

3.1.3 Discarded Commercial Chemical Products

Discarded chemical products consist of those products listed in WAC 173-303-081. Chapter 1.0, for the 325 HWTUs identifies all of the discarded chemical products listed in WAC 173-303-9903 (P001 through P123 and U001 through U359) and specifies an estimated maximum annual management quantity. Typically, only a few of these waste types are generated at any one time. Chapter 1.0, lists all of the waste types, because the wide variety of research activities conducted on the Hanford Facility presents the potential for generating these waste types.

Waste types in this category are designated based on process knowledge. Because this waste is usually in the original container, information on the container label is verified by process knowledge (i.e., knowledge that material is in its original container) and the label is used to identify contents. Excess or expired chemicals that have been determined to be a waste and that are still in the original container will not be sampled. These listed-waste types contain those designated as dangerous waste as well as those designated as extremely hazardous waste. These waste types also are subject to land-disposal restriction (LDR) regulations under 40 CFR 268 and WAC 173-303-140, including disposal prohibitions and treatment standards.

3.1.4 Hazardous or Mixed Waste from Chemicals Synthesized or Created in Research Activities Using Radioactive Isotopes

Waste from research activities may contain radioactive isotopes in addition to RCRA regulated constituents. In such cases the wastes are designated as mixed waste. Typically such wastes are

generated in small quantities, ranging from a few grams to a few liters. Waste is designated based on process knowledge or on the basis of sampling and analysis. Process knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste (e.g., log sheets for accumulation containers). If information available from the generator is inadequate for waste designation, the waste is sampled, and the results of the analysis are used for designation. These waste types include waste designated as characteristic dangerous-waste mixtures under WAC 173-303-090 and waste designated as dangerous waste under WAC 173-303-100. Chapter 1.0, includes all categories of toxic, persistent, and carcinogenic waste mixtures (i.e., both dangerous waste and extremely hazardous waste). While not all of these waste types currently are generated or have been generated, the wide variety of research activities conducted on the Hanford Facility presents the potential that these waste types could be generated and could require subsequent management at the 325 HWTUs. Similarly, the Chapter 1.0, includes the characteristic dangerous-waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and toxicity characteristics leaching procedure [TCLP] toxics caused by metals or organics content).

The waste also could be LDR waste regulated under 40 CFR 268 and WAC 173-303-140.

3.1.5 Discarded Commercial Chemical Products Exhibiting Dangerous-Waste Characteristics and/or Criteria

Many discarded chemical products handled in the 325 HWTUs are not listed in WAC 173-303-9903 but are still considered dangerous waste, because these products exhibit at least one dangerous-waste characteristic and/or criterion (WAC 173-303-090 and WAC 173-303-100). This waste is included in Chapter 1.0, under waste numbers D001 through D043, WT01, WT02, WP01, WP02, WP03, and WSC2. This waste typically is received in the manufacturer's original container.

Waste in this category is designated based on the process knowledge. Because this waste is usually in the original container, information on the container label is used to identify the contents. This waste includes waste designated as dangerous waste and waste designated as extremely hazardous waste.

The waste also could be LDR waste regulated under 40 CFR 268 and WAC 173-303-140.

3.1.6 Waste Analysis Plan

The 325 HWTUs Waste-Analysis Plan describes the procedures used to obtain the information necessary to manage waste in accordance with the requirement of WAC 173-303. The following are described: sampling methods; analytical parameters and rationale; quality-control and quality-assurance procedures; requirements for incoming waste; storage requirements for ignitable, reactive, and incompatible waste; and the waste-tracking and record-keeping procedures.

3.1.7 Manifest System

Onsite waste shipments are manifested pursuant to Hanford Facility RCRA Permit (Permit) Condition II.P.2. Offsite waste shipments are manifested in accordance with the requirements of WAC 173-303-370 and -180. The process for managing waste shipment documentation is given in Section 3.10.

3.1.7.1 Procedures for Receiving Shipments

The onsite generator is responsible for identifying waste composition accurately and arranging for the transport of the waste. A copy of all other pertinent operating records are maintained by the 325 HWTUs for 5 years. The waste-tracking methods are as follows.

Inspection of Transfer Papers/Documentation – The necessary transfer papers for the entire transfer are verified (i.e., signatures are dated, all waste containers included in the transfer are accounted for and correctly indicated on the transfer documentation, there is consistency between documents provided that describe the waste(s) being transferred, and the documentation matches the labels on the containers).

Inspection of Waste Containers – The condition of waste containers is checked to verify that the containers are in good condition (e.g., free of holes and punctures).

Inspection of Container Labeling – Transfer documentation is used to verify containers are labeled with the appropriate 'Hazardous/Dangerous Waste' labeling and associated markings according to the contents of the waste container.

Acceptance of Waste Containers – The 325 HWTUs personnel sign the transfer documents and retain a copy.

If transport will be over public roads (unless those roads are closed to public access during waste transport), a Uniform Hazardous Waste Manifest will be prepared identifying the 325 HWTUs as the receiving unit. The 325 HWTUs operations staff will sign and date each copy of the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 325 HWTUs. A copy of the manifest also will be retained in the 325 HWTUs operating record for 5 years.

3.1.7.2 Response to Significant Discrepancies

The primary concern during acceptance of containers for storage is improper packaging or waste-tracking form discrepancies. Depending on the nature of the condition, waste-tracking form discrepancies can be resolved through the stepwise use of the following alternatives.

- Contact the generator and transporter to reconcile the discrepancy. Incorrect or incomplete entries thus identified on the Uniform Hazardous Waste Manifest or the onsite waste-tracking form can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.
- The waste packages can be held and the onsite generator or offsite waste generator can be requested to provide written instructions for use in correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- The onsite generator or offsite waste generator can be requested to correct the condition on the Hanford Facility before the waste is accepted.
- If a noncompliant dangerous-waste package is received from an offsite waste generator, and the waste package is nonreturnable because of condition, packaging, etc., and if an agreement cannot be reached among the involved parties as to resolving the noncompliant condition, then the issue will be referred to the U.S. Department of Energy-Richland Operations Office (DOE-RL) and the Washington State Department of Ecology (Ecology) for resolution. Ecology will be notified if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Such waste packages, although not accepted, might be placed in the 325 HWTUs pending resolution. The package will be segregated from other waste and labeled in accordance with instructions in the unit contingency plan in the 'Event Scenarios' section.

3.1.7.3 Provisions for Nonacceptance of Shipment

Provisions for nonacceptance of waste transfers are discussed in the following sections.

3.1.7.4 Nonacceptance of Undamaged Shipment

Before waste is brought into the 325 HWTUs, all associated documentation is inspected and verified for treatment and/or storage authorization. Any transfer of materials that the 325 HWTUs are not designed to treat and/or store neither are unloaded from the vehicle nor accepted for treatment or storage.

3.1.7.5 Activation of Contingency Plan for Damaged Shipment

If waste transfers arrive at the 325 HWTUs in a condition that presents a hazard to public health or the environment, the building emergency plan is implemented, as described in Chapter 7.0.

3.1.8 Tracking System

Upon generation or receipt into the 325 HWTUs, each container of waste is assigned a unique tracking number. This number is used to track the following information:

- a description and the quantity of each dangerous waste received and the method(s) and date(s) of storage or treatment in the 325 HWTUs, in accordance with WAC 173-303-380(2)
- the location of each dangerous-waste container stored within the unit and the quantity at each location, including cross-reference to any applicable manifest and/or waste-tracking numbers
- waste-analysis results.

This system effectively tracks waste containers as the containers move through treatment or storage at the 325 HWTUs. The information is retained as part of the 325 HWTUs operating record, readily accessible for 5 years.

3.2 325 HAZARDOUS WASTE TREATMENT UNITS WASTE ANALYSIS PLAN

The 325 HWTUs are part of the Unit-Specific Portion of the Hanford Facility Resource Conservation and Recovery Act Permit (WA7890008967).

The 325 HWTUs consist of two units; all within the 325 Building, located in the 300 Area on the Hanford Facility (refer to Chapter 1.0). Chapter 2.0 provides detailed location information.

The 325 Building includes the following: (1) a central portion (completed in 1953) that consists of three floors (basement, ground, and second) containing general-purpose laboratories, provided with special ventilation and work enclosures (2) a south (front) wing containing office space, locker rooms, and a lunch room; and (3) east and west wings containing shielded enclosures with remote manipulators. The Shielded Analytical Laboratory (SAL) is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, 524 and 528. Figures 3.1 through Figure 3.2 provide drawings of the TSD units.

The fire water-collection tank, which serves rooms 520 and 528 of the HWTU, is located beneath Room 520 in the basement of the 325 Building. The rectangular tank measures 1.65 meters by 2.25 meters by 1.92 meters, and has a 22,710-liter capacity. The sides and floor of the tank are constructed of epoxy-coated carbon-steel plate. The steel sides and floor provide support for the chemical-resistant polypropylene liner. The tank is secured to the concrete floor of the 325 Building with 1.3-centimeter bolts at 1.82-meter intervals.

3.3 DESCRIPTION OF UNIT PROCESSES AND ACTIVITIES

The 325 HWTUs store and treat dangerous waste generated by Hanford Facility programs (primarily from research activities in the 325 Building and other Pacific Northwest National Laboratory [PNNL] facilities) and potentially from other onsite/offsite laboratories. Storage in containers and bench- or small-scale treatment of dangerous waste occur in both the HWTU and the SAL. As described in further

detail in Chapter 4.0, containers are managed in accordance with WAC 173-303-630; the SAL tank is managed and operated in accordance with WAC 173-303-640.

At the SAL, dangerous waste liquid is stored in a tank in Room 32.

Before receipt or acceptance of waste at the 325 HWTUs, the generator must supply adequate information to characterize and manage the waste properly. The information may include waste-characterization data, waste volume, container information, and process information.

If the material safety data sheets (MSDS), laboratory reagent, process knowledge, or analytical information provide insufficient information for a complete designation, the 325 HWTUs personnel require the generator unit to provide laboratory analyses before acceptance of the waste at the 325 HWTUs.

Containers in poor condition or inadequate for storage (e.g., damaged, not intact, or not securely sealed to prevent leakage) are not accepted in the 325 HWTUs. Examples of acceptable packaging include laboratory reagent bottles, U.S. Department of Transportation (DOT)-approved containers, spray cans, sealed ampules, paint cans, leaking containers that have been overpacked, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage using the criteria of WAC 173-303-190, and using professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment. Containers will not be opened, handled, or stored in a manner that would cause the containers to leak or rupture. Containers will remain closed except when sampling, adding, or removing waste or when analysis or treatment of the waste is ongoing. Containers of incompatible waste are segregated in the storage areas.

The regulated waste managed in the 325 HWTUs includes dangerous waste designated as listed waste; waste from nonspecific sources; selected waste from specific sources, characteristic waste, and state-only. Dangerous wastes that are managed in the 325 HWTUs are listed by waste code in Chapter 1.0.

Specific waste-treatment processes are found in the list of treatments in Chapter 1.0. Chapter 1.0, also provides the maximum process-design capacity for treatment and storage activities conducted in the HWTU and SAL.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste, as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for transfer are selected and labeled according to applicable regulations. Shipments may include manifesting and DOT compliance requirements. Shipments will be in accordance with 49 CFR as required by WAC 173-303-190.

The containers used for storage or treatment of dangerous waste is compatible with the waste stored in the containers.

All flammable-liquid waste is stored in compatible containers and in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable-storage cabinets or DOT-approved shipping containers. Solid chemicals are stored on shelving/flat surfaces in specifically designated areas based on need. All incompatible materials will be segregated.

325 HWTUs staff moves the dangerous waste containers in accordance with 325 HWTUs collection procedures that address safety and hazard considerations. The procedures cover various dangerous waste types and transportation modes. 325 HWTUs staff does not perform the operations, covered by a procedure, until they are formally trained on the procedure. All 325 HWTU staff is instructed in proper

container handling and spill-prevention safeguards as part of their training. When in storage, containers are kept closed except when adding or removing waste, in accordance with WAC 173-303-630(5)(a).

Because of the nature of some dangerous waste stored at the SAL, it is often necessary to modify the standard containers. This modification ensures that the containers are specially shielded to reduce the hazard of the radioactive component of the dangerous waste stored in the container and are compliant with ALARA criteria. These specially designed shielded containers are packaged depending on the amount of shielding required. The shielding is accomplished by surrounding the containers with concrete, lead, or other materials to reduce the dose rate produced by the radiological component of the dangerous waste.

The requirements in WAC 173-303-140 encourage the best-management practices for dangerous waste according to the priorities of RCW 70.105.150. In order of priority, these are reduction; recycling; physical, chemical, and biological treatment; incineration; stabilization and solidification; and land filling. The 325 HWTUs will observe these priorities whenever a management option exists. Recycling will be performed whenever waste can be used as reagent material to treat other waste received. To the extent practical, reduction of waste will be incorporated in the treatment processes so that the volume of residues will be reduced.

3.3.1 Identification/Classification and Quantities of Dangerous Waste Generated or Managed at the 325 HWTUs and Restricted/Prohibited

The dangerous waste managed at the 325 HWTUs can be categorized as originating from the following general sources:

- listed waste from specific and nonspecific sources
- laboratory waste resulting from analysis of samples
- discarded commercial chemical products
- waste from hazardous or mixed chemicals synthesized or created in research activities using radioactive isotopes
- discarded commercial chemical products exhibiting dangerous-waste characteristics and/or criteria.

Each of these waste categories is discussed in Section 3.1, including waste descriptions, hazard characteristics, and basis for hazard designations. This information includes data that must be known to treat, store, or dispose of the waste as required under WAC 173-303-806(4)(a)(ii).

3.4 DESCRIPTION OF CONFIRMATION PROCESS

325 HWTUs staff requires confirmation on all dangerous wastes before acceptance into the unit for treatment or storage. Generators must supply adequate information to characterize and manage the waste properly. The information includes waste-characterization data, waste volume, container information, and process information. A flow chart describing the confirmation process is shown in Table 3.1.

3.4.1 Pre-Shipment Review

Essentially all of the waste received at the 325 HWTUs is characterized before acceptance because the waste streams are generated from known processes. Unknown wastes are analyzed by the generator before they are accepted into the 325 HWTUs. Nearly all dangerous waste generated in the 325 Building is generated from analytical or research processes, both of which require detailed records. This data is provided for review prior to shipment to determine acceptability and to verify the waste in accordance with Section 3.4.2.

The primary source of information used by the generator to complete the waste-tracking form is process knowledge. Other information sources could be used, so long as these sources provide detailed information on the chemical constituents present, chemical concentrations, material characteristics (e.g., physical state, ignitability), and the characterization requirements on the waste-tracking form.

If the MSDS, laboratory reagent, process knowledge, or analytical information provides insufficient information for a complete designation, the 325 HWTUs personnel require the generator to provide laboratory analyses before acceptance of the waste at the 325 HWTUs.

All process knowledge and analytical data that are used for waste characterization, LDR determination, and/or treatment activities at this TSD unit shall be documented and placed in the Operating Record.

3.4.1.1 Technical Review Process Overview

This program, administered by the 325 HWTUs personnel, is designed to obtain the waste information required pursuant to 40 CFR 264.13 and WAC 173-303-300. The review is conducted by qualified 325 HWTUs personnel using procedural guidelines and professional judgment. The reviewer(s), at their discretion, could request additional information or require additional analytical data before determining waste acceptability.

The first step in evaluating the acceptability of a waste is to obtain a general description of the wastes and to identify the waste codes and regulatory requirements that apply to the waste.

Technical review of waste information is designed to accomplish three objectives: (1) determine if the 325 HWTUs can accept the material; (2) identify special handling procedures necessary to store the material safely before and during treatment; and (3) identify treatment technologies that meet waste-minimization efforts and applicable regulatory restrictions.

The waste-stream file includes the following information submitted by the generator and any literature reviews, records of conversations, etc., completed by the reviewer:

- copies of laboratory-test results, specific information on the process that generated the waste, MSDSs, etc., used to determine the components of the waste;
- waste characteristics, including compatibility, reactivity, ignitability, and corrosivity;
- documentation of conversations that clarify omissions or discrepancies;
- copies of data from additional analytical tests requested or conducted by the 325 HWTUs personnel; and
- container information, including number of containers, volume capacity of each of the containers, and type of material.

3.4.1.2 Review Criteria

The documentation and any required analyses must provide the information necessary to make decisions concerning waste acceptance or denial, storage requirements, treatments, legal/regulatory requirements, additional laboratory work, potential safety and handling hazards, and methods to verify that treatment is successful.

3.4.2 Verification

Where potential deficiencies exist in the information provided or where additional waste constituents might be expected to be present that do not appear in the supporting documentation, the generator is contacted by 325 HWTUs personnel for resolution. Upon approval, the 325 HWTUs personnel review the data package to determine whether or not the information is sufficient to complete the following:

- appropriate waste designation per WAC 173-303-070
- LDR per 40 CFR 268
- packaging, marking, and labeling requirements
- DOT compatibility groups, if applicable
- identification of a proper storage location within the 325 HWTUs.

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 325 HWTUs to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The information must be updated by the generator annually or when the waste stream changes, whichever comes first, or if the following occurs.

- The 325 HWTUs personnel have reason to suspect a change in the waste, based on inconsistencies in packaging or labeling of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.
- Parameters for the waste designation and/or characterization rationale are listed in Table 3.3.

Sampling and laboratory analysis or physical screening could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- waste streams generated onsite will be verified at 5 percent of each waste stream
- waste streams received for treatment or storage from non-PNNL offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- identification and characterization for unknown waste and spills within the unit.

Exceptions to physical screening for verification are:

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, 325 HWTUs staff must perform a more rigorous documentation review utilizing the radionuclide content information as an indicator of the accuracy of process knowledge of RCRA-regulated components and obtain the raw data to characterize the waste (<1 percent of current waste receipts).
- Waste which cannot be verified at the 325 HWTUs must be verified at the generating unit (e.g., large components, containers which cannot be opened, for ALARA reasons, or will not fit into the NDE unit). Physical screening at the customer location consists of observing packaging of the waste.

If the physical screening cannot be performed due to a location having adequate radiological and hazardous materials safety provisions for the container(s) involved, then no screening is required and the waste is eligible for acceptance. A more rigorous documentation review utilizing the radionuclide content information is used as an indicator of the accuracy of process knowledge of RCRA-regulated components.

- Wastes which are packaged by the 325 HWTUs authorized independent agent are considered to have met the physical screening requirements (e.g., PNNL-packaged waste which is transferred to PNNL-operated TSD units).

A bulk-waste stream (e.g., large volumes of waste from a single generating event, such as soil remediation from a single event) may be verified by screening the allowable rate of the total number of loads throughout the waste stream.

3.5 SELECTING WASTE-ANALYSIS PARAMETERS

State and federal regulations [WAC 173-303-300(2) and (5)(a); WAC 173-303-140; 40 CFR 268.7(a)] require that information be obtained, documented, and/or reported on wastes received by a TSD unit. These requirements include ensuring that only waste which meet 325 HWTUs permit requirements are accepted, and reporting the information required by WAC 173-303-380. In addition to providing a general description of the waste, the focus of the information collected for regulatory purposes is to ensure that the 325 HWTUs are permitted to accept the waste and treat it to LDR requirements.

The 325 HWTUs accept only wastes that have been characterized properly. Before receipt or acceptance of waste at the 325 HWTUs, generators must supply adequate information to characterize and manage wastes properly.

One of the most important aspects of operating the 325 HWTUs in a safe manner is to ensure that incompatible wastes are not mixed together. For the purposes of this document, wastes are considered compatible when mixed they do not: (1) generate extreme heat or pressure, fire, or explosion, or violent reaction; (2) produce uncontrolled toxic mists, dusts, or gases in sufficient quantities to threaten human health; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the device or facility containing the waste; or (5) through other like means threaten human health or the environment.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- 5 percent waste verification for PNNL-generated waste
- 10 percent waste verification for non-PNNL-generated waste identification and characterization for unknown waste and spills within the unit.

3.5.1 Parameter Selection Process

The selection of analytical parameters is based on the State of Washington's *Dangerous Waste Regulations*, WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

The selection of analytical parameters is based on the State of Washington's *Dangerous Waste Regulations*, WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

At least five percent of the waste containers received at the HWTU during a federal fiscal year (October 1 through September 30) will undergo confirmation of designation. The number of containers needed to meet the five percent requirement is five percent of the average of containers for the previous three months. For example if 200 containers are received in January, 180 in February, and 220 in March, then 10 containers of received waste must undergo confirmation of designation in April. All non-PNNL generating units which ship more than 20 containers through the HWTU in a fiscal year will have at least

one container sampled and analyzed. Containers, for which there is insufficient process knowledge, or analytical information to designate without sampling and analysis, may not be counted as part of the five percent requirement unless there is additional confirmation of designation

Containers of the following are exempt from the confirmation calculation above: Laboratory reagents or other unused products such as paint, lubricants, solvent, or cleaning products, whether received for redistribution, recycling, or as waste. To qualify for this exemption, such materials must be received at the HWTU in their original containers.

Wastes that are considered non-verifiable if the dose rate is >20mRem/hr, at contact contains greater than, 100 nCi/g of Transuranics, will not fit into the X-ray unit, is shielded, classified or remote handled.

Prior to acceptance of wastes at the HWTU, confirmation of designation may be required. Wastes that shall undergo confirmation are divided into two groups; those that easily yield a representative sample (Category I), and those that do not (Category II). The confirmation steps for each type are outlined below along with a description of which wastes fall into each category:

Category I. If a waste which easily yields a representative sample is received, a representative sample will be taken from the waste containers selected. If more than one phase is present, each phase must be tested individually. The following field tests will be performed as appropriate for the waste stream:

- Oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- pH - by pH meter[1] or pH paper (Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045)[1]. This test will be used to identify the pH and corrosive nature of an aqueous or solid waste.
- Halogenated organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.
- Volatile organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

When mathematically possible, the Permittees shall perform confirmation on an equal number of Category I and Category II containers.

Category II. If a representative sample is not easily obtained (for example, discarded machinery or shop rags), or if the waste is a labpack or discarded laboratory reagent container, the following steps will be performed:

a. Visually verify the waste. Examine each selected container to ensure that it matches the data provided on the Disposal Request form(s) provided to document the waste. Depending on accessibility of items to be verified, this may be done through direct observation or with the aid of an x-ray examination unit. Labpacks and combination packages that are accepted from non-PNNL generators must be removed from the outer container. If the waste matches the description specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, more information is collected or the waste is rejected and returned to the generating unit, and the generating unit revises and resubmits the documentation to reflect the actual contents. If necessary, the waste shall be re-designated utilizing the designation methods identified in WAC 173-303-070 through 173-303-100.

If the sample data observed meets the parameters specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, more information is collected or the waste

is rejected and returned to the generating unit for additional characterization. The waste will be required to be resubmitted with a revised Disposal Request following the additional characterization activity.

[1]The pH paper must have a distinct color change every 0.5 pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

3.5.2 Criteria and Rationale for Parameter Selection

Waste testing methods and references are as specified in WAC 173-303-110(3) or approved by Ecology in accordance with WAC 173-303-110(5). These methods are summarized in Table 3-3. All methods are specified in *Chemical Testing Methods*, WDOE 83-13 (Ecology 1983) and/or *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA SW-846 (EPA 1986).

Testing parameters for each type of waste were selected to obtain data sufficient to designate the waste properly under WAC 173-303-070, meet requirements for Land Disposal Restrictions, and to manage the waste properly. If information on the source of the waste is available, then all parameters might not be required, e.g., exclusion of testing for pesticides from a metal-machining operation.

Some of the parameters that are considered for waste received at the HWTU are as follows.

- Visual Inspection – used to determine the general characteristics of the waste. This facilitates subjective comparison of the sampled waste with previous waste descriptions or samples. Also, a physical description is used to verify the observational presence or absence of free liquids. Visual inspections may be performed utilizing the X-ray examination unit to verify contents and inspect for prohibited articles. (Materials not allowed to be disposed of at the TSD facility planned for disposal of the waste. e.g. prohibited articles identified in HNF-EP-0063 for waste to be disposed of in Hanford burial grounds).
- pH – used to identify the pH and corrosive nature of an aqueous or solid waste.
- Oxidizer – used to indicate if the waste is an oxidizing agent.
- Cyanide – used to indicate whether the waste produces hydrogen cyanide upon acidification below pH 2.
- Sulfide screen – used to indicate if the waste produces hydrogen sulfide upon acidification below pH 2.
- Halogenated hydrocarbon content screen – used to indicate whether chlorinated hydrocarbons or polychlorinated biphenyls (PCBs) are present in waste and to determine if the waste needs to be managed in accordance with the regulations prescribed in the *Toxic Substance Control Act of 1976*.
- Volatile Organic Analysis – used to confirm or deny the presence of VOAs in the waste stream as listed by the generator. This may also indicate the potential ignitable waste that must be managed and protected from sources of open flame.

Testing kits – used to determine waste characteristics and verify information provided on the disposal paperwork. The testing procedures for each test are included in the appropriate test kit.

3.6 SELECTING SAMPLING PROCEDURES

Because of physical variations of the waste that could be received at 325 HWTUs, sampling methodologies differ among the waste streams. In general, aqueous liquids will be sampled using

polyethylene samplers, organic liquids will be sampled using glass samplers, and solids will be sampled using polyethylene samplers.

Typical sample-container requirements for aqueous and solid samples are provided in Table 3.1. Containers selected should be durable, and must be compliant with applicable DOT and other shipping requirements if the sample is to be transported offsite for analysis. If any questions arise as to the appropriateness of a sample container for a particular sample, consult the MSDS for the material(s) to be sampled and/or a chemist.

Representative sampling methods for these various types of waste are selected according to the methods and equipment listed in WAC 173-303-110(2). Sampling methods and equipment are identified in Table 3.2. Representative samples of liquid wastes (vertical 'core sections') will be obtained using a composite liquid-waste sampler (COLIWASA) or tubing, as appropriate. If a liquid waste has more than one phase, then each phase will be separated for individual testing and designation. Other waste types that may require sampling are sludges, powders, and granules. In general, nonviscous sludges will be sampled using a COLIWASA. Highly viscous sludges and cohesive solids will be sampled using a trier, as specified in SW-846 (EPA 1986). Dry powders and granules will be sampled using a thief, also as specified in SW-846 (EPA 1986). The sampling methods and equipment used are identified on Table 3.2.

Exceptions to the representative sampling methods may be used if permissible pursuant to the provisions of:

- WAC 173-303-110
- NRC/EPA *Clarification of RCRA Hazardous Waste Testing Requirements for Low-Level Radioactive Mixed Waste – Final Guidance* (62 Federal Register 62080, November 20, 1997)
- Data Quality Objectives developed in accordance with the Tri-Party Agreement Action Plan Section 6.5 or 7.8 (Quality Assurance), and/or
- An alternative approved by Ecology pursuant to the permit modification process.

The number of samples collected will depend on the amount of waste present and on the homogeneity of the waste, as determined by observation. In most instances, there will be only one container of waste present. In such instances, only one vertical composite sample will be collected (e.g., COLIWASA). If more than one container of a waste stream is present, then a random number of samples will be collected and analyzed statistically using the procedures specified in Section 9.2 of SW-846 (EPA 1986).

Generators or 325 HWTUs personnel are responsible for arranging all sampling and laboratory support for sample analysis. Samples are processed either onsite or offsite at one of several laboratories qualified to perform analysis of waste samples in accordance with SW-846 methods.

Table 3.1. Sample-Container Compatibility

Sample	Container		
	Plastic	Glass	Metal
Acids (except hydrofluoric acid)	*	*	
Hydrofluoric acid	*		
Alkali (concentrated)	*		
Solvents/solvent-contaminated oils	*[1]	*	*
Oils	*	*	*
Solids	*	*	*
Aqueous waste	*	*	*

* Sample compatible for storage in this type of container.
[1] Polypropylene may be used with some solvent/solvent-oil waste; consult a chemist and/or MSDS for the material(s) being sampled.

Table 3.2. Sampling Methods and Equipment

Material	Sampling Method	Sampling Equipment
Containerized liquids	SW-846	COLIWASA* or tubing
Extremely viscous liquid	ASTM D140-70	Tubing or trier
Crushed or powdered material	ASTM D364-75	Tubing, trier, auger, scoop or shovel
Soil or rock-like material	ASTM D420-69	Tubing, trier, auger, scoop or shovel
Soil-like material	ASTM D1452-65	Tubing, trier, auger, scoop or shovel
Fly ash-like material	ASTM D2234-76	Tubing, trier, auger, scoop or shovel
Containment systems	Wipe sample (OSHA 1977)	Filter paper and cleaning solution

* COLIWASA: composite liquid-waste sampler.

Generators or 325 HWTUs personnel also document the sampling activities and chain of custody and arrange sample shipment. Sampling information, custody records, and analytical results are submitted as part of the waste-tracking form data package submitted by the generator to the waste-management section for review, approval, and designation.

All sampling will meet or exceed the protocols in SW-846 or an equivalent. These protocols are described briefly in the following paragraphs.

Sample-control procedures (i.e., chain-of-custody forms) are designed to ensure that each sample is accounted for at all times. The primary objectives of the sample-control procedures are as follows:

- Each sample received for analysis is uniquely identified.
- Correct samples are analyzed and are traceable to the applicable data records.
- Important and necessary sample constituents are preserved.
- Samples are protected from loss, damage, or tampering.
- Any alteration of samples during collection or shipping (e.g., filtration, preservation, breakage) is documented.
- A record of sample custody and integrity is established that will satisfy legal scrutiny.

Sample-container selection is crucial to sample quality. Considering waste compatibility, durability, volume, and analytical sensitivities, the containers listed in Table 3.1 are recommended to the generators for these efforts.

The basic sampling procedure is as follows:

- Obtain samples using a precleaned sampler.
- Fill sample containers in the following sequence: head-space volatile organics, volatile organics, semi-volatile organics, metals, ignitability, pH (corrosivity), and reactivity.
- Label sample containers.
- Properly clean and decontaminate sample containers and the sampling hardware.
- Custody-seal and blister-wrap all sample containers, place wrapped containers in a leak-tight polyethylene bag, and place samples in a durable ice-filled cooler or comparable receptacle for transport to the laboratory or laboratory receiving facility. If ALARA practices allow, custody-seal and blister-wrap will be used; otherwise, seals will be placed on secondary containers.
- Complete the chain-of-custody and request-for-analysis forms.
- Review all paperwork and enclose the forms in a leak-tight polyethylene bag taped to the underside of the cooler lid or attach paperwork to the container as appropriate.
- Seal and mark the coolers or comparable receptacles in accordance with applicable DOT requirements.

Transport coolers or appropriate containers to the analytical laboratory or laboratory receiving facility.

All samples are labeled with at least the following information:

- a unique alpha-numeric identifier
- date and time of collection
- sample collector's name
- preservatives used
- analyses requested.

Immediately after collection, samples are placed on blue ice or an equivalent, as required, in durable coolers or comparable receptacles for transport to the offsite laboratory. Before shipping or transfer, coolers or comparable receptacles are tightly sealed with tape and are custody-sealed along the front and back edges of the lids. Samples are transported to offsite laboratories by overnight courier to ensure delivery within 24 hours of sample collection as allowed or dependent upon sample holding times. All offsite sample collection, preparation, packaging, transportation, and analyses conform to the requirements of SW-846 or equivalent.

During all sampling activities, strict compliance with health physics, industrial hygiene, and safety standards is mandatory. Personnel are required to wear eye-, skin-, and respiratory-protection gear as dictated by industrial hygiene and health- physics personnel. If personnel accidentally contact waste material, decontamination procedures are to be performed immediately.

A chain-of-custody record accompanies samples being analyzed for chemical constituents at all times. The record contains the sample number, date and time of collection, sample description, and signatures of the collector and all subsequent custodians.

Transportation of samples is in accordance with the DOT and the DOE-RL requirements. Hazardous-waste samples are properly packaged, marked, and labeled. For offsite shipments, shipping papers are prepared in accordance with applicable DOT regulations.

All equipment used to sample waste materials is disposable or designed for easy decontamination. Cleanable equipment is thoroughly decontaminated before reuse. Decontamination solutions are managed as hazardous waste as appropriate, according to the threshold-contaminant levels exceeded in the sampled liquids. Disposable samplers will be used whenever possible to eliminate the potential for cross-contamination.

3.6.1 Sample Custody

The generators or 325 HWTUs personnel are responsible for initiating and following chain-of-custody form. Generators initiate sample-custody records in the field at the time samples are collected. A chain-of-custody form is used to document sample-collection activities, including sampling site, sample identification, number of samples, and date and time of collection. Additionally, the form documents the chain of custody including the names of responsible individuals and the dates and times of custody transfers.

3.6.2 Sample Receipt and Storage

Samples are received at a qualified contracted laboratory or laboratory receiving facility by a sample custodian. This individual carefully reviews received samples and documentation for compliance with sampling and documentation requirements, such as type and condition of container, sample preservation, collection date, and chain-of-custody forms. The sample custodian signs and dates the chain-of-custody form after verifying that all samples submitted are listed and that the required information is listed on the form. The sample custodian places an identification number on each sample and returns the samples to a refrigerator, if required, designated for storage of samples requiring analysis, as required. The sample custodian stores and secures the samples appropriately (e.g., in a locked refrigerator). Based on the type of sample and analysis requested, special procedures for sample handling, storage, and distribution could be specified.

3.7 SAMPLE DISTRIBUTION

Where practical, chain-of-custody documentation for samples continues throughout the analytical process. After logging in and storing the samples, the sample custodian distributes sample documentation, which lists sample numbers and analyses to be performed, to the appropriate analysts and technical leaders. On completion of analyses, results are submitted to the generators or 325 HWTUs personnel along with QA/QC information.

3.7.1 Field Analytical Methods

Analytical methods employed to verify or characterize waste are of two types: fingerprint analysis and laboratory analysis. Fingerprint analysis is used primarily to verify waste characteristics of waste received from offsite. Laboratory analytical methods will be employed to establish waste identity and characteristics and verify waste characteristics when 325 HWTUs personnel determine it is necessary.

3.7.1.1 Fingerprint Sampling Analytical Methods

A representative sample will be taken of the waste (if more than one phase is present, each phase must be tested individually), and the following field tests will be performed:

- Oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- pH - by pH meter[1] or pH paper (Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045)[1]. This test will be used to identify the pH and corrosive nature of an aqueous or solid waste.
- Halogenated organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

- Volatile organic compounds - by photo or flame ionization tester, or by gas chromatography with or without mass spectrometry.

If the waste meets the parameters specified in the documentation, then confirmation of designation is complete. If the waste does not meet these parameters, then proceed to the next step.

1. Sample and analyze the materials in accordance with WAC 173-303-110.

2. Reassess and re-designate the waste. Repackage and label as necessary or return to the generator.

3. Data obtained through the waste-verification process will be used to verify the accuracy of the waste designation for waste received at 325 HWTUs.

[1] The pH paper must have a distinct color change every 0.5 pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

3.7.2 LDR Waste-Analysis Requirements

The *Hazardous and Solid Waste Amendments of 1984* prohibit the land disposal of certain types of waste that are subject to RCRA. Many of the waste types stored at 325 HWTUs fall within the purview of these LDRs. Information presented below describes how generators and 325 HWTUs personnel characterize, document, and certify waste subject to LDR requirements.

3.7.2.1 Waste Characterization

Shipments of waste shall not be accepted from any off-site generator without LDR certification, if applicable, accompanying each shipment. For waste received from off-site generators, the TSD unit shall receive the information pursuant to 40 CFR 268 regarding LDR wastes. The generator must sign the LDR certification.

Before being received at 325 HWTUs, the RCRA waste characteristics, the level of toxicity characteristics, and the presence of listed, wastes are determined during the physical and chemical analyses process. This information allows waste-management personnel to make all LDR determinations accurately and complete appropriate notifications and certifications.

3.7.2.2 Sampling and Analytical Procedures

The LDR characterization and analysis may be performed as part of the waste-characterization and analysis process. If waste is sampled and analyzed for LDR characterization, then only EPA or equivalent methods are used to provide sufficient information for proper management and for decisions regarding LDRs pursuant to 40 CFR 268.

3.7.2.3 Frequency of Analysis

Before acceptance and during the waste-characterization and analysis process, all LDR characterizations and designations are made. The characterization and analysis process is performed when a disposal request is submitted for waste pick-up, unless there is insufficient data or if the waste stream has changed. Instances where sampling and laboratory analysis may be required to determine accurate LDR determinations include the following:

- when waste-management personnel have reason to suspect a change in the waste based on inconsistencies in the waste-tracking form, packaging, or labeling of the waste

- when the information submitted previously by a generator does not match the characteristics of the waste that was submitted

- when the offsite TSD facility rejects the waste because the fingerprint samples are inconsistent with the waste profile provided by 325 HWTUs, which was established using generator information.

3.7.2.4 Documentation and Certification

The 325 HWTUs have and will continue to receive and store LDR waste. Because 325 HWTUs personnel determine designations and characterization, including LDR determinations, all notifications and certifications, as required by 40 CFR 268, are prepared by PNNL qualified staff for PNNL-generated waste. The 325 HWTUs staff collect from the generator(s) the information pursuant to 40 CFR 268 regarding LDR wastes, the appropriate treatment standards, whether the waste meets the treatment standards, and certification that the waste meets the treatment standards, if necessary, as well as any other data, e.g., documented process knowledge and waste-analyses data that support the generator's determinations. If any of the requested information is not supplied by the generator, then the 325 HWTUs personnel complete and transmit all subsequent information regarding LDR wastes, pursuant to 40 CFR 268. The notification and certifications are submitted to onsite and offsite TSD units during the waste-shipment process. Additionally, any necessary LDR variances are prepared and submitted by PNNL qualified staff.

The 325 HWTUs staff requires applicable LDR information/notifications from non-PNNL generators.

Where an LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268, Subpart D, or exceeds the application prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, 325 HWTUs provides to the onsite and offsite TSD a written notice that includes the following information:

- EPA hazardous-waste number
- the corresponding treatment standards and all applicable prohibitions set forth in WAC 173-303, 40 CFR 268.32, or RCRA Section 3004(d)
- the manifest number associated with the waste
- all available waste-characterization data.
- identification of underlying hazardous constituents.

In instances where 325 HWTUs determines that a restricted waste is being managed that can be land-disposed without further treatment, 325 HWTUs staff submits a written notice and certification to the onsite or offsite TSD where the waste is being shipped, stating that the waste meets applicable treatment standards set forth in WAC 173-303-140 (40 CFR 268, Subpart D), and the applicable prohibition levels set forth in 40 CFR 268.32 or RCRA Section 3004(d). The notice includes the following information:

- EPA hazardous-waste number
- corresponding treatment standards and applicable prohibitions
- waste-tracking number associated with the waste
- all available waste-characterization data
- identification of underlying hazardous constituents.

The certification accompanying any of the previously described notices is signed by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Copies of all notices and certifications described are retained at the TSD unit for at least 5 years from the date that the waste was last sent to an onsite or offsite TSD unit. After that time, the notices and certifications are sent to Records Storage.

3.7.3 Waste Analysis for Spills and Unknowns

In the event of a spill or release of dangerous waste within 325 HWTUs, the following steps will be implemented:

1. The identification number on the leaking container will be determined based on visual inspection. If the container(s) involved cannot be approached, the location of the container involved and the associated storage-cell designations can be determined from a distance.

2. The container-identification number or container-location number will be entered into 325 HWTUs inventory database to determine the Disposal Request number.

3. The hard copy of the Disposal Request or a computerized information printout for the container, which contains all applicable information regarding the contents of the container, will be located. The hazards associated with the waste will be determined before exercising the emergency-response procedures outlined in Chapter 7.0.

4. Respond to the spill in accordance with the requirements of Chapter 7.0. The Chapter 7.0, Contingency Plan is implemented if there is a threat to human health or the environment.

5. A new Disposal Request will be filled out using the information from the original Disposal Request and information from any spill-cleanup kits or absorbents. The waste will then be designated and characterized.

If a leak or other liquid is discovered in the 325 HWTUs that cannot be tracked to a specific container because of safety or logistics reasons, then the procedures outlined in Chapter 7.0, *325 HWTUs Contingency Plan* would be implemented for responding to an 'unknown' chemical release. The residues, including cleanup absorbents, of such a release would be sampled and analyzed in accordance with the requirements in the Chapter 7.0, determine the characteristics of the waste residue as defined by WAC 173-303-070. Sampling and analysis of the residues will include pH, metals, volatile organics, and semi-volatile organics analyses, as required.

Based on the information gathered from the laboratory analysis, a new Disposal Request for the waste cleanup will be filled out. The waste will then be designated and characterized.

3.8 SELECTING A LABORATORY, LABORATORY TESTING, AND ANALYTICAL METHODS

Laboratory selection is limited; only a few laboratories are equipped to handle mixed waste because of special equipment and procedures that must be used to minimize personnel exposure. Preference will be given to the 325 Analytical Chemistry Laboratory (ACL) and then to other laboratories on the Hanford Facility that exhibit demonstrated experience and capabilities in three major areas:

1. comprehensive written QA/QC program based on DOE-RL requirements specifically for that laboratory

2. audited for effective implementation of QA/QC program

3. participate in performance-evaluation samples to demonstrate analytical proficiency.

All laboratories (onsite or offsite) are required to have the following QA/QC documentation.

- Daily analytical data generated in the contracted analytical laboratories is controlled by the implementation of an analytical laboratory QA plan.
- Before commencement of the contract for analytical work, the laboratory will, if requested, have their QA plan available for review. At a minimum, the QA plan will document the following:
- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

3.8.1 Testing and Analytical Methods

325 HWTUs customers will need to conduct analyses to provide information to fill out Disposal Requests, and to determine compatibility, safety, and operating information. As needed, 325 HWTUs staff also will conduct analyses to determine completeness of information and if treatment and verification material meets the acceptance criteria for treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of the offsite TSD facility. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information.

All testing is performed by chemists and/or appropriate analytical personnel working under approved QA guidelines. Analytical methods will be selected from those that are used routinely by the Analytical Chemistry Laboratory (ACL) in located in the 325 Building or the various Hanford Facility analytical laboratories.

The 325 HWTUs manages limited quantities of dangerous waste; therefore, deviations from SW-846 protocols may occur during its analysis. Many of the deviations from the SW-846 protocols arise from the mixed waste nature of the samples handled.

Analytical methods will be selected from those that are routinely used by the ACL in 325 HWTUs, or by the various Hanford Facility analytical laboratories.

3.8.2 Quality Assurance and Quality Control

PNNL is committed to maintaining a high standard of quality for all of its activities. A crucial element in maintaining that standard is a quality-assurance program that provides management controls for conducting activities in a planned and controlled manner and enabling the verification of those activities.

Activities pertaining to waste analysis include, but are not limited to, the preparation, review, and control of procedures and the selection of analytical laboratories. The PNNL QA manual has administrative procedures that establish requirements and provide guidance for the preparation of analytical and technical (i.e., sampling, chain-of-custody, work processes) procedures, as well as other administrative procedures. Procedures undergo a review cycle and, once issued, are controlled to ensure that only current copies are used.

The primary purpose of waste testing is to ensure that the waste is properly characterized in lieu of process-knowledge data, in compliance with RCRA requirements for general waste analysis [WAC 173-303-300(2); 40 CFR 264.13]. Waste testing also is performed to ensure the safe management of waste being stored, proper disposition of residuals from incidents that might occur, and control of the acceptance of waste for storage. The specific objectives of the waste-sampling and analysis program at 325 HWTUs are as follows:

- Identify the presence of waste that is substantially different from waste currently stored.
- Provide a detailed chemical and physical analysis of a representative sample of the waste, before the waste is accepted at or transferred from 325 HWTUs to an offsite TSD facility, to ensure proper management and disposal.
- Provide an analysis that is accurate and current to ensure that waste is properly treated and disposed of.
- Ensure safe management of waste undergoing storage at 325 HWTUs.
- Ensure proper disposal of residuals.
- Ensure compliance with LDRs.
- Identify and reject waste that does not meet 325 HWTUs acceptance requirements (e.g., incomplete information).
- Identify and reject waste that does not meet specifications for 325 HWTUs (i.e., Chapter 1.0, listing is restricted from storage at 325 HWTUs).

3.8.3 Quality Assurance and Quality Control Objectives

The objectives of the QA/QC program are two-fold. The first objective is to control and characterize any errors associated with the collected data. Quality-assurance activities, such as the use of standard procedures for locating and collecting samples, are intended to limit the introduction of error. Quality-control activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets, are intended to provide the information required to characterize any errors in the data. Other QC activities, such as planning the QC program and auditing ongoing and completed activities, ensure that the specified procedures are followed and that the QA information needed for characterizing error is obtained.

The QA/QC control program for sampling and analysis related to this TSD unit must, at a minimum, comply with the applicable Hanford Site standard requirements and regulatory requirements. All analytical data shall be defensible and shall be traceable to specific, related quality control samples and calibrations.

The second QA/QC objective is to illustrate that waste testing has been performed according to specification in this waste-analysis plan. The QA/QC activities will include the following:

- **Field inspections** – performed by a PNNL QA officer or designee, depending on the activity. The inspections primarily are visual examinations but might include measurements of materials and equipment used, techniques employed, and the final products. The purpose of these inspections is to verify that a specific guideline, specification, or procedure for the activity is completed successfully.
- **Field testing** – performed onsite by the QA officer (or designee) according to specified procedures.

- **Laboratory analyses** – performed by onsite or offsite laboratories on samples of waste. The purpose of the laboratory analyses is to determine constituents or characteristics present and the concentration or level.

- **Checklists** – required for crucial inspections. Checklists are filled out during the course of inspection to document inspection results.

- **Instrument calibration** – required for maintaining records of calibration of all instruments used to perform surveying, field testing, and laboratory analyses.

3.8.4 Sampling Objectives

The data-quality objectives (DQO) for the waste sampling and data analyses are as follows:

- Determine if waste samples are representative of the contents of the containers at the time the samples were taken.

- Determine if waste samples are representative of long-term operations affecting 325 HWTUs.

- Determine if waste accepted for storage is within the RCRA permit documentation limitations.

- Determine if waste accepted for storage meets the requirements of 325 HWTUs waste-acceptance criteria.

- Determine if waste accepted for storage meets the information provided by the generator.

3.8.5 Data Collection/Sampling Objectives

For determining the toxicity characteristics, SW-846 Method 1311 should be followed wherever possible. The Permittee may use the total metals test and assumption of complete extractability as described in Method 1311. A reduced sample size may also be utilized for As Low As Reasonably Achievable purposes as recommended by the *Joint NRC/EPA Guidance on Testing Requirements of Mixed Radioactive and Hazardous Waste* (62 FR 62079).

For a given parameter, analytical methods are selected and may be modified as long as the applicable precision, accuracy, and quantitation limit (or minimum detectable activity) necessary to meet the regulatory or decision limit can be met or improved.

For a given parameter, analytical methods are selected and may be modified as long as the applicable precision, accuracy, and quantitation limit (or minimum detectable activity) necessary to meet the regulatory or decision limit can be met or improved.

The acquired data need to be scientifically sound, of known quality, and thoroughly documented. The DQOs for the data assessment will be used to determine compliance with national quality standards, which are as follows:

- **Precision** – The precision will be the agreement between the collected samples (duplicates) for the same parameters, at the same location, and from the same collection vessel.

- **Representativeness** – The representativeness will address the degree to which the data accurately and precisely represent a real characterization of the population, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness will be addressed for the following points:

- Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected

The representativeness of selected media has been defined accurately.

- The sampling and analytical methodologies are appropriate.
- The environmental conditions at the time of sampling are documented.
- **Completeness** – The completeness will be defined as the capability of the sampling and analytical methodologies to measure the contaminants present in the waste accurately.
- **Comparability** – The comparability of the data generated will be defined as the data that are gathered using standardized sampling methods, standardized analyses methods, and quality-controlled data-reduction and validation methods.

3.8.6 Analytical Objectives

Analytical data will be communicated clearly and documented to verify that laboratory data-quality objects are achieved.

3.8.7 Field Quality Assurance and Quality Control

Internal QA/QC checks will be established by submitting QA and QC samples to the analytical laboratory. The number of field QA samples will be approximately 5 percent of the total number of field samples taken. The five percent criterion commonly is accepted for a minimum number of QA/QC samples. The types and frequency of collection for field QA samples are as follows:

- Field Blanks – A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. Field blanks are prepared and preserved using sample containers from the same lot as the other samples collected that day. A sample blank is used to document contamination attributable to shipping and field-handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.
- Field Duplicates – defined as independent samples collected in such a manner that the samples are equally representative of the variables of interest at a given point in space and time. The laboratory will use the field duplicate as laboratory duplicate and/or matrix spikes. Thus, for the duplicate sample, there will be the normal sample analysis, the field duplicate, and the laboratory duplicate (inorganic analysis). Duplicate samples will provide an estimate of sampling precision.

3.8.8 Laboratory Quality Assurance and Quality Control

All analytical work, whether performed in-house by PNNL's ACL or by outside, independent laboratories, is defined and controlled by a Statement of Work, prepared in accordance with administrative procedures. The daily quality of analytical data generated in the analytical laboratories will be controlled by the implementation of an analytical laboratory QA plan. At a minimum, the plan will document the following:

- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements
- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

The types of internal quality-control checks are as follows:

- **Method Blanks** – Method blanks usually consist of laboratory reagent-grade water treated in the same manner as the sample (i.e., digested, extracted, distilled) that is analyzed and reported as a standard sample would be reported.

- **Method Blank Spike** – A method blank spike is a sample of laboratory reagent-grade water fortified (spiked) with the analytes of interest, which is prepared and analyzed with the associated sample batch.

- **Laboratory Control Sample** – A QC sample introduced into a process to monitor the performance of the system.

- **Matrix Spikes** – An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. Matrix spikes will be performed on 5 percent of the samples (1 in 20) or one per batch of samples.

- **Laboratory Duplicate Samples** – Duplicate samples are obtained by splitting a field sample into two separate aliquots and performing two separate analyses on the aliquots. The analyses of laboratory duplicates monitor the precision of the analytical method for the sample matrix; however, the analyses might be affected by nonhomogeneity of the sample, in particular, by nonaqueous samples. Duplicates are performed only in association with selected protocols. Duplicates are performed only in association with selected protocols. Laboratory duplicates are performed on 5 percent of the samples (1 in 20) or one per batch of samples. If the precision value exceeds the control limit, then the sample set must be reanalyzed for the parameter in question.

- **Known QC Check Sample** – This is a reference QC sample as denoted by SW-846 of known concentration, obtained from the EPA, the National Institute of Standards and Technology, or an EPA-approved commercial source. This QC sample is taken to check the accuracy of an analytical procedure. The QC sample is particularly applicable when a minor revision or adjustment has been made to an analytical procedure or instrument. The results of a QC-check-standard analysis are compared with the true values, and the percent recovery of the check standard is calculated.

3.8.8.1 PNNL Analytical Chemistry Laboratory QA/QC

PNNL's analytical chemistry laboratory may need to be used to analyze samples of high-activity dangerous waste. It has a rigorous QA plan that ensures that data produced are defensible, scientifically valid, and of known precision and accuracy, and meets the requirements of its clients, i.e., the 325 HWTUs.

3.8.8.2 Offsite Laboratory QA/QC

When it is necessary to send samples to an independent laboratory, contracts are not awarded until a pre-award evaluation of the prospective laboratory has been performed. The pre-award evaluation process involves the submittal of its QA plan to the waste-analysis project manager and the QA officer for approval. It also may involve a site visit by QA personnel and a technical expert, or may consist of a review of the prospective laboratories' QA/QC documents and records of surveillances/inspections, audits, nonconformances, and corrective actions maintained by PNNL or other Hanford Facility contractors.

3.8.9 Record-Keeping

Records associated with the waste-analysis plan and waste-verification program are maintained by the waste-management organization. A copy of the Disposal Request for each waste stream accepted at 325 HWTUs is maintained as part of the operating record. Generators maintain their sampling and analysis records. The waste-analysis plan will be revised whenever regulation changes affect the waste-analysis plan.

3.9 SELECTING WASTE RE-EVALUATION FREQUENCIES

Some analysis will be needed to verify that waste streams received by the 325 HWTUs conform to the information on the Disposal Request and or the waste analysis sheet supplied by the generator. If discrepancies are found between information on the Disposal Request, hazardous-waste manifest, shipping papers, waste- analysis documentation and verification analysis, then the discrepancy will be resolved by:

1. returning waste to the generator, or sample and analyze the materials in accordance with WAC 173-303-110; and/or
2. reassessing and re-designating the waste; repackaging and labeling as necessary or return to the generator.

Periodic re-evaluation provides verification that the results from the initial verification are still valid. Periodic re-evaluation also checks for changes in the waste stream.

Exceptions to physical screening for verification are:

- Shielded, classified, and remote-handled mixed waste are not required to be physically screened; however, 325 HWTUs staff must perform a more rigorous documentation review and obtain the raw data to characterize the waste (< 1 percent of current waste receipts).
- Wastes which cannot be verified at the 325 HWTUs must be verified by the generator (e.g., large components, containers which cannot be opened, for ALARA reasons, or will not fit into the NDE unit).

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 325 HWTUs to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The information must be updated by the generator annually or when the waste stream changes, whichever comes first, or if the following occurs.

- The 325 HWTUs personnel have reason to suspect a change in the waste, based on inconsistencies in packaging or labeling of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 325 HWTUs. The following are instances where sampling and laboratory analysis are required:

- inadequate information on PNNL-generated waste
- waste streams generated onsite will be verified at 5 percent of each waste stream
- inadequate information before waste was shipped or discrepancy discovered
- waste streams received for treatment from offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- identification and characterization for unknown waste and spills.

3.10 SPECIAL PROCEDURAL REQUIREMENTS

3.10.1 Procedures for Receiving Shipments

The generator is responsible for identifying waste composition accurately and arranging for the transport of the waste. A copy of each transfer-tracking form and any other pertinent operating records are maintained by the 325 HWTUs for 5 years. The waste-tracking methods are as follows.

- **Inspection of Transfer Papers/Documentation** – The necessary transfer papers for the entire transfer are verified (i.e., signatures are dated, all waste containers included in the transfer are accounted for and correctly indicated on the transfer documentation, there is consistency throughout the different transfer documentation, and the documentation matches the labels on the containers).

- **Inspection of Waste Containers** – The condition of waste containers is checked to verify that the containers are in good condition (i.e., free of holes and punctures).

- **Inspection of Container Labeling** – Transfer documentation is used to verify that the containers are labeled with the appropriate 'Hazardous/Dangerous Waste' labeling and associated markings according to the contents of the waste container.

- **Acceptance of Waste Containers** – The 325 HWTUs personnel sign the transfer documents and retain a copy.

If transport will be over public roads (unless those roads are closed to public access during waste transport) or offsite, then a Uniform Hazardous Waste Manifest will be prepared identifying the 325 HWTUs as the receiving unit (Permit Condition II.Q.1). The 325 HWTUs operations staff will sign and date each copy of the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 325 HWTUs. A copy of the manifest also will be retained in the 325 HWTUs operating records for 3 years.

For all shipments of dangerous waste to or from the 325 HWTUs, the Permittees shall comply with the applicable information in Permit Conditions II.Q.1.h. and II.Q.2. For clarification, all dangerous waste must be transported in accordance with the unit specific provisions as outlined in the PNNL Operating Procedure for the 325 Building, in effect at the date of the transfer. With exception to, and in addition to, the packaging and transporting operations, shall be as follows:

The acceptance of all dangerous waste received at the 325 TSD Units will be dependent upon their packaging. Liquid waste containers accepted from other buildings to the 325 HWTUs shall have secondary containment with absorbent materials packed around the contents.

3.10.2 Response to Significant Discrepancies

The primary concern during acceptance of containers for storage is improper packaging or waste-tracking form discrepancies. Containers with such discrepancies are not accepted at the 325 HWTUs. Depending on the nature of the condition, such discrepancies can be resolved through the use of one or more of the following alternatives.

- Incorrect or incomplete entries on the Uniform Hazardous Waste Manifest or the onsite waste-tracking form can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.

- The waste packages can be held and the onsite generator or offsite waste generator requested to provide written instructions for use in correcting the condition before the waste is accepted.

- Waste packages can be returned as unacceptable.

- The onsite generator or offsite waste generator can be requested to correct the condition on the Hanford Facility before the waste is accepted.

- If a noncompliant dangerous waste package is received from an offsite waste generator, and the waste package is nonreturnable because of condition, packaging, etc., and if an agreement cannot be reached among the involved parties to resolve the noncompliant condition, then the issue will be referred to DOE-RL and Ecology for resolution. Ecology will be notified if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 325 HWTUs. The package(s) will be segregated from other waste.

3.10.3 Provisions for Non-Acceptance of Shipment

Before waste is brought into the 325 HWTUs, all associated documentation is inspected and verified for treatment and/or storage authorization. Any transfer of materials that the 325 HWTUs are not designed to treat and/or store neither are unloaded from the vehicle nor accepted for treatment or storage.

3.10.4 Activation of Contingency Plan for Damaged Shipment

If waste transfers arrive at the 325 HWTUs in a condition that presents a hazard to public health or the environment, the building emergency plan is implemented as described in Chapter 7.0.

3.10.5 Tracking System

Upon generation or receipt into the 325 HWTUs, each container of waste is assigned a unique tracking number. This number is used to track the following information:

- a description and the quantity of each dangerous waste received and the method(s) and date(s) of storage or treatment in the 325 HWTUs, in accordance with WAC 173-303-380(2)
- the location of each dangerous-waste container stored in the unit and the quantity at each location, including cross-reference to any applicable manifest and/or waste-tracking numbers
- waste-analysis results.

This system effectively tracks waste containers as the containers move through treatment or storage at the 325 HWTUs. The information is retained as part of the 325 HWTUs operating record.

Sample-container selection is crucial to sample quality. When considering waste compatibility, durability, volume, and analytical sensitivities, the containers listed in Table 3.1 are recommended.

Table 3.3. Summary of Test Parameters, Rationales, and Methods

Parameter [a]	Method [b, c]	Rationale for Selection
Physical Screening		
Visual inspection	Field method - observe phases, presence of solids in waste and look for prohibited articles utilizing x-ray examination when appropriate.	Confirm that waste matches that information described on waste acceptance documentation.
Chemical Screening [d]		
Oxidizer	Oxidizer Screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
pH	pH screen Liquids - SW-846 Method 9041A or 9040B. Solids or semi-solid - SW-846 Method 9045	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Cyanides	Cyanide screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Sulfides	Sulfide screen HAZCAT™	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Halogenated/Volatile Organic Compounds	Photoionizer or Flame Ionizer, or Clor-D-Tect © Kits	Confirm that waste matches that described on waste acceptance documentation
Toxicity characteristic organic compounds [e]	Generator knowledge or SW-846 Methods 1311 and 8260 (volatile organic compounds) and 8270 (semivolatile organic compounds)	Identify constituents for compliance with Hanford Facility Permit

[a] Addition parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.
[b] Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.
[c] QA/QC requirements associated with these screening methods are addressed by following manufacturer's instructions for instrumentation (such as photoionizer), or test kit instructions. Detection limits are given in the SW-846 method, manufacturer's instructions for instrumentation (such as photoionizer), or test kit instructions.
[d] These test will not be performed on materials known to be organic peroxides, ether, and/or water reactive compounds.
[e] This test will only be performed on waste to be stored in tank TK-1waste in addition to any other appropriate chemical screening.

3.11 REFERENCES

U.S. Department of Energy. 1993. *Preparation of RCRA Waste Analysis Plans (interim guidance).* DOE/EH-306, Washington D.C.

U.S. Department of Energy, Richland Operations Office. 1992. *Hanford Facility Dangerous Waste Permit Application, 325 Hazardous Waste Treatment Units.* DOE/RL-92-35, Richland, Washington.

U.S. Department of Energy Richland Operations Office. 1996. Letter from Patrick Willison, RL, to Tanya Barnett, Assistant Attorney General, dated December 10, 1996, responding to (Ecology 1996), Richland WA.

U.S. Environmental Protection Agency. 1980. *A Method for Determining the Compatibility of Hazardous Wastes*. EPA-600/2-80-076, Cincinnati, Ohio.

U.S. Environmental Protection Agency. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*. SW-846, 3rd edition, November 1986 (as amended by Updates I, II, IIA, IIB, and III), Washington D.C.

U.S. Environmental Protection Agency. 1987. 52 *Federal Register*, p. 35556, *Final Authorization of State Hazardous Waste Management Program; Washington*. September 22, 1987, Washington D.C.

U.S. Environmental Protection Agency. 1993. *Test Methods for Evaluating Solid Waste*. SW-846, 3rd edition, Washington, D.C.

U.S. Environmental Protection Agency. 1994. *Waste Analysis at Facilities that Generate, Treat, Store, and Dispose of Hazardous Wastes: A Guidance Manual*. OSWER 9938.4-03, Washington D.C.

U.S. Environmental Protection Agency. 1996. Letter from James R. Berlow, EPA-HQ, to Barton Day, Bryan Cave LLP, dated April 24, 1996, Washington D.C.

U.S. Department of Health, Education, and Welfare. *Registry of Toxic Effects of Chemical Substances*. National Institute for Occupational Safety and Health, Washington, D.C.

U.S. Department of Health and Human Services. 1990. *NIOSH Pocket Guide to Chemical Hazards*, National Institute for Occupational Safety and Health, Cincinnati, Ohio.

U.S. Nuclear Regulatory Commission and U.S. Environmental Protection Agency. 1997. *Clarification of RCRA Hazardous Waste Testing Requirements for Low-Level Radioactive Mixed Waste – Final Guidance*. 62 Federal Register 62080, November 20, 1997, Washington, D.C.

Washington State Department of Ecology. 1994. Letter from T. Thomas, Ecology, to Bill Habenicht, Burlington Environmental, dated March 1, 1994, Ecology compendium number 3140.940301, *State-Only Dangerous Waste and Federal Land Disposal Restrictions*. Olympia, Washington.

Washington State Department of Ecology. 1995a. *Responsiveness Summary Amendment to the Dangerous Waste Regulations Chapter 173-303 WAC*. Publication 95-423, dated October 1995, Olympia, Washington.

Washington State Department of Ecology. 1995b. *Hanford Facility RCRA Permit,* Expiration date September 27, 2004. Olympia, Washington.

Washington State Department of Ecology. 1996. Letter from Tanya Barnett, Assistant Attorney General, to Patrick W. Willison, RL, dated September 26, 1996, regarding the effective date of mixed waste, Attorney General of Washington, Olympia WA.

Washington State Department of Ecology. 1997. Letter from Tom Cusack, Ecology, to Bob Wilson, Ecology, dated January 16, 1997. *State LDR Testing and Waste Analysis Plan Requirements*, Olympia, WA.

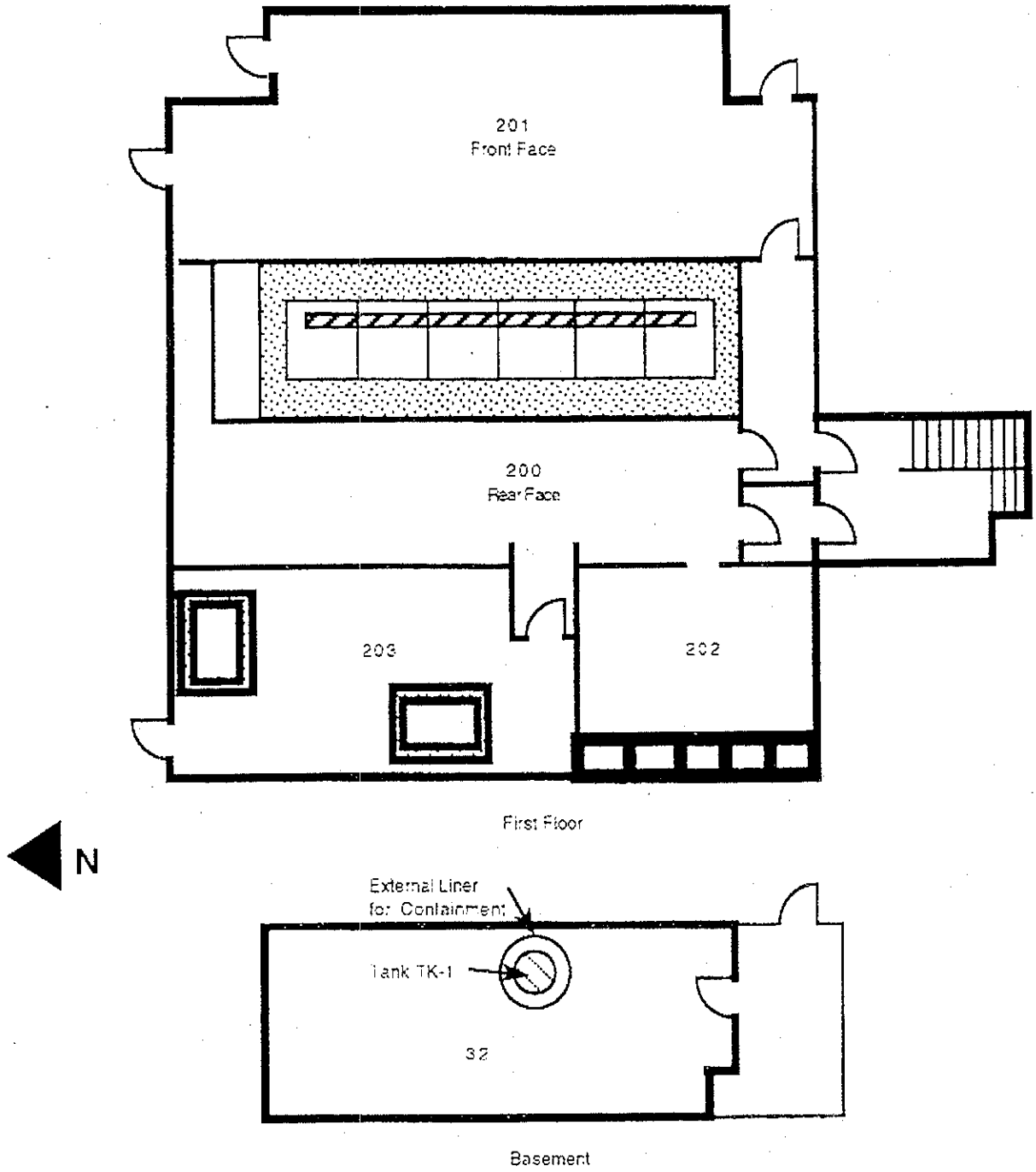
Washington State Department of Ecology. 1998. *Chemical Testing Methods for Designating Dangerous Waste*. Publication 97-407, Olympia, Washington.

Washington State Department of Ecology. 1999. *Biological Testing Methods*. DOE 80-12, revised May 1999, Olympia, Washington.

WG 1996, Ecology/RL Waste Analysis Plan Work Group Definition, December 1996.

1
2

Figure 3.1. Floor Plan of SAL



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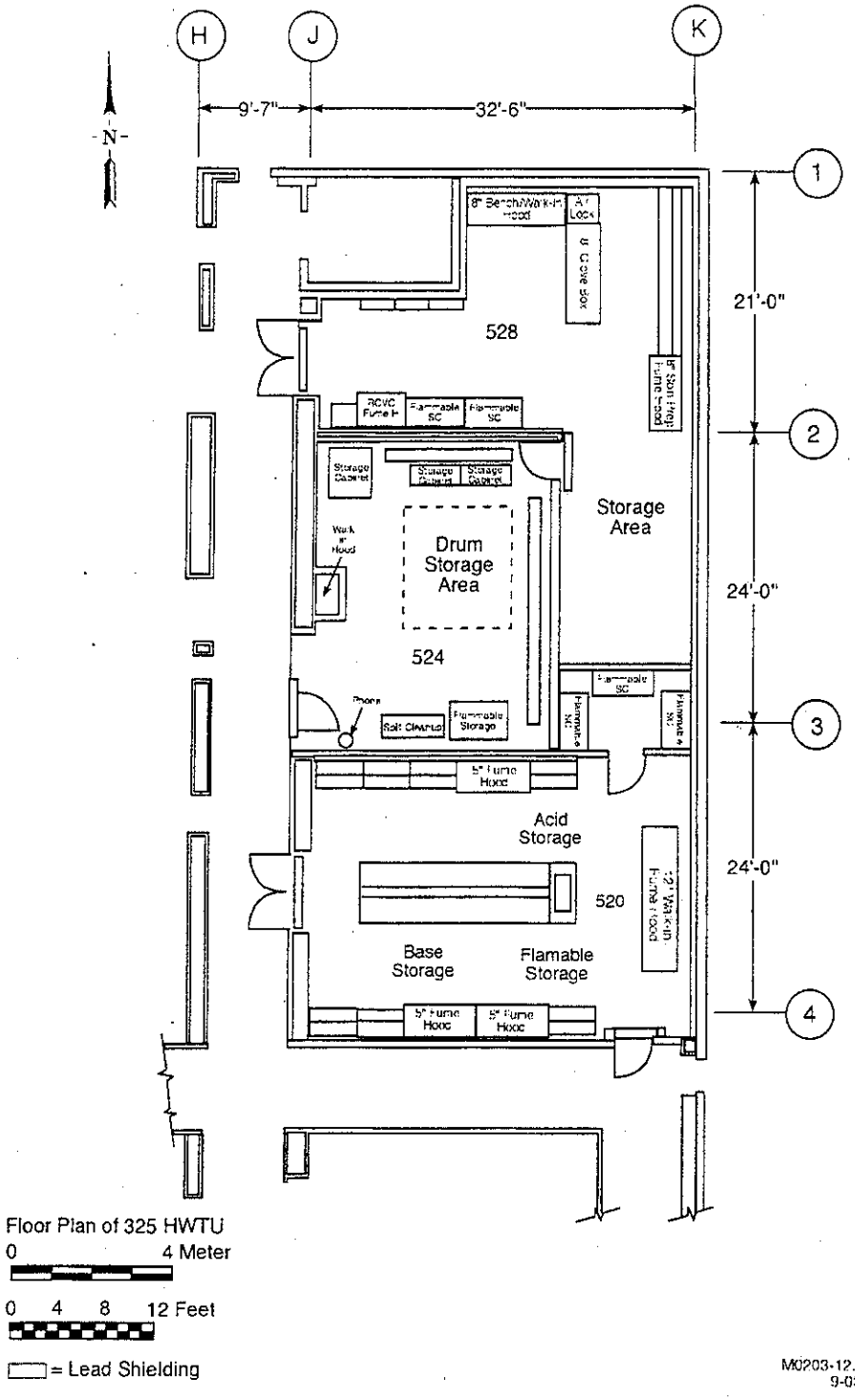
2
4

Figure 3.2. Drawings of the TSD Units



Chapter 4.0 Process Information

Figures

Table

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4.0 PROCESS INFORMATION

This chapter provides a description of waste management, equipment, treatment processes, and storage operations.

The 325 HWTUs receive and treat and/or store wastes described in Chapter 3.0, Waste Analysis Plan. Small-volume containers are segregated by compatibility and stored until sufficient quantity is accumulated to prepare a labpack or bulk container (usually a 208-liter (55 gallon) drum.) Waste introduced into the SAL tank is containerized for further management as described in Section 4.2.1. Containers are repackaged for shipment as necessary and manifested for shipment to a permitted onsite or offsite TSD facility for any necessary further treatment and compliant disposal.

4.1 CONTAINERS

The following sections describe the management of dangerous waste in containers at the 325 HWTUs. Container management occurs at both the HWTU and the SAL. Both portions of the 325 HWTUs are used to store and treat dangerous wastes generated from onsite programs, primarily research laboratory analytical activities in the 325 Building and other PNNL facilities. Containers are then prepared for shipment to other TSD facilities for further treatment as required and compliant disposal. Descriptions of the containers used are provided in the sections that follow for the HWTU and SAL.

4.1.1 Containers Located in the Hazardous Waste Treatment Unit

Rooms 520, 524 and 528 of the HWTU are used to store and treat dangerous waste generated primarily from laboratory operations throughout the 325 Building and the Hanford Facility. The containers used to store and treat dangerous waste vary widely from original manufacturer containers to laboratory glassware for sample analysis or to 322-liter containers used to overpack smaller containers. Containers used for storage or treatment of dangerous waste are compatible with the waste stored in them. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table 4.1 provides an example of the types of containers that could be used in the HWTU rooms, including the material of construction and the capacity of the container.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to any applicable regulations, including 49 CFR as required by WAC 173-303-190.

All flammable liquid waste is stored in compatible containers and in Underwriter's Laboratory (UL)-listed and Factory Mutual (FM)-approved flammable storage. Solid chemicals are stored on shelving or in drums in specifically designated areas based on the hazard classification.

4.1.1.1 Shielded Analytical Laboratory Containers

The primary function of the SAL is to conduct analysis of samples of waste streams collected at various locations on the Hanford Facility. The types of containers used to store dangerous waste in the SAL can vary widely from the original containers to laboratory glassware for sample analysis to 322-liter containers used to overpack smaller containers.

The containers used for storage or treatment of dangerous waste are compatible with the waste stored in the containers. Acceptable containers for acidic waste include plastic, steel lined with plastic, glass, and fiberglass containers. Acceptable containers for other waste include steel, glass, fiberglass, plastic, and steel lined with plastic. Table 4.1 provides an example of the types of container that could be used in the SAL, including the material of construction and the capacity of the container.

Rooms 32, 200, 201, 202, and 203 are used to store dangerous waste in containers. The back face of the SAL is typically used to store waste in the larger containers. These containers include various types of 208-liter steel containers (lined and unlined). Because of the nature of some mixed waste being stored at the SAL, it is often necessary that these standard 208-liter containers be modified. This modification ensures that the containers are specially shielded to be compliant with the ALARA criteria. These specially designed shielded containers are packaged to contain anywhere from 3.79 liters to 53 liters of waste depending on the amount of shielding required. The solid waste typically is packed in individual 3.79-liter to 4.73-liter containers before placement in the 208-liter shielded container. The shielding is accomplished by surrounding the small containers with concrete, lead, or other materials.

All containers of dangerous waste are labeled to describe the contents of the container and the major hazards of the waste as required under WAC 173-303-395. Each container is assigned a unique identifying number. All containers used for onsite transfer are selected and labeled according to any applicable regulations, including 49 CFR are required by WAC 173-303-190.

All flammable liquid waste is segregated from any incompatible waste types and packaged in approved containers.

4.1.2 Container Management Practices

Management practices and procedures for containers of dangerous waste ensure the safe receipt, handling, preparation for transfer, and transportation of the waste. The following sections describe the container management practices used for the HWTU and the SAL. Table 4.1 lists the typical containers used in the 325 HWTUs.

4.1.2.1 Hazardous Waste Treatment Unit Container Management Practices

Dangerous waste containers are inspected for integrity and adequate seals before being accepted at the HWTU. Waste received for storage and treatment from outside Rooms 520, 524 and 528 is either picked up by HWTU personnel or moved to Rooms 520, 524 and 528 in containers suitable for the waste. Depending on the container weight, size or number of containers to be moved, container(s) of dangerous waste are hand carried or moved on a platform or handcart, as appropriate, to Rooms 520, 524 or 528. 325 HWTUs staff moves the dangerous containers in accordance with 325 HWTUs collection procedures that address safety and hazard consideration. These procedures cover various waste types and transportation modes. Unsupervised 325 HWTUs staff does not perform the operations, covered by a procedure, until they are formally trained on the procedure.

Containers in poor condition or inadequate for storage (e.g., damaged, not intact, or not securely sealed to prevent leakage) are not accepted at Rooms 520, 524 and 528. Examples of acceptable packaging include laboratory reagent bottles, U.S. Department of Transportation-approved containers, spray cans, sealed ampules, paint cans, leaking containers that have been over packed, etc. Unit operations personnel have the authority to determine whether a container is in poor condition or inadequate for storage using the criteria of WAC 173-303-190 and to use professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Chapter 6.0, 36, §6.2. Containers are inspected for integrity before acceptance at or transport to the HWTU. Containers found to be in poor condition or inadequate for storage are not accepted.

Container Handling. All HWTU staff is instructed in proper container handling and spill prevention safeguards as part of their training (Chapter 8.0). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a). All personnel are trained and all operations are conducted to ensure that containers are not opened, handled, or stored in a manner that would cause the container to leak or rupture. All flammable cabinets containing dangerous waste are maintained with a minimum of 76 centimeters of aisle space in front of the doors. In room 520, the walk-in fume hood containing the 208-liter containers is designed to hold four 208-liter containers and has over 76 centimeters of aisle space; the containers are not stacked in the hood. In room 524, the walk-in fume hood containing the 208-liter containers is designed to hold two 208-liter containers and has over 76 centimeters of isle space in front of the doors; the containers are not stacked in the hood. Waste-handling operations can be conducted only when two or more persons are present in the unit or when the personnel present have immediate access to a communication device such as a telephone or hand-held radio.

4.1.2.2 Shielded Analytical Laboratory Container Management Practices

Containers are not opened, handled, or stored in a manner that would cause the containers to leak or rupture. Containers will remain closed except when sampling, adding, or removing waste; or when analysis or treatment of the waste is ongoing. Containers of incompatible waste are segregated in the storage areas. In-cell containers will be stacked no more than four high and labels will not be obscured.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections are in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Chapter 6.0, §6.2. Containers are inspected for integrity before acceptance at or transport to the SAL. Containers found to be in poor condition or inadequate for storage are not accepted.

Container Handling. All personnel are instructed in proper container-handling safeguards as part of their training (Chapter 8.0). Containers are kept closed except when adding or removing waste in accordance with WAC 173-303-630(5)(a).

All container handling in the hot cells must be performed remotely with manipulators. Waste samples managed in the SAL enter the cells through rotating transfer wheels located in the back walls of cells 1, 2, and 6 and through a 17.8-centimeter borehole in the back wall of cell 1. Waste samples are moved into and out of the cells at these locations according to approved procedures that vary with ALARA concerns with the sample. After analysis of the sample and necessary confirmation of results, compatible solid waste samples are consolidated into appropriate size containers often referred to as 'paint cans' and usually stored in cell 1. However, any of the cells can be used for storage of waste during operations.

After evaluation for treatment and the subsequent treatment, liquid waste is either transferred to the SAL tank (discussed in §4.2) or solidified and repackaged into shielded 208-liter containers and stored in the back face area of the SAL. Waste generated outside of the hot cells is placed into appropriately sized containers and stored until packaged for shipment or transfer. Waste-handling operations are conducted outside of the cells only when a minimum of two persons are present in the unit or when the personnel present has immediate access to a communication device such as a telephone or hand-held radio.

4.1.3 Container Labeling

Once the material has been designated as a dangerous waste, all containers are marked and/or labeled to describe the content of the container as required by WAC 173-303-395. Containers also are marked with a unique identifying number assigned by the generating unit. All containers used for transfer of dangerous waste are prepared for transport in accordance with WAC 173-303-190.

4.1.4 Containment Requirements for Storing Containers

A description of secondary containment system design and operation is provided for the HWTU and SAL in this section.

4.1.4.1 Secondary Containment System Design and Operation for the Hazardous Waste Treatment Unit

The secondary containment system for the HWTU has three primary components: uniform fire code-approved flammable liquid storage cabinets, the floor of the rooms, and the firewater containment system (Figure 4.1).

Dangerous waste in containers of 65 liters or less is stored in Room 520 in steel flammable storage cabinets located in a storage room that forms the northeast corner of the room. An additional flammable storage cabinet is located beneath a stainless steel ventilated hood located along the south wall of Room 520. Containers over 65 liters may be stored in a hood located along the east wall of the room or on the floor of the unit, as noted below. The containers are made of stainless steel or other suitable material depending on the characteristics of the waste and are kept closed except when waste is being added or withdrawn.

Dangerous waste in containers of 20 liters or less is stored in Room 524 in steel storage cabinets or DOT approved containers providing secondary containment awaiting packaging. Flammable liquids will be stored in the flammable storage cabinet located along the south wall. Larger waste containers that contain liquids are stored in DOT approved containers providing secondary containment. These containers are then placed in a portable secondary containment system. Containers holding waste not subject to containment system requirements will be stored on the floor.

Dangerous waste in containers of 65 liters or less is stored in Room 528 steel storage cabinets in accordance with WAC 173-303-395(1)(a) and the Uniform Building Code (ICBO 1991). There are eight storage cabinets, four for flammable waste and four for corrosive waste. Two cabinets (one flammable storage cabinet and one corrosive storage cabinet) are located along the north wall of the room. Two cabinets for corrosive waste are located along the east wall. Two cabinets for flammable waste are also located along the south wall. Further storage is provided by a flammable cabinet located beneath a stainless steel ventilated hood on the east wall of the room. Each cabinet is clearly marked as containing either flammable or corrosive waste. Flammable waste cabinets are painted yellow, and corrosive cabinets are painted blue.

Liquid wastes in containers from 65 to 328 liters (17 to 85 gallons) capacity will be placed within drip pans or similar secondary containment devices. Containers from 65 to 328 liters (17 to 85 gallons) capacity holding only wastes that do not contain free liquids, do not exhibit either the characteristic if ignitability or reactivity as described in WAC 173-303-090(5) or (7), and are not designated as F020, F021, F022, F023, F026, or F027 will be stored in DOT approved drums on the floor within the unit.

Rooms 520 and 528 are located on the main floor of the 325 Building and are constructed of concrete. The concrete floors of both rooms have been equipped with a heat-sealed seamless chemical-resistant polypropylene coating that covers the entire floor area of both rooms and laps approximately 10 centimeters up all of the outside walls of each room. The coated floor is capable of containing minor spills and leaks of liquid mixed waste.

Major spills or leaks of liquid mixed waste flow into the firewater containment system. The firewater containment system consists of floor trenches located at each entrance to 520 and 528 and the firewater containment tank located in the basement of the building. The system is designed to collect the fire-suppression water in the event that the automatic sprinkler system was activated. The location of the trenches is shown in Figure 4.1.

The floor trenches located under the double doors on the west side of Rooms 520 and 528 are approximately 20 centimeters wide, 46 centimeters deep and 1.91 meters long. The floor trench located under the single south door of Room 520 is approximately 20 centimeters wide, 46 centimeters deep, and 1.5 meters long. The floor trench located under the single southwest door of Room 528 is 20 centimeters wide, 61 centimeters deep, and 1.5 meters long. The trenches extend completely across the entrance of each room so that liquids do not flow out through a doorway. The trenches are constructed of 14-gauge stainless steel and are equipped with a steel grate cover. All seams are welded to ensure integrity. Trenches under the double doors are equipped with two drains in the bottom, and trenches located under single doors are equipped with one drain to allow liquid to drain from the trench through 15-centimeter-diameter carbon steel piping to the firewater containment tank.

The firewater containment tank is located beneath Room 520 in the basement of the 325 Building. The rectangular tank has dimensions of 1.65 meters by 2.25 meters by 1.92 meters and a capacity of 22,710 liters. The sides and floor of the tank are constructed of epoxy-coated carbon steel plate. The steel sides and floor provide support for the chemical-resistant polypropylene liner. The tank is secured to the concrete floor of the 325 Building basement with 1.3-centimeter bolts at 1.82-meter intervals.

The possibility of mixing incompatible waste in the containment system is minimized, because the number of containers open at one time will be limited to those in process (waste not in process is stored in closed containers). In addition, the very large volume of any firewater flow would dilute waste and would minimize the possibility of adverse reactions.

4.1.4.2 Secondary Containment System Design and Operation for the Shielded Analytical Laboratory

The secondary containment in the SAL is divided into three systems: the six hot cells, the front face, and the back face. Figure 4.2 provides a first floor plan view depicting these three areas.

The secondary containment for the six hot cells consists of the stainless steel base of the cell and a continuous trough located on the east side of the cells. The hot cell secondary containment system is shown in Figure 4.2. The base and trough can collect leaks and spills generated during analytical chemistry operations. The stainless steel bases are approximately 0.55 square-meters. The troughs are approximately 15.2 centimeters wide, 7.6 centimeters deep, and extend across the entire 1.82-meter width of each cell. The troughs are equipped with a stainless steel grate cover. The leaks and spills are drained by gravity through drains in the bottom of the trough and through stainless steel piping to the SAL tank located in the basement (Room 32). The SAL tank is constructed of stainless steel and has a capacity of 1,218 liters. Design and operating specifications are provided in §4.2.

The secondary containment system for the back face of the SAL consists of shielded 208-liter containers and plastic containers. Solid mixed waste is packaged in containers (e.g., paint cans, bottles, and bags) before removal from the hot cells. Once removed from the hot cells, the containers are placed into specially designed, shielded 208-liter containers to provide secondary containment. Containers of liquid waste are placed into plastic containers that provide secondary containment and prevent spilled liquids from contacting other waste containers. Some containers are placed in shielded cubicles in Room 202 depending on container dose rates. The location of the cubicles is shown in Figure 4.2.

The secondary containment system for the front face of the SAL, which is minimally used to store mixed waste, is similar to the system for the back face. Containers holding liquid and solid mixed waste are placed into containers to provide secondary containment; the primary area for mixed waste storage is the fume hood.

4.1.5 Structural Integrity of Base

A description of the requirements for base or liner to contain liquid is provided in the following sections for the HWTU and the SAL.

4.1.5.1 Requirements for Base or Liner to Contain Liquids in the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 have been equipped with the chemical-resistant polypropylene coating. All seams in the coating were finished by heat welding to ensure the integrity of the coating. The coating currently is free of cracks, gaps, and will be maintained that way throughout the life of the HWTU. The condition of the floor is inspected weekly as part of the inspection program (Chapter 6.0). Floor coating assessment is carried out whenever the floor coating is observed to be chipped, bubbled up, scraped, or otherwise damaged in a manner that would impact the ability of the coating to contain spilled materials. Minor nicks and small chips resulting from normal operations are repaired periodically.

The floor coating holds spilled liquid until the liquid is cleaned up, or enters the drains in each room. Once the liquid has entered the drains, the liquid drains into the firewater containment tank in the basement, where the liquid is stored pending chemical analysis and treatment and/or disposal.

The base of the HWTU floors consists of 14.2 centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete is mixed in accordance with ASTM 094, Section 5.3, Alternate 2, and is finished with a smooth troweled surface. The concrete base has a load capacity of 976 kilograms per square meter.

The floor trenches that prevent liquids from migrating from rooms 520 and 528 are constructed of 14-gauge stainless steel. All seams are welded and the connections with the drains are tight. The stainless steel is compatible with and resistant to the liquid mixed waste managed in the HWTU.

4.1.5.2 Requirements for Base or Liner to Contain Liquids in the Shielded Analytical Laboratory

The base currently is free of cracks, gaps, and will be maintained that way throughout the life of the SAL. The base of the floor for the six hot cells consists of a 0.48-centimeter layer of stainless steel formed on top of poured concrete. The stainless steel base is compatible with most of the waste generated in the hot cells. The exceptions are waste containing hydrofluoric acid and high concentrations of hydrochloric acids. This waste is stored in individual secondary containment to prevent contact of the waste with the stainless steel in the event that a primary waste container was to fail. Because the volumes of waste generated and stored are small and the hot cell floors are not sloped; waste spilled during waste handling

activities probably would remain localized and be cleaned up expeditiously to ensure that no damage occurs to the stainless steel. As was previously discussed, a stainless steel tank provides the secondary containment system for the six cells. Liner and base requirements for the SAL tank are discussed in §4.2.

The bases of the back face and front face of the SAL consist of a 15.2 -centimeter, reinforced, poured concrete slabs with no cracks or gaps. The concrete base has a load capacity of 976 kilograms per square meter. The base in Room 201 is topped with a seamless chemical resistant polypropylene coating. Rooms 202 and 203 are topped with epoxy-based paint. Room 200 concrete slab is painted, and has a trap door in the painted floor that enables transfer of equipment between Rooms 200 and 32. The airflow between these rooms is from Room 200 to Room 32 due to positive air pressure in Room 200.

4.1.6 Containment System Drainage

A description of the containment system drainage for the HWTU and SAL is provided in this section.

4.1.6.1 Containment System Drainage for the Hazardous Waste Treatment Unit

The floors in Rooms 520 and 528 are not sloped. Small spills of liquid probably will remain in a localized area until the spills are cleaned up. Either all containers of dangerous waste are stored in drums, on shelves within open-faced hoods, or within flammable or corrosive storage-cabinets to prevent the containers from contacting spilled materials. Large spills of liquid material would spread laterally across the flat surface of the floor. The flow of the spilled liquid would be stopped by an outside wall(s) of the room or by one of the trenches protecting the entrances to the room. The lower 10 centimeters of the outside walls of the rooms are covered with the same chemical-resistant coating as that on the floor to prevent spills from migrating throughout the walls.

The floor in Room 524 is not sloped. All liquid waste in this room will be stored in secondary containment. The secondary containment for liquids will consist of steel storage cabinets with secondary containment, DOT approved containers or one of the stainless steel 'container pans'. Any container holding waste not subject to containment system requirements will be stored on the floor.

The floor drains across each exit in Rooms 520 and 528 drain spills to an emergency firewater containment tank (22,710-liter capacity) located in the basement of the 325 Building. The tank captures all drained liquid, where the liquid is stored until sampling and analysis indicates a proper treatment and/or disposal method.

4.1.6.2 Containment System Drainage for the Shielded Analytical Laboratory

The stainless steel base of the hot cell is not sloped. Because of the small volume of waste that is handled, small spills probably would remain in a localized area until the spills are cleaned up. As a result, all containers of liquid mixed waste are stored within secondary containment to prevent spilled liquids from contacting the containers. Large spills that occur within the SAL hot cells flow to the stainless steel trough at the front of each cell, which gravity drains into the SAL tank (TK-1, Room 32).

The bases of the front and back faces are not sloped. Containers in these areas are stored within secondary containment and off the base surface to prevent spilled liquids from contacting the containers.

4.1.7 Containment System Capacity

A description of the containment system capacity for the HWTU and SAL is provided in the following sections.

4.1.7.1 Containment System Capacity for the Hazardous Waste Treatment Unit

The maximum combined total volume of all containers of dangerous waste stored in both HWTU rooms is 10,000 liters. The largest mixed waste storage container is a 322-liter container. The firewater containment tank provides secondary containment for both HWTU rooms. The capacity of the firewater containment tank is 22,710 liters; therefore, the containment system is more than adequate to contain either 10 percent of the total volume of waste (2,840 liters) or the entire volume of the largest container (322 liters).

4.1.7.2 Containment System Capacity for the Shielded Analytical Laboratory

The SAL tank is considered the secondary containment for the hot cells. The largest quantity of liquid that could be stored in the hot cells while maintaining adequate (10 percent of total volume) secondary containment would be 12,491 liters. The total amount of liquid to be stored in the hot cells is governed by the area constraint of the cells. Typically, the largest amount of liquid waste to be stored in the hot cells at one time is 75.8 liters.

Liquid waste stored in Room 201 is stored in the fume hood. The waste is stored in glass or plastic bottles that are placed in individual plastic containers of a size that is sufficient to hold all of the contents of the inner vessel. The quantity of liquid waste stored in the hood is governed by the area constraint in the hood. Similarly, liquid waste stored in Room 202 is stored in glass or plastic bottles that are each placed in individual secondary containment.

The floors of the front face and back face are constructed of concrete. The rear face floor in Rooms 202 and 203 is covered with epoxy paint. Because of the small quantities of liquid stored in the front face and back face, any spill that is not contained by the plastic overpack probably would remain on the floor in a localized area until cleaned.

4.1.8 Control of Run-on

Run-on control for the HWTU and SAL is described in the following sections.

4.1.8.1 Control of Run-on for the Hazardous Waste Treatment Unit

The 325 Building mitigates the possibility of run-on for the HWTU. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

4.1.8.2 Control of Run-on for the Shielded Analytical Lab

The 325 Building mitigates the possibility of run-on for the SAL. The level of the main floor is approximately 1.52 meters above the level of the ground surface around the building.

4.1.9 Removal of Liquids from Containment System

The removal of liquids from the containment system for the HWTU and SAL is described in the following sections.

4.1.9.1 Removal of Liquids from the Hazardous Waste Treatment Unit Containment System

On discovery of liquid accumulation in the containment resulting from a spill or other release, the Building Emergency Director (BED) must be contacted in accordance with the contingency plan (Chapter 7.0). The BED may determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area might be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Liquid spills are contained within the Room 520, 524 or Room 528 floor or within the firewater containment tank. Localized spills of liquids to the floor of the HWTU rooms are absorbed with an appropriate absorbent (after the appropriate chemical reaction has occurred to neutralize reactivity in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material is recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material are disposed of in an appropriate manner. If spilled materials in the HWTU reach the firewater containment tank, the material will be held in place until chemical analysis indicates an appropriate treatment and/or disposal method. The waste analysis procedures and analytical methods used to designate the spilled materials are described in Chapter 3.0, Waste Analysis Plan. The tank is designed to allow easy access for material sampling. Depending on the results of the analysis, the collected spill material will be recovered and disposed of at an appropriate facility.

4.1.9.2 Removal of Liquids from the Shielded Analytical Laboratory Containment System

The removal of liquid from the SAL tank, which provides the secondary containment for the six hot cells, is discussed in §4.2. The tank will be emptied after the accumulated waste is designated.

On discovery of liquid accumulation in the back or front face containment resulting from a spill or other release, the BED must be contacted in accordance with the contingency plan (Chapter 7.0). The BED could determine that the contingency plan should be implemented. If the incident is minor, and if the BED approves, removal of the liquid commences immediately following a safety evaluation. Appropriate protective clothing and respiratory protection will be worn during removal activities; an industrial hygienist could be contacted to determine appropriate personal protection requirements and any other safety requirements that might be required, such as chemical testing or air monitoring. In addition, ventilation of the spill area could be performed if it is determined to be safe and if appropriate monitoring of the air discharge(s) is performed.

Localized spills of liquids to the floor of the SAL will be absorbed with an appropriate absorbent (after the appropriate chemical reaction to neutralize reactivity has occurred in the case of reactive waste or after neutralization has occurred in the case of corrosive materials). The absorbent material will be recovered and placed in an appropriate container. The floor, cabinets, and any other impacted containers can be cleaned by dry rags, soap and water, or a compatible solvent, if necessary, to remove external contamination. Contaminated rags and other cleanup material will be disposed of in accordance with applicable regulations and PNNL internal waste management procedures.

4.1.10 Management of Ignitable and Reactive Waste in Containers

Management of ignitable and reactive-waste in containers within the HWTU and SAL is described in the following sections.

4.1.10.1 Management of Ignitable and Reactive Waste in Containers in the Hazardous Waste Treatment Units

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the HWTUs.

4.1.10.2 Management of Ignitable and Reactive Waste in Containers in the Shielded Analytical Laboratory

Ignitable and reactive wastes are stored in compliance with Article 79, Regulations for Flammable and Combustible Liquids (ICBO 1997). Containers of ignitable and reactive waste are stored in individual flammable storage cabinets within the SAL.

4.1.11 Management of Incompatible Waste in Containers

The prevention of reaction of ignitable, reactive, and incompatible waste in containers for the 325 HWTUs is discussed in the following sections.

4.1.11.1 Management of Incompatible Waste in Containers at the Hazardous Waste Treatment Unit

Containers of ignitable and reactive waste are stored in segregated flammable storage cabinets. Chapter 6.0, §6.5.2, describes the methods used to determine the compatibility of dangerous waste so that incompatible waste is not stored together. Incompatible waste is never placed in the same container or in unwashed containers that previously held incompatible waste. Operations are conducted such that extreme heat or pressure, fire or explosions, or violent reactions do not occur. Uncontrolled toxic mists, fumes, dust, or gases in sufficient quantities to threaten human health or the environment are not produced; uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosion are not produced; and damage to the container does not occur. Information on the hazard classification of waste accepted by the HWTU is documented by the generating unit, which is carefully reviewed by HWTU personnel before waste acceptance. Mixing of incompatible waste is prevented through waste segregation and storage. As the containers received in the HWTU usually are smaller than 19 liters, the most common segregation is performed by storage of incompatible hazard classes in separate chemical storage cabinets. Guidance for the segregation is provided in Chapter 6.0, §6.5.2.

Minimum aisle space is maintained according to the Uniform Fire Code to separate incompatible waste. The possibility of adverse reaction is minimized (Chapter 6.0, §6.6 and §6.7 for methods used to prevent source of ignition).

4.1.11.2 Management of Incompatible Waste in Containers at the Shielded Analytical Laboratory

Incompatible waste in the SAL hot cells is managed by placing primary containers into a second container or tray capable of managing any leak or spilled material. Incompatible waste is never placed in the same container or in an unwashed container that previously held incompatible waste.

Treatment operations are conducted with minor amounts of waste to ensure that extreme heat or pressure, fire, or explosive or violent reactions do not occur. Potential releases would be controlled by the ventilation system that exhausts through two high-efficiency particulate air (HEPA) filters set in series, and due to the limited amount of waste in the SAL. These HEPA filters are part of the building exhaust system, which is maintained and inspected routinely in accordance with PNNL preventive maintenance standards. Emissions from the 325 Building stack, and control devices for those emissions, are regulated by the Washington State Department of Health pursuant to Chapter 246-247 WAC, and the Washington State Department of Ecology (Ecology) pursuant to Chapters 173-400, 173-401, and 173-460 WAC, respectively. Air-pressure barriers for containment control are achieved by supplying air from areas of least contamination (i.e., offices) to areas of higher contamination (i.e., cells). These systems ensure proper emission flow through the HEPA filters.

Because waste normally is treated in the SAL hot cells, human exposure to the remote potential of mixing incompatible waste or reactive waste is minimal. Waste generated and treated within the SAL hot cells is stored within separate secondary containers, which eliminates the potential for combining incompatible waste. Waste stored in the front or back face of the SAL is packaged by hazard classes for transfer or is segregated in separate secondary containment.

4.2 TANK SYSTEMS

The following sections describe the management of dangerous waste in the SAL tank system. The tank system consists of the tank; associated piping, valves and pumps; and secondary containment. The tank system is located in Room 32 of the SAL and is used to collect liquid waste generated from the analytical laboratory operations. This SAL tank system is described in §4.2.1.

4.2.1 Shielded Analytical Laboratory Tank System

The SAL is an analytical chemistry laboratory used primarily to prepare and analyze samples for research and development activities and waste characterization. Storage and treatment of dangerous waste in containers also occurs in the SAL. This work is conducted in six inter-connected hot cells. Liquid waste generated during these operations is collected, treated if necessary and may be containerized or drained from the hot cells to the SAL tank located in Room 32 of the basement directly below the hot cells. A stainless steel trough, 15.2 centimeters wide by 7.62 centimeters deep, traverses the front of all six hot cells in which solution is poured. The trough is equipped with stainless steel grating to capture solids during solution pour. The trough collects any liquid waste poured from analytical chemistry operations, mixed waste treatment operations, other chemical and mixed waste stored in the hot cells, and spills or leaks. The liquid waste is transferred through a common stainless steel pipeline that drains into the SAL tank. The waste is treated in the tank, as needed, and batch transferred from the SAL tank to containers for disposal through a pressurized transfer line that leads back into Cell 6 of the SAL. The SAL tank volume is 1,218 liters and has a throughput of 10,000 kilograms per year.

4.2.1.1 Design, Installation, and Assessment of Tank Systems

The following sections discuss the design and installation of the SAL tank and provide information on the integrity assessment.

4.2.1.1.1 Design Requirements

Waste stored in the SAL tank has a pH between 7 and 12. The tank is constructed of 316L stainless steel. This material is compatible with any of the dangerous waste that is discharged to the tank.

The tank system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the material is adequate and that it can withstand the stress of daily operation. The professional engineer evaluation is included in the tank integrity assessment.

The SAL tank is a vertical double-shell tank supported by 3 legs and stands approximately 1.7 meters above the ground. The top head is a 0.95-centimeter-thick flat stainless steel plate. Both bottom heads are flanged and dished heads (torispherical), and the bottom height is 10.2 centimeters above ground. The inner shell is 107 centimeters outside diameter, the outer shell is 114 centimeters outside diameter, and each shell is 0.8-centimeter-thick stainless steel plate. The tank is located inside a containment pan that has a 203-centimeter diameter and is 51 centimeters high; the total volume of the pan is 1,648 liters. The pan provides for secondary containment of leaks from the tank, piping, and ancillary equipment and instruments located above the tank. Flanged and threaded connections are located within the containment boundary of the pan to capture any leaks that might occur from these connections. Outside the containment area, all connections are welded. There are no outlets, drainage or otherwise, on the bottom or sides of the tank.

Solution enters the tank through a gravity flow, welded drain line piped from the hot cells. The SAL sources that tie into this drainpipe includes: the hot cells, sink drain, hood drain via the sink drain, and floor drain. The cup sink drain and hood drain line is sealed off and is not in use. The drain line also functions as the tank vent that is exhausted by the hot cell exhaust system. A return line of stainless steel is attached to the top of the tank and can be 'jetted' using water pressure to transfer the tank contents back up to Cell 6 of the SAL. A mixer is located on top of the SAL tank to provide agitation of the contents for sampling and washout purposes. Process water also is provided to the tank system for cleanout of the tank and associated piping. The solution is stored in the SAL tank, treated as needed and transferred to containers for final disposal.

The SAL tank is located in a controlled access room and is monitored from two operating panels. The smaller sample panel is located next to the SAL tank, and the second main control panel is located in Room 201, the main operating gallery. The sample panel provides control for activities related to pulling a sample, such as activating the sample pump and controlling process water, and monitoring the liquid level of the tank. The main control panel provides the operators with the ability to monitor and control the entire SAL tank system. The main control panel provides level indication, high, and high-high level annunciation and contains switches for controlling pumps, agitators, valves, etc. The SAL tank is instrumented with three types of level-monitoring devices. Two devices are wired into the annunciator at the main control panel to provide high-level alarms, and one high-level alarm annunciates at the annunciator board in the control room on the third floor. This control room is staffed 24 hours a day, 7 days a week. If a high-alarm situation occurs after normal working hour's operations personnel would be notified immediately by the alarm and would take corrective action according to procedure. The SAL tank system normally is operated on the day shift. Personnel occupy the main operating gallery in Room 201, where the personnel would be alerted to off-normal conditions on the main control panel. A high-level alarm also would deenergize the process water solenoid valves to the closed position on three water lines into the hot cells and on the process water lines to the SAL tank. The containment pan contains a conductivity element that alarms at the main control panel should solution be detected in the pan. Operating procedures require that inspections of the entire system be made daily when in use (Chapter 6.0).

4.2.1.1.2 Integrity Assessments

An independent, qualified, registered professional engineer's tank integrity certification has been completed and will be submitted as a separate document.

Within three (3) months of final installation of the new tank, the Permittee shall submit to Ecology a written integrity assessment, which has been reviewed and certified by an independent, qualified, registered professional engineer, in accordance with WAC 173-303-810 (13)(a).

4.2.1.2 Secondary Containment and Release Detection for Tank Systems

This section describes the secondary containment systems and leak detection systems installed in the SAL.

4.2.1.2.1 Requirements for Tank Systems

The secondary containment system for the SAL Tank in Room 32 consists of two components. The SAL tank is a double-walled vessel and the outer tank provides secondary containment for the inner tank; and; a pan has been installed under the tank to provide secondary containment for the pumps, valves, and flanges located on the top of the tank. The pan also provides tertiary containment for the tank.

The existing drainpipe from the hot cells to the SAL tank is a single-walled, 5.1-centimeter welded stainless steel pipe. This piping is visually inspected for leaks on a daily basis when the tank system is in use, by means of a remote video system. Flanges in this piping and ancillary equipment are located so that secondary containment is provided by the SAL tank secondary containment pan. The 325 Building provides additional containment. The basement floors are concrete, and any liquid release remains in the immediate area until cleanup. The openings to the drains in the basement are elevated 10.2 centimeters above the floor; thus, any spill would remain in the basement until enough liquid collects to fill the entire basement to a 10.2-centimeter depth. The SAL tank can hold a maximum of 1,218 liters, and the entire contents of the SAL tank would fill an area of only 3.5 meters by 3.5 meters to a depth of 10.2 centimeters. Because the basement is larger than 3.5 meters square, the liquid from the SAL tank would not enter a drain opening. Details of the design, construction, and operation of the secondary containment system are described in the following sections.

4.2.1.2.2 Requirements for Secondary Containment and Leak Detection

The secondary containment has been designed to prevent any migration of waste or accumulated liquid from the tank system to the soil, groundwater, or surface water. The secondary containment system also can detect and collect releases of accumulated liquids. A zoom color television camera surveillance system allows for tank, ancillary equipment, and general Room 32 viewing. The camera, located in Room 32, is equipped with auxiliary lighting and mounted on a remote controlled pan and tilt head. The color monitor and camera controls are housed in a dedicated cabinet in Room 527 or 527A. The HWTU will have the option of either keeping the camera/monitor controls in Room 527, 527A, or moving it to another location for operational flexibility. By maintaining operational flexibility of where the camera controls are located, the HWTU can meet ALARA (As Low As Reasonably Achievable) requirements and minimize the expense of added HWTU training requirements.

The following is the system description.

Materials of construction. The tank and components are constructed of 316L stainless steel; this material is compatible with the aqueous waste being discharged to the tank. The waste has a pH between 7 and 12.

Strength of materials. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of materials is adequate and that the tank can withstand the stress of daily operation (SAIC 1996). In addition, pressure relief valves are installed in each line exiting the SAL tank. In the event that there is a blockage in the pipe or tubing, pressure will not build up

in the lines. The pressure relief valves are set to 30 psi, which is well below the design strength of stainless steel pipe and tubing. Waste drains back into the SAL tank when a pressure relief valve opens.

Strength of foundation. The system design has been reviewed by an independent, qualified, registered professional engineer to verify that the strength of the tank mounting and foundation is adequate to withstand the design-basis earthquake (DBE). This ensures that the foundation is capable of providing support to the tank and will resist settlement, compression, or uplift.

Leak detection system description. The SAL tank is double walled, and a conductivity probe is installed in the annulus to detect any leak of liquid from the primary containment. If liquid is detected by the probe, alarms are sounded immediately in a local control panel located in Room 32 and in the main control room.

A pan installed beneath the SAL tank provides tertiary containment. The containment pan has a conductivity element that alarms at the main control panel if the presence of liquid in the pan is detected. The containment pan has a 203-centimeter diameter and a 51-centimeter height with a containment capacity of 1,648 liters. The containment pan will easily hold the total capacity of the 1,218-liter SAL tank plus any potential process water that might be released.

Removal of liquids from secondary containment. The tank secondary containment, the outer shell of the double-walled vessel, is designed to contain a liquid leak from the inner vessel until provisions can be made to remove the liquid. The liquid might not be removed within 24 hours because of the coordination that must take place in the 325 Building. A tube is installed in the tank annulus, extending to the bottom and is capped at the top. If liquid were detected in the annulus, the liquid could be removed by connecting a tube between the capped fitting and the transfer pump, which would pump out the liquid to appropriate containers.

A delay of greater than 24 hours in removing the liquid from the secondary containment poses no threat to human health or the environment, because the waste continues to be contained in a sealed vessel. In the event that the secondary containment should leak, the containment pan installed beneath the tank provides tertiary containment.

4.2.1.2.3 Secondary Containment and Leak Detection Requirements for Ancillary Equipment

Secondary containment for the SAL tank system ancillary equipment is provided by the containment pan below the SAL tank, by double-walled piping for the sample line between the tank and the sample station, and by daily visual inspection during use of the entire system including the existing single-walled piping. Flanged and threaded connections, joints, and other connections are located within the confines of the containment pan. Outside this pan, only double-walled piping and welded piping is allowed. The pumps are magnetic coupling pumps located above the pan. All construction material is stainless steel; for the welded parts, the material is 316L stainless steel. Stainless steel material is compatible with the expected corrosive, dangerous, and mixed waste stored in the SAL tank. The strength and thickness of the piping, equipment supports, and containment pan are designed to onsite standards that take into account seismic requirements for the region and corrosion protection. The entire system is located on an existing basement floor built in the 1960s. The 325 Building has proven over time to be of a sound structural integrity to withstand mild earthquake forces. The containment pan has a liquid element sensor that alarms immediately at the main control panel should any leakage be detected. The containment pan has a 203-centimeter diameter and a 51-centimeter height, or 1,648 liters of capacity. The containment pan will hold the total capacity of the 1,218-liter SAL tank plus any potential process water that also might be released. In the event of an alarm, the process water solenoid valves will become de-energized to the closed position to minimize the loss of additional water.

The 325 Building is staffed or monitored 24 hours a day, 7 days a week. The control system is designed to alarm on any leak/spill or high-level alarm encountered. The personnel responding to the alarm condition will stop or secure the action causing the leak/spill, warn others of the spill, isolate the spill area, and minimize individual contamination and exposure. The spilled or leaked waste will be removed in an expeditious manner according to procedures for cleaning up spills and leaks. Any required release reports will be filed according to the requirements of WAC 173-303-640(7).

4.2.1.2.4 Controls and Practices to Prevent Spills and Overflows

The SAL tank system has been designed to account for safe and reliable operation to prevent the system from rupturing, leaking, corroding, or otherwise failing. The tank is provided with redundant-level instrumentation to monitor tank levels. Both capacitance- and conductance-level probes are used for level monitoring and alarming. The tank will alarm on high level and interlock the process water to fail close. The process water is supplied to both the hot cells and the tank system. The containment pan is equipped with a liquid-sensing element to detect the presence of liquid and alarms at the main control panel if liquid is detected. Normally, liquid is drained to the tank by operators pouring solution into the troughs in the hot cells. This operation is carried out in a 'batch mode'. If this operation sets off a high-level alarm, the operators stop pouring solution into the troughs. Even if this operation caused an alarm condition, no spill is expected, because the tank has sufficient freeboard to hold additional waste solution. The initial level alarm is set at 92 percent of full volume.

Trained personnel respond to spills by stopping or securing the action causing the spill, notifying others in the area of the spill, and following guidance provided in the 325 Building Emergency Plan and the 325 HWTUs Contingency Plan (Chapter 7.0). Measures are in place to inspect the system daily.

4.2.1.3 Tank Management Practices

According to operating procedures, liquid waste is poured into the troughs. The troughs tie into the 5.08-centimeter drain header located under the hot cells. This drain header is sloped down to the SAL tank located in Room 32 of the basement. The existing drain header is the only method of introducing mixed waste solutions into this tank. The drain line is fully welded and is constructed of 316L stainless steel material. Because this drain line also serves as the SAL tank vent line, the SAL tank operates at the same pressure as that of the hot cells. The heating, ventilation, and air conditioning operating pressure for the hot cells, and therefore the SAL tank, is -1.27 centimeters water (vacuum). The SAL tank operates at slightly subatmospheric pressure, and no pressure controls are necessary for this tank system.

The SAL tank is fully monitored with tank-level instruments. A main control panel provides level status and high-alarm annunciation. Two control panels are provided with the SAL tank monitoring system. One control panel is located adjacent to the sampling station in Room 32 to control the sampling pump when samples are pulled. A second control panel is located on the operating floor in Room 201, the SAL main operating gallery. Tank status is monitored from the first floor control panel. Because waste solution is generated in a batch mode, waste solution drained to the tank is effectively controlled through operating and administrative procedures in order to prevent high-level-alarm conditions. A safety cutoff system for the tank will shut off all incoming water to the SAL in conjunction with a high-level-alarm condition. A backup tank system was determined to be unnecessary for the SAL operations because of the presence of tank monitoring devices and the use of administrative and operational (batch-processing) controls.

The tank transfer controls provide similar safety features. The SAL tank volume maybe transferred, to SAL Cell 6 for treatment and/or subsequent storage in containers using a pressurized transfer line. As

with the drain lines, the pressurized line is constructed of single-wall stainless steel piping. All connections outside the tank's secondary containment system are welded.

4.2.1.4 Marking or Labeling

Due to the ALARA concerns associated with the SAL tank, the tank itself is not labeled. The tank is located in a locked room to comply with ALARA standards. Access points to the room are labeled to meet the requirements of WAC 173-303-395. The marking of the access points is legible from a distance of 15 meters and identifies the waste. The label adequately warns employees, emergency response personnel, and the public of the major risks associated with the waste being stored within the tank. The tank also has a written placard identifying important hazard concerns.

4.2.1.5 Ignitable, Reactive, and Incompatible Waste

Many different types of samples and waste materials will be brought to the SAL hot cells for analytical or research activities. These samples are accompanied by an internal PNNL documentation form that provides waste characterization information from the sample-generating unit. Chemical characterization provided in these forms is based on previous chemical analysis or process knowledge. The hazard potential includes exposure to mixed waste, corrosive chemicals, and hazardous chemicals. All operations performed in the SAL hot cells are conducted by qualified operators following approved procedures. Typical hot cell analytic processes generate liquid waste that is highly acidic and/or that have a high chloride level. A small quantity of organic waste is generated and segregated prior to treatment or disposal. If heavy metals are present in the liquid waste before neutralization, the metals are precipitated as hydroxides incident to the neutralization and are filtered from the solution. If the chloride content of the liquid is above 0.01 Molar, the chlorides may be removed through silver nitrate precipitation. Therefore, waste solutions are not expected to be ignitable, reactive, or incompatible when transferred to the SAL tank.

4.3 AIR EMISSIONS CONTROL

The TSD unit shall comply with all applicable Subpart AA and BB requirements of the Air Emission Standards. The air emissions standards on 40 CFR 265, Subpart AA and BB do not apply to any part of the 325 HWTUs. Containers in the 325 HWTUs are primarily managed as mixed waste. Such containers are exempt from 40 CFR 264, Subpart CC by 40 CFR 264.1080(6).

Table 4.1. Typical Storage Containers Used at the 325 Hazardous Waste Treatment Units

Material of construction	Waste Capacity
Glass container/bottles	1 milliliter to 3.79 liters
Plastic containers/bottles	1 milliliter to 19 liters
Paint cans	0.47 liters to 4.73 liters
Steel containers	114 liters, 322 liters
Plastic-lined steel containers	114 liters, 208 liters
Steel 'shielded' 208-liter container	Various nominal capacity depending on necessary shielding; 3.79 liters; 53 liters
Overpack containers	322 liters

Figure 4.1. Hazardous Waste Treatment Unit Secondary Containment System

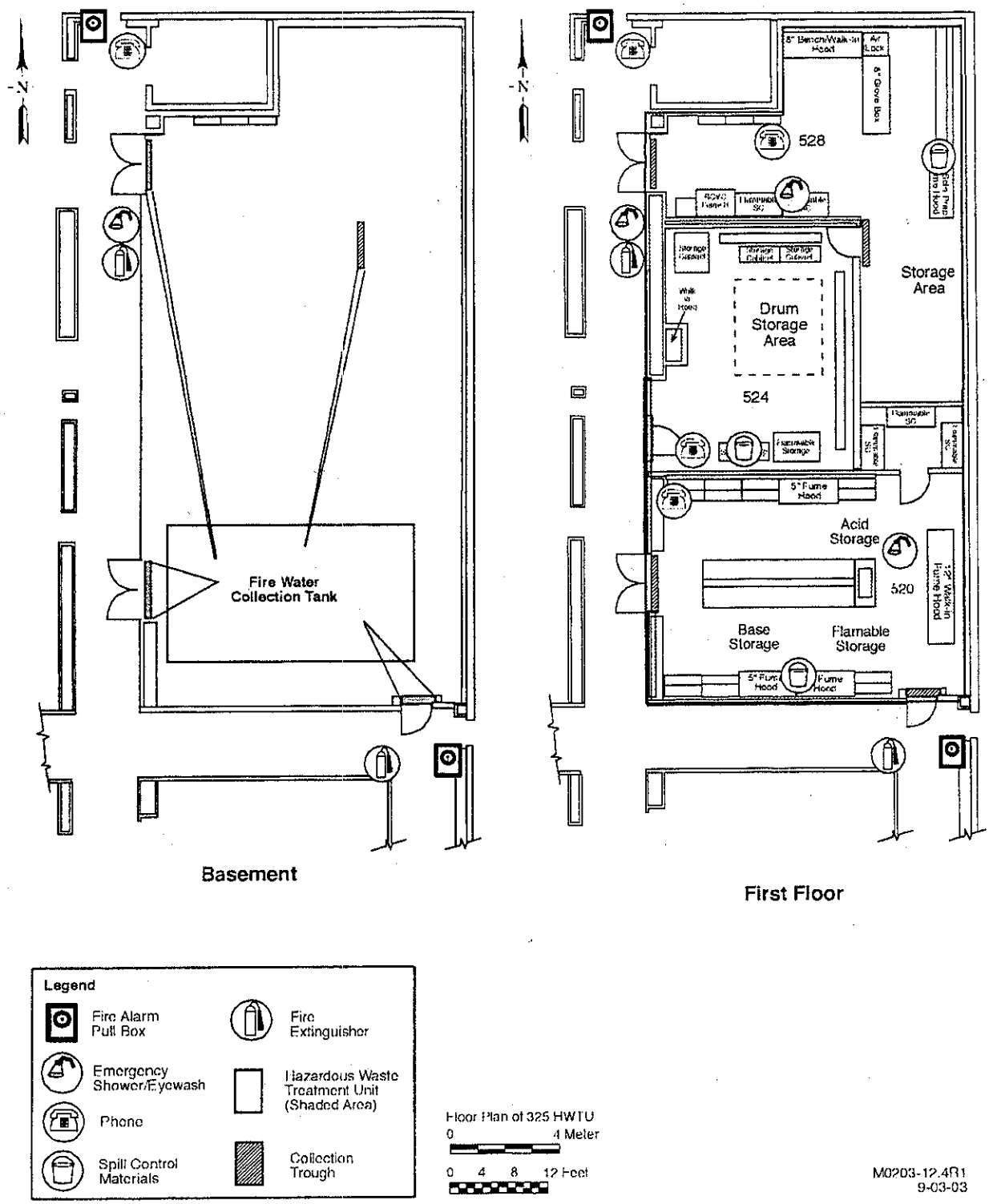
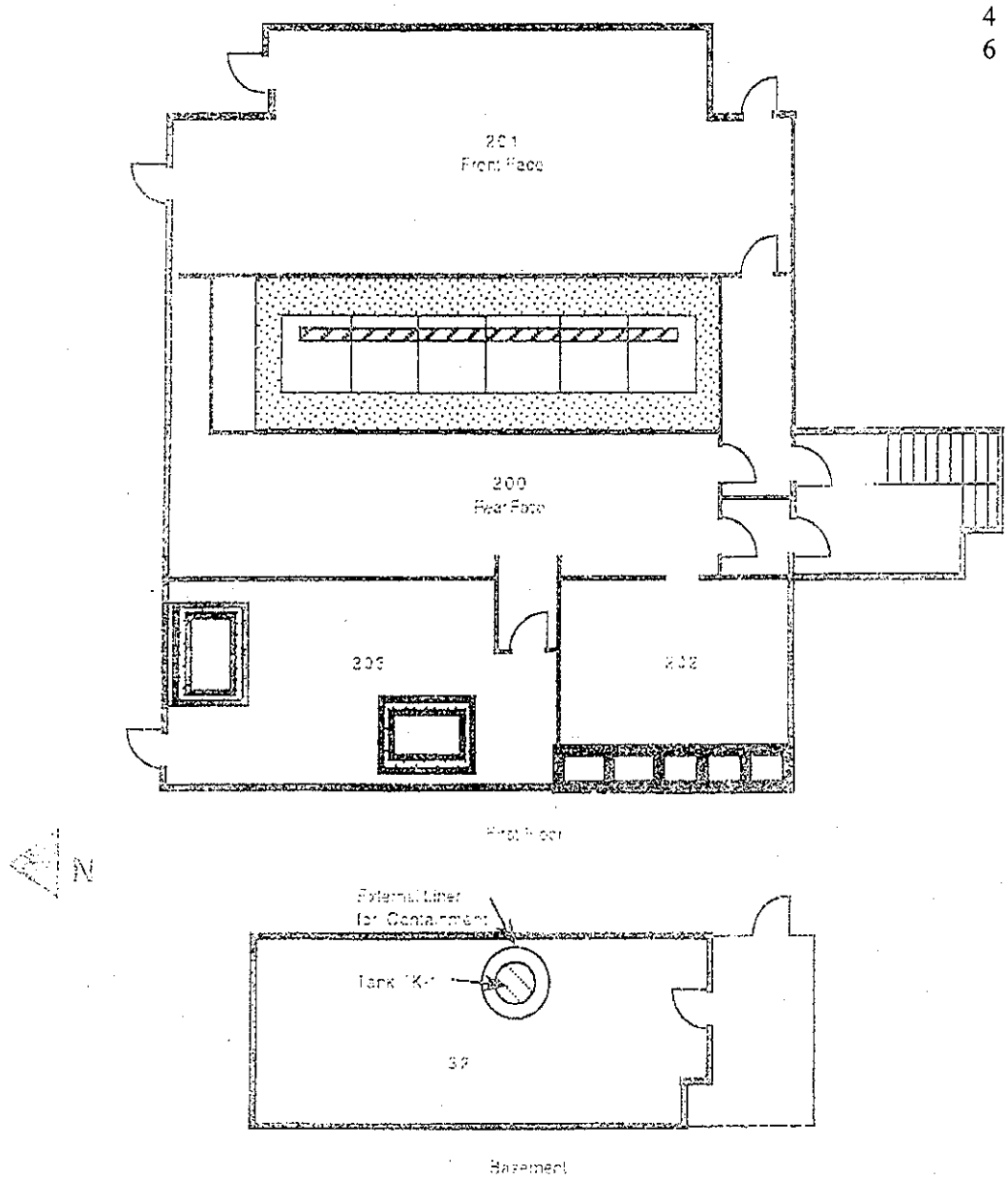


Figure 4.2. Hot Cell Secondary Containment System



Chapter 6.0 Procedures to Prevent Hazards

Figures

Table

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Official Use Only section not scanned*

WA7890008967, ATTACHMENT 36

Pages 36.6.1 through 36.6.18

*Complete document located in Sensitive Table

Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

WAC Requirement WAC 173-303-XXX	Permit Attachment 4 *Hanford Emergency Management Plan* DOE/RL-94-02[1]	325 Building Emergency Procedure[2]	Permit, Part III, 325 HWTUs
None	N/A	§1.1 thru 1.4	Chapter 1.0, Site Plan
-350(3)(d)	N/A	§12.2.1[3]	N/A
-360(1)	N/A	§3.1.1, 28th bullet	Chapter 8.0, references Training Plan
-350(3)(a), (b)	§1.3.4	§6.1, §6.3, and §6.4	§3.10 (activation of plan for damaged shipment)
-360(2)(a)	§1.3.4 §5.2.1	§1.5, §6.1, §6.3, and §6.4	N/A
-360(2)(b)	§2.2.1.1.3(g)	§3.1.1, 17th bullet; §9.2	N/A
-360(2)(c), (d), and (e)	§2.2.1.1.3(a) and (c), §4.2, 5.1.1, and §5.1.2	§3.7 notification §4.0 criteria	N/A
-360(2)(f) and (g); -630(2), and -640(7)	§2.2.1.1.3(g)	§3.1.1, 17th bullet; §4.0	N/A
-360(h), (i), (j), and (k)	§5.1.2.2, §5.1.2.3, §9.2.3, and §11.2	§3.1.1, 25th bullet; §3.7, §9.2, and §9.3	§6.4.5 (restocking of protective equipment as it is used)
-350(3)(e)	Appendix C	§10	§6.3.1 emergency equipment and §6.4.5 protective clothing
-350(3)(c) and -340(4)	§3.2.3, §3.3.1, §3.3.2, §3.4, §3.4.1.1, §3.4.1.2, §3.4.1.3, §3.7, and Table 3-1	§1.7	N/A
-350(3)(f)	Figure 7-3, Table 5-1	§1.5 and §1.6; Exhibits 13.1 through 13.4	N/A
-360(2)(k)	§5.1.2.2	§3.1.1, 25th bullet; §3.7, §9.2, and §9.3	N/A
-640(7)(d)(iii) and -640(7)(f)	§5.1.2.2 and §5.1.2.3	§3.1.1, 25th bullet; §3.7, §9.2, and§ 9.3	§.2.1.2.3 non-emergency reporting

[1] Sections of the Hanford Emergency Management Plan and the 325 BEP not referenced here are not enforceable under the Permit. Refer to also Permit Condition III.6.B.a.
[2] March 2005 version.
[3] This information is not required pursuant to Permit Condition II.A.4 and is included only in order to avoid modification to the complete Building Emergency Procedure.

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1.0 General Information

The Radiochemical Processing Laboratory (RPL), (325 Building) Building Emergency Procedure (BEP) has been designed to provide information necessary to minimize risks to personnel, facilities, programs, and the environment in the event of an emergency. This procedure applies to all resident staff, visitors, vendors and contractor/subcontractor personnel. If an event is of a security nature (bomb threat, hostage situation, or other act of violence), security procedures may supersede this procedure; this will be assessed on a case-by-case basis.

This facility contains both radioactive and hazardous materials in operations, storage, and handling. The RPL Facility poses a possible significant hazard to adjacent facilities, personnel, programs and the environment.

This BEP includes the contingency plans and emergency procedures for hazardous waste management activities as referenced by the Washington Administrative Code (WAC) [173-303-340, -350, and -360]. This plan must be implemented whenever an emergency threatens human health and the environment.

Emergencies may arise from, but are not limited to the following:

- fire
- explosion
- loss of service systems
- a medical emergency
- bomb threats
- criticality
- criminal activity
- incidents at other facilities
- natural hazards or natural forces
- spill/release to the environment requiring assistance
- hazardous materials release.

Expected responses are those actions, which are intended to minimize the effects of a situation while providing optimum protection to personnel. Expected responses include notification to the PNNL Operations Center, Building Manager (BM), Building Emergency Response Organization (BERO) and personnel in the facility. This procedure also provides plans for notifying personnel to take safe actions, such as "Take Cover," "Evacuate" or other planned actions dictated by the event. The procedure provides for formal notification and reporting.

Other emergency response agencies available to assist the Building Emergency Director (BED) and Incident Commander from offsite are described in DOE/RL 94-02, Section 3.0. [WAC 173-303-350(3)(c)]

The BED will provide BERO members BEP training annually. The BED and Alternate BEDs will receive annual training by the PNNL Emergency Preparedness office.

The policy of PNNL is to provide for the safety of its staff, contractor/subcontractor personnel, visitors, and members of the public in case of an emergency incident. PNNL Line Management has the responsibility to execute this policy and to see that all staff understand their responsibilities and know the action to be taken in an emergency. Every staff member is responsible for using the appropriate safety instructions and procedures, and to remain alert to unsafe conditions or acts while performing his or her job. All personnel are responsible for responding to emergency conditions to minimize adverse impacts.

In the event of an emergency condition in the facility, members of the RPL BERO will perform their duties as described in this procedure. Specific emergency actions for response to events will be applicable as specified in this BEP. Those BERO members whose assistance is needed to mitigate a lesser event will be notified by telephone or personal contact by the BED or a delegate. Occupants of the facility who are not members of the BERO shall follow the standard PNNL Emergency Preparedness requirements (http://sbms.pnl.gov/standard/83/8300t010.htm).

The building fire alarm is the primary means of notification for an event that requires full activation of the BERO. Emergency telephone numbers are listed in Exhibit 12.2.

This procedure will be reviewed at least annually and amended if necessary or whenever any of the following occurs [WAC 173-303-350 (5)]:

- The applicable regulations or the HWTU's permit is revised
- The procedure fails in an emergency.
- The facility changes in a manner that materially increases or decreases the potential for fire, explosions, or release of hazardous waste or hazardous waste constituents, or in a way that changes the response necessary in an emergency.
- The emergency coordinating personnel list changes.
- The emergency equipment list changes.

1.1 Facility Name/Identification

Name: Radiochemical Processing Laboratory (RPL), 325 Building.
Address: Cypress St., 300 Area
Richland, WA 99352

EPA Generator Identification Number: WA 7890008967

1.2 Facility Location

The RPL Facility is in the southern portion of the 300 Area, East of the 329 Building and West of the 308 Building.

1.3 Owner/Operator

The RPL Facility is owned/operated by DOE-RL and co-operated by PNNL. The primary research organization in the RPL is the Radiochemical Science and Engineering Group (RS&EG) from the Environmental Technology Directorate (ETD). The Manager of the RS&EG is also the RPL Manager (senior Line Manager in the RPL) and is ultimately responsible for every aspect of operations in the RPL. Facilities and Operations, through the Building Manager, support operations and maintenance of the facility. The Building Manager is the primary Building Emergency Director (BED).

1.4 Facility Description

The RPL as referred to in this BEP consists of the RPL Building, RPL Filter Building, and the East Storage Yard located east of the RPL Building.

The RPL Building houses laboratories and specialized facilities including general-purpose chemical laboratories, High-Level Radiochemistry Facility (HLRF), Shielded Analytical Laboratory (SAL), fissionable material storage areas and 325 Hazardous Waste Treatment Units (HWTUs). The general-purpose laboratories characterize fuel, single and double-shell tank waste, environmental samples, fusion/tritium samples, and other wastes. The radiochemistry facility includes areas for glove boxes, hot cells, cask handling, storage and the isolation of isotopes for unique applications like medical use. Analytical laboratory operations are conducted on small amounts of highly radioactive materials such as samples of single-shell tank waste. The HWTU treats hazardous, mixed, low-level radioactive and transuranic waste.

The RPL Filter Building is located on the northwest corner of the main RPL structure and houses the final stage HEPA filters and the main exhaust fans.

The East Storage Yard is a fenced enclosure adjacent to the east side of the RPL Building and is designated as an outdoor Radioactive Material Area (RMA).

1.5 Hanford Site Emergency Sirens/Alarms

SIGNAL	MEANING	ACTIONS
Gong/electronic chime/strobe light	Fire	Vacate building; proceed to staging area.
Steady tone on whistle, klaxon horn, or siren	Area Evacuation	Vacate building; proceed to staging area
Wavering siren or short blasts on whistle, klaxon horn, or siren.	Shelter (take cover)	Proceed to shelter or stay indoors. Close all exterior doors, turn off all intake ventilation (only if it can be done safely), and notify manager of whereabouts. Personnel in vehicles shall proceed to the nearest occupied facility and report to facility management.
AH-OO-GAH horn (howler) or flashing blue light (in high noise areas)	Nuclear criticality	Run at least 100 feet from building; proceed to staging area, along a path that does not take you closer to the building.
Variable color (red, amber) light with ringing bell or whistle	Airborne Radioactivity or Area Radiation Monitor	Stop work activities; immediately exit the area; notify Radiological Control personnel.
Ringing of a red crash alarm telephone	Emergency communications	Lift receiver, do not speak, listen to caller, and relay message(s) to the BED and the building occupants.
Note: Some signals may not be applicable to the building; however, they may be heard in other parts of the Hanford Site. In the event of a "take cover" or "evacuation" alarm, the BERO will respond to the RPL lunchroom/lobby for BED direction.		

1.6 Building-Specific Emergency Alarms

The following local alarms are located within Radiological Controlled Areas of the RPL Building. Facility staff that have unescorted access to Radiological Controlled Areas shall be cognizant of the response to these alarms. Staff/Vendors that are under escort shall follow the directions of their escort.

SIGNAL	MEANING	ACTIONS
Area Radiation Monitor (ARM) --- Various colored lights (red, amber) Various high pitch noises (bell, whistle)	Radiation in the vicinity of the monitor has exceeded the alarm set point	• Stop work • Alert personnel in the area • Exit the RCA that is monitored by the alarm • Notify an RCT • Notify the Building Manager • Notify the PNNL Operations Center on 375-2400
Continuous Air Monitor (CAM) --- Rotating/flashing red light Various high-pitch noises (bell, whistle)	High level of airborne radioactive contamination	• Stop work • Alert others working in the area • Exit the area monitored by the alarm • Get into another breathing space • Notify an RCT • Notify the Building Manager • Notify the PNNL Operations Center on 375-2400
Glove Box High Differential Pressure Alarm --- Steady high pitch whistle noise*	Potential loss of negative pressure in the glove box	• Stop work • Alert others in the area • Exit the immediate area • Notify an RCT • Notify the Building Manager • Notify the PNNL Operations Center on 375-2400
***Note:** **IF** a local audible alarm actuates as a result of a transient condition associated with a known work condition, **THEN** it is acceptable (as applicable) to attempt to manually reset the alarm or to wait 10 seconds for the alarm to automatically reset before taking emergency actions. **IF** the alarm lasts longer than 10 seconds or the direct cause of the alarm is unknown, **THEN** immediately perform the emergency actions.		

1.7 Coordination Activities with Local Emergency Responders

Interfaces and coordination with offsite agencies are in the planning, preparedness, response and recovery elements of the Hanford emergency management program. RL has developed and maintains agreements to formalize areas of understanding, cooperation and support with offsite agencies. These agreements are applicable to all Hanford facilities, including the RPL. Summaries of these memoranda of agreement (MOA) are given in Table 3-1 of the Hanford Emergency Management Plan (DOE/RL 94-02). Copies of the MOAs are provided in Appendix B of DOE/RL 94-02.

2.0 Purpose of the Building Emergency Procedure

This procedure describes the processes and information necessary in the event of an emergency for the RPL BERO members to react to the emergency and to perform the following actions:

- Maximize safety, minimize risk to life, and provide prompt efficient treatment for injured persons.
- Provide all members of the BERO with an understanding of their roles and responsibilities in the event of an emergency.
- Minimize the effects on the health and safety of personnel, property, the environment, programs, and the public.
- Provide prompt internal and external notifications to the responsible authorities.

2.1 Distribution

Controlled copies of the BEP will be located in the following areas as a minimum:

- BED Emergency response bag
- RPL Power Operator Office (Room 900)
- Building Manager's file
- EP Program Office
- PNNL Operations Center
- Hanford Emergency Operations Center (Hanford Site facilities only).
- Management Support Group Emergency Response Bag
- Alternate Incident Command Post (3760 Building).

The RPL BEP may also be viewed via the PNNL Facilities and Operations website at http://facilities.pnl.gov/building/buildinginfo.html. Copies of the BEP that are printed from this website are considered uncontrolled copies.

2.2 Acronyms

AMH	AdvanceMed Hanford
ARM	Area Radiation Monitor
BED	Building Emergency Director
BEP	Building Emergency Procedure
BERO	Building Emergency Response Organization
BM	Building Manager
BSL	Biological Safety Level
CAM	Continuous Air Monitor

CAS	Criticality Alarm System
CMS	Chemical Management System
CSM	Cognizant Space Manager
DOE/RL	Department of Energy, Richland Operations Office
DSA	Documented Safety Analysis
EAL	Emergency Action Level
EDO	Emergency Duty Officer
EEMT	Essential Emergency Management Team
EIP	Emergency Information Posting
EOC	Emergency Operations Center
EMSD	Environmental Management Services Department
EPA	Environmental Protection Agency
EPO	Emergency Preparedness Office
ESM	Electronic Storage Media
ETD	Environmental Technology Division
FOD	Facility Operations Division
FOS	Facility Operations Specialist
FSR	Field Services Representative
HFD	Hanford Fire Department
HLRF	High-Level Radiochemistry Facility
HVAC	Heating, Ventilation, & Air Conditioning
HWTU	Hazardous Waste Treatment Unit
IC	Incident Commander
ICP	Incident Command Post
IOPS	Integrated Operations System
LA/LAI	Limited Area/Limited Area Island
MIT	Map Information Tool
MOA	Memorandum of Agreement
MSDS	Materials Safety Data Sheet
MSG	Management Support Group
ONC	Occurrence Notification Center
PIV	Post Indicator Valve
PNNL	Pacific Northwest National Laboratory
POC	Patrol Operations Center
PPE	Personnel Protective Equipment
RBA	Radiological Buffer Area
RCRA	Resource Conservation and Recovery Act
RCP	Radiological Control Procedure
RCT	Radiological Control Technician
RMA	Radiological Material Area
RPL	Radiochemical Processing Laboratory
RS&EG	Radiochemical Science & Engineering Group
SAL	Shielded Analytical Laboratory
SAS	Staging Area Supervisor
SED	Site Emergency Director

SBMS	Standards Based Management System
SME	Subject Matter Expert
SNM	Special Nuclear Material
SOP	Standard Operating Procedure
SPC	Single Point of Contact, 375-2400
TDP	Testing Designated Position
TSD	Treatment, Storage, Disposal
UDAC	Unified Dose Assessment Center
WAC	Washington Administrative Code

2.3 Making Changes to the BEP

Section 8.1.3 of PNNL-MA-110 requires the BED to keep the Emergency Preparedness Office (EPO) advised of all changes in the Building Emergency Response Organization. This may be accomplished by memo to the EPO. The Hazardous Waste Treatment Unit (HWTU) Permit Coordinator and the RCRA Subject Matter Expert are also required to be notified before any changes are made to the BEP.

3.0 Building Emergency Response Organization

The RPL Building Emergency Response Organization (BERO) is an emergency response organization with clearly defined responsibilities. The BERO consists of pre-designated and trained individuals who have been assigned emergency response activities associated with RPL. In addition, other positions in RPL have responsibilities associated with emergency responses and preparedness.

3.1 Building Emergency Directors and Alternates

3.1.1 Building Emergency Director

The BED has responsibility for the welfare and safety of the building personnel and for directing efforts to control, evaluate, and terminate the event if the building is the site of an event. The BED performs duties of the Emergency Coordinator as prescribed under the WAC [WAC 173-303-360] until relieved by the Incident Commander, and has the authority to commit the resources needed to carry out the BEP. The BED function is a Testing-Designated Position (TDP) in accordance with SBMS Subject Area *Workplace Substance Abuse.* The BED and BED alternates are required to participate in the TDP program.

The BED manages facility operations and personnel during an emergency and is responsible for implementation of appropriate emergency procedures and their follow up 24 hours a day. The BED has the authority to commit the resources necessary to carry out emergency plan activities. Activities include:

- directing configuration control over facility systems and components at the event scene
- activating the BERO
- assessing the event scene
- allocating personnel to conduct facility-specific emergency response actions within the affected facility boundary (including acting as or delegating duty as the Facility Operations Specialist [FOS] and taking appropriate protective actions in response to events occurring in other onsite geographic areas or adjacent facilities)
- categorizing the incident and notifying the PNNL Environmental Support Contact and/or the Occurrence Notification Center (ONC)
- communicating with the Environmental Management Services Department
- initiating establishment of a Management Support Group (MSG)
- reviewing the EAL criteria (PNNL-EAL-RPL) and providing an initial EAL classification to the Occurrence Notification Center (ONC) using the Emergency Notification Form (Exhibit 12.12)

- directing implementation of initial preplanned area/site protective actions
- identifying an alternate Staging Area in the event of an extended building evacuation during inclement weather
- determining personnel accountability status within 30 minutes (not to exceed 45 minutes) of emergency determination
- performing the necessary steps in the "Building Emergency Director Checklist for Hazardous Facilities," Exhibit 12.4
- verifying other BERO positions use checklists as appropriate
- verifying that preservation of evidence at the event scene is taken into consideration during the event
- developing and transmitting event reports to maintain accurate and complete records of events, decisions, and actions during an event
- verifying the appropriate alarms are sounded when necessary
- acting as the IC and a member of the Incident Command Post (ICP) and providing information and assistance to the responding agencies as requested to mitigate the event, including:
    - identifying the character, exact source, amount, and extent of any released materials
    - taking reasonable measures (e.g., stopping processes/operations, collecting/containing released waste, removing/isolating containers) necessary to make sure that fires, explosions, and releases do not occur, recur, or spread to other dangerous waste
    - monitoring for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, or other equipment, as appropriate.
- approving reentry and/or rescue operations
- arranging care for any injured persons and contacting their line management
- notifying the HWTU permit personnel of any planned changes to the BEP
- verifying hazardous spill/release events are logged in the HWTU operating records
- taking appropriate actions during adverse chemical conditions (Adverse Chemical Conditions subject area)
- providing a thorough turnover to the Hanford Site emergency responder (e.g., Hanford Fire Department, Hanford Patrol, etc.)
- maintaining emergency equipment

- verifying that the Environmental Support Contact will provide any necessary notifications to regulatory agencies such as the Washington State Department of Ecology and verifying that required written reports to regulatory agencies are completed within 15 days of event termination
- performing an annual review and update of the BEP
- informing the Emergency Response Organization of any changes in RPL BERO staff
- being thoroughly familiar with the following:
  - the RPL Building Emergency Procedure
  - all operations and activities
  - locations and characteristics of waste handling
  - locations of all records
  - physical layout of the building and area of responsibility.

3.2 Other Members of the Building Emergency Response Organization

3.2.1 Incident Command Post (ICP) Communicator

The individual responsible for completing and transmitting the Hanford Emergency Notification Form (Exhibit 12.12) to the ONC, phoning the POC at 911 to initiate a conference telephone bridge between the POC, ONC and ICP Communicator and to conduct a line by line review of the Hanford Emergency Notification Form. Initiates and maintains a communication line between the Event Scene Liaison at the RL-EOC and the Incident Command Post (ICP). As a precautionary measure, the BED makes sure that this position is staffed for all events. The ICP Communicator is responsible for completing the "ICP Communicator Checklist for Hazardous Facilities", Exhibit 12.5. The ICP Communicator function is a Testing-Designated Position (TDP) in accordance with SBMS Subject Area *Workplace Substance Abuse.* The ICP Communicator and alternates are required to participate in the TDP program.

3.2.2 Assisting Communicator

Provides assistance to the ICP Communicator as directed by:

- keeping the IC and BED aware of all transmitted and received information
- maintaining a log of communications sent and received
- establishing and maintaining a communication line with the Technical Support Representative (376-7148) in the RL-EOC and the ICP throughout the incident.

3.2.3 Incident Command Post (ICP) Recorder

Records, in a time-line format, event related notifications and activities associated with the direction administered and information received by the ICP.

3.2.4 Management Support Group (MSG) Lead

The Facilities Operations Manager or his delegate will respond as the Management Support Group (MSG) leader when requested by the BED. The MSG Lead function is a Testing-Designated Position (TDP) in accordance with SBMS Subject Area *Workplace Substance Abuse.* The MSG Lead and alternates are required to participate in the TDP program. The MSG leader is responsible for the following:

- performing the necessary steps listed in the "Emergency Checklist for Emergency Management Support Group," Exhibit 12.10
- having applicable notifications made to PNNL and DOE-RL management
- having the event classified per established PNNL procedures
- providing senior management assistance to the BED as necessary
- assisting in handling communications and notifications
- obtaining personnel, supplies, and equipment as necessary.

3.2.5 Management Support Group (MSG) Liaison

Reports to the Incident Command Post (ICP) to facilitate communications between the BED/IC and the MSG. The MSG Liaison is responsible for the following:

- Establish phone communications with the MSG as needed to communicate with the MSG.
- Convey BED/IC requests for MSG support to the MSG.
- Communicate information from the MSG to the BED, IC, or other appropriate BERO members.
- Assist the MSG in completing the MSG Checklist while minimizing interference with activities at the ICP by observing activities and communications at the ICP.

3.2.6 Management Support Group (MSG) Recorder

Records, in a time-line format, event related notifications and activities associated with the direction administered and information received by the MSG.

3.2.7 Staging Area Supervisor (SAS)

The Staging Area Supervisor (SAS) will direct all activities at the Building Staging Area and is responsible for:

- Assisting in personnel accountability by receiving that status of building occupancy from the Zone Wardens and then informing the BED of facility status with regard to personnel or if help is needed to locate or account for missing personnel
- Assisting in Area evacuation
- Assisting with communications
- Supporting the BED as requested
- Maintaining a log of their activities or assigning a log keeper to do so
- completing the SAS checklist, Exhibit 12.7.

3.2.8 Zone Wardens

Zone Wardens provide the results of their accountability sweeps information to the BED via the SAS and assists as required in additional duties as determined by the BED. To accomplish this function, the Zone Wardens:

- determine if all personnel have left their assigned area by performing a thorough room-by-room search, if safe to do so (see Note below), including unoccupied spaces such as stairwells, corridors, elevators, closets, and other common areas
- determine if aid and/or rescue is required and without endangering their own safety, aid those who may need help in evacuating the building.
- report the occupancy status of the assigned zone(s) to the SAS noting areas that could not be checked
- complete the Zone Warden Checklist, Exhibit 12.8.

NOTE: The function of the Zone Warden is to verify (when possible) that assigned zones have been evacuated as a means of assisting other emergency responders and to verify the locations of building personnel. The function of Zone Wardens does not include search and rescue; they should not enter any area they feel presents a hazard to them. Once the Evacuation Alarm is sounded, Zone Wardens should not enter any location in the facility where there are indications that a hazard may exist. The indications include such things as visible smoke, fire, unusual odors, local alarms, criticality alarms, spilled chemicals, indications on the fire alarm supervisory panel, incapacitated personnel, etc. If a Zone Warden is not in the facility when the evacuation or take cover alarm is initiated, is a significant distance from their assigned zones, or has been isolated from their zone, they should report to the SAS at the Staging Area or ICP for instructions.

3.2.9 Facility Operations Specialist (FOS)

This individual, either the BED or his/her designee, is responsible for the immediate mitigative actions at the event scene that cannot be delayed without threatening human health and/or the environment. The FOS is responsible for meeting emergency responders at the event scene and providing information on event status and initial actions that are underway. This position will serve under the direction of the Hanford Fire Department or Hanford Patrol Operations Section Chiefs, upon their arrival, and will provide facility expertise to support Operations Section activities. The FOS is responsible for implementing the Facility Operations Specialist Check listed Duties, Exhibit 12.11, and maintains a log of activities, conversations, and directives given and received. The FOS function is a Testing-Designated Position (TDP) in accordance with SBMS Subject Area *Workplace Substance Abuse.* The FOS and alternates are required to participate in the TDP program.

3.2.10 Hazard Communicator

The Hazards Communicator is a facility or process knowledgeable individual responsible for communicating data to the Uniform Dose Assessment Center (UDAC) for further consequence assessment during DOE-declared emergencies. This position is staffed only during DOE declared emergencies at the request of the BED/IC. The Hazards Communicator:

- establishes and maintains an Emergency Response Organization (ERO) communication line with the UDAC Hazards Communicator to provide incident scene radiological or chemical data as reported by the Hazard Assessors
- keeps the IC and BED aware of all transmitted and received information
- maintains a log or assigns a log keeper to record all activities, including the date and time information was received or the time when an action was taken
- responds to requests for information from the UDAC and assures that requests for information are relayed to the Hazards Assessor(s) for response.
- implements the Hazard Communicator check listed duties, Exhibit 12.13.

3.2.11 Hazards Assessors

There are two different Hazard Assessors. One deals with radiological assessments and the other deals with chemical assessments.

The Radiological Hazards Assessors are responsible for coordinating and ensuring accomplishment of radiological control functions throughout the scene. This position reports to the Operations Section Chief at any assigned location. The affected facility's radiological control manager or equivalent will fill this position. The Radiological Hazards Assessor is responsible for:

- implementing Part 1, Radiological, of the ICP Hazards Assessor Checklist, Exhibit 12.6

- maintaining a log of activities, conversations and directives given and received.
- supervises maintenance a log of RCT activities

The Chemical Hazards Assessors position is filled by an Industrial Hygienist assigned to the Hanford Fire Department (HFD) (the HFD may use facility IH personnel if available until HFD IH personnel arrive), in support of the HFD HazMat Team HFD-Medical Staff, and HFD-Safety Officer who will provide technical expertise in chemical and toxicological hazard identification, evaluation, reactivity and dispersion modeling at the incident scene. The Industrial Hygienist may also serve as a chemical/decontamination Safety Officer, if designated by the IC. Activities will be conducted in accordance with this procedure and other internal HFD procedures as applicable. This position may be staffed for non-declared, RCRA and DOE declared emergencies as necessary. The Chemical Hazards Assessor is responsible for:

- implementing Part 2, Chemical, the ICP Hazards Assessor Checklist, Exhibit 12.6,
- maintaining a log of activities, conversations and both directives given and received.

3.3 Individual Staff Member Responsibilities

- Announce and activate the appropriate alarm and notify management upon observing an emergency. This includes the red Crash Alarm phone located in the North end of the RPL lobby. If the Crash alarm phone rings, lift the receiver, do not speak, listen to the caller, and relay message(s) to the BED and the building occupants. The instructions to be followed when the Crash phone rings are posted on the wall next to the phone.
- Read and understand the Emergency Information Postings (EIP) and BEP.
- Become familiar with the BEP homepage and the Emergency Preparedness SBMS Subject Area. Avoid exposure to harmful and life-threatening conditions.
- If it can be done safely, secure classified documents and electronic storage media (ESM) before leaving limited areas. If this cannot be done without endangering your self: 1) take the classified documents and ESM with you, if time permits 2) Report to the staging area, 3) Inform the BED and then call 375-2400 to report an incident of security concern.
- Provide the BED with any information to assist in evaluating the emergency condition.
- If it is safe to do so, discard PPE outside exterior doors if evacuating due to a fire alarm and segregate yourself from others at the staging area until surveyed by an RCT.
- Remain at the Staging Area and follow the instructions of the BED and Staging Area Supervisor.
- Wear your individual Emergency Preparedness Information Card.
- Perform normally required radiological exit surveys except when responding to a fire or criticality alarm. When evacuating the RPL due to a fire or criticality alarm staff are authorized and expected to NOT perform radiological exit surveys within the RPL. If a radiological exit survey is not performed staff should segregate themselves from others at the staging area until surveyed by an RCT.

3.4 Facility Visitor Responsibilities

The safety of building visitors is the responsibility of the facility host, who shall assure that visitors are provided a safe and orderly evacuation. The facility host will report the visitor status to the Staging Area Supervisor as soon as is practical after an evacuation.

3.5 Supervisors/Manager Responsibilities

Account for all staff members. Report missing or injured members to the Staging Area Supervisor and if requested, assist the Staging Area Supervisor.

3.6 Unique Program Laboratory Expertise

The technical knowledge of specific programs/laboratory activities are usually known by the laboratory occupant or program manager. When applicable, Cognizant Space Managers, Alternate Cognizant Space Managers, and Team Leads may be contacted in regards to Emergencies or Off-Normal Events in assigned laboratories. Hazard Awareness Summaries containing this information are posted throughout the facility.

Rooms/Areas 44, 64, 529, and 603 and East Storage Yard are less than 90-Day Radioactive Hazardous Waste Accumulation Areas. The Treatment, Storage, and Disposal (TSD) areas consist of the following rooms: 32, 200, 201, 202, 203, 520, 524, and 528.

These rooms may contain significant quantities of hazardous waste for short periods of time. This waste can be radioactive, toxic, corrosive, ignitable, reactive, carcinogenic, or environmentally persistent according to the WAC [WAC 173-303].

No one will enter these rooms without permission from one of the individuals whose names are posted on the door.

Wastes stored in these rooms could have significant environmental or health hazards. Incidents involving any of these locations will require hazardous materials expertise by the responders.

3.7 Environment, Safety, and Health Advisors Responsibilities

Provides guidance for establishing safety requirements for mitigation and recovery actions, which include coordinating any support needed from other disciplines of the PNNL Environment, Safety and Health (ES&H) Directorate (i.e., Environmental Compliance Representatives, Radiological Control, Industrial Hygiene, and Field Service Representatives [FSR]).

The Environmental Compliance and Field Services Representatives conduct activities within specific Hazardous Waste Management Activity Areas and provide support to the BED in case of an emergency. The Environmental Support Contact (375-2966) will provide any necessary

notifications to regulatory agencies such as the Washington State Department of Ecology and transmit required written reports to regulatory agencies within 15 days of event termination.

3.8 Line Management

The responsibilities of Line Management include the following activities:

- keeping the BED informed of changes in programmatic activities that could affect an emergency event
- providing or verifying that your staff are trained as specified in PNNL-MA-110, Section 8.4.1
- providing training for unescorted visitors for whom you are responsible, as specified in PNNL-MA-110, Section 8.4.7
- keeping the BED and Zone Wardens informed of any staff member assigned to RPL who has a physical disability
- being familiar with the SBMS subject area "Injury or Illness"
- providing your staff who are resident in the RPL or are qualified Fissionable Material Handlers with a Personal Nuclear Accident Dosimeter (PNAD).".

Line management has the responsibility to assure that each PNNL staff member performing work in or having unescorted access approval into the RPL reviews this RPL Building Emergency procedure annually and documents the review with their Training Coordinator.

3.9 New Staff Assigned to RPL

All new assignees to the RPL Facility shall complete initial training within 10 working days of assignment. All temporary personnel with unescorted access are required to receive this training before beginning work in the RPL Facility.

4.0 Implementation of the BEP

The decision to implement the BEP should be made whenever unusual or emergency conditions exist that require the response of facility and/or emergency personnel and the establishment of an ICP.

For RCRA events, the BEP must be implemented and the Washington State Department of Ecology notified, if all of the following criteria are met:

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

AND

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

OR;

2b. The unplanned fire or explosion occurred at a facility or transportation activity subject to RCRA contingency planning requirements;

AND

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

- Based on evaluation of the event, the BED or alternate will implement the BEP to the extent necessary to protect human health and/or the environment. The BED has the authority to commit the resources necessary to carry out the actions required by the BEP.

- The BED will direct that additional checklists identified in the BEP exhibits be initiated and completed. When the materials and quantities involved in the incident have been identified, it should be possible to evaluate the magnitude of the hazard.

During an emergency event, the BED will take all reasonable measures to assure that fires, explosions and releases do not occur, recur or spread to other dangerous waste in the facility. Measures include stopping processes and operations, collecting and containing released waste, and removing or isolating containers, as appropriate.

In any emergency, priority is given to protection of the health and safety of persons in the immediate area. Containment and cleanup are secondary objectives. When responding to minor spill events, onsite personnel will generally perform immediate cleanup of minor spill or releases using facility equipment. Remediation of such spills and releases would not normally constitute activation of the BEP. A spill or release of dangerous waste is considered "minor' if **ALL** of the following are true:

- The spill is either contained or, if outside a secondary containment, is minor in quantity (generally less than ten gallons of liquid or 100 pounds of solids);
- The composition of the material or waste is known and can be immediately determined from the label, manifest, MSDS, or other records;
- The spill does not threaten the health and safety of building occupants such that an area evacuation is necessary;
- Response personnel have appropriate training and equipment to expeditiously remediate the spill or release.

5.0 Facility Hazards

The RPL contains both radioactive and hazardous chemicals that pose a potential hazard to the public, adjacent facilities, personnel, programs, and the environment during an emergency. Because the location of hazardous materials and equipment within the facility can change on a frequent basis due to specific research needs, a variety of informational tools have been created and integrated into daily operations. Some of the tools available within the facility are the Map Information Tool (MIT), Chemical Management System (CMS), the RPL Operating Envelope Web Page, and the Integrated Operations System (IOPS) which includes the Hazard Awareness Summaries for each hazardous space in the RPL.

5.1 Hazardous Materials

The RPL contains hazardous material including:

- chemicals exhibiting one or more hazards such as corrosives, oxidizers, flammable solids and liquids, poisons, etc.
- radioactive materials
- hazardous wastes, including listed wastes and waste exhibiting one or more characteristics such as corrosivity, reactivity, ignitability, toxicity, and/or environmental persistence
- mixed wastes (wastes containing both radioactive and hazardous components).

Hazards associated with these materials vary depending on type, quantity, and concentration of the material(s) involved in the incident as well as the type of incident.

During an emergency, the PNNL Chemical Management System (CMS) may be consulted to determine the identity and quantity of hazardous chemicals located in affected areas of the facility. The listing of satellite and 90-day accumulation areas (available on the Environmental Management Services Department (EMSD) internal web page) may be consulted to identify the location and type of wastes (hazardous and mixed) in the facility. The inventory of waste stored in the RPL RCRA permitted unit may be determined by consulting with EMSD personnel.

Arrangements for local response agencies (fire, police, and medical, and emergency response teams) are required to assist in pre-emergency planning. These arrangements include familiarization with the properties of dangerous waste handled at the facility and associated hazards. PNNL Emergency Preparedness provides these coordination efforts, with input from individual BEDs and others as appropriate.

5.2 Physical (Industrial) Hazards

The RPL contains industrial hazards such as high-voltage equipment, high temperature equipment, elevated work areas, and overhead hazards. Refer to the Hazard Awareness Summaries in the IOPS and posted at the entrance to each space for specific details.

5.3 Dangerous and Mixed Waste

See Section 5.1 above. Refer to the RPL MIT to identify the location of any dangerous mixed waste located in a specific room.

5.4 Radioactive Materials

See Section 5.1 above. Refer to the RPL MIT and FUA to identify if radioactive materials are located in a specific room.

5.5 Criticality

The RPL is a Hazard Category II non-reactor nuclear facility designed as a multi-purpose research facility. Fissionable materials are stored in various locations throughout the RPL, including the first floor storage room (Room 530), laboratories, and the East Storage Yard.

Storage of fissionable material uses a combination of mass, spacing, geometry, and moderation limits to provide criticality safety. An important criticality control element is through limiting the mass of fissionable material within boundaries of criticality safety controlled areas so that even if two batches were inadvertently stored together, criticality would not occur.

The RPL Documented Safety Analysis (DSA) analyzed various scenarios regarding potential criticality incidents. The Nuclear Criticality Safety Program administered within the RPL provides the administrative and physical controls necessary to assure the possibility of a criticality event remains extremely unlikely. The RPL Criticality Alarm System is tested on a quarterly basis.

6.0 Potential Emergency Conditions and Appropriate Response

6.1 Facility Operations Emergencies

For an Off-Normal Event or Emergency Condition not specifically addressed, call the PNNL Operations Center on 375-2400. If an unknown facility condition includes, but is not limited to, the following: smoke, heat, vibration, or unusual sounds (such as hissing) direct staff to leave the area immediately and make the appropriate emergency notifications. The following guidance is offered for specific listed incidents:

6.1.1 Loss of Electrical Power

1. **(Signal): NONE**

2. **Response/Action (If Time Permits)**

   - Verify fume hoods and sashes are closed.
   - Verify equipment is shutdown.
   - Verify nuclear material(s) are secure.
   - Verify all hazardous materials are secure.

3. **If the RPL has a loss of electrical power and standby power is still available, assemble in the Lunch Room. Personnel exiting Radiological Buffer Areas do so without surveying through the PCMs. If personnel are wearing Personnel Protective Equipment (PPE clothing) are suspected of being contaminated, or have exited a Radiological Buffer Area (RBA), isolate them from other building occupants and request they be surveyed by Radiological Control personnel.**

   - Refer to Section 6.1.11 for Reduced Ventilation Flows.

4. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the Limited Area (LA) or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

5. **If Standby Power Fails: Evaluate if an evacuation is advisable. If an evacuation is ordered, assemble at the Staging Area. Zone Wardens report to the Staging Area Supervisor.**

   - If personnel are wearing Personal Protective Equipment (PPE) clothing, or are suspected of being contaminated, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel. If possible, direct staff to discard PPE clothing outside exterior doors.

- Zone Wardens and all Staff are to remain at the staging area unless otherwise directed/released by the BED.

6. **Prior to re-entering the facility, perform radiological surveys to detect any spread of contamination as required by Radiological Controls instructions.**

6.1.2 Major Process Disruption/Loss of Building Control

Information applicable to this emergency condition is found in Sections 6.1.1, "Loss of Electrical Power," 6.1.4.1, "Explosion," and 7.0, "Facility Take Cover – Shutdown of HVAC Systems."

6.1.3 Pressure Release

Information applicable to this emergency condition is found in Sections 6.1.4.1, "Explosion," 6.1.5.1, "Major Hazardous Material Spill/Release or Tank Spill," 6.1.9, "Radiological Material Release," and 6.1.12, "Area Evacuation."

6.1.4 Fire

1. **(Signal): GONG/VIBRATONE/STROBE LIGHT**

2. **Response/Action (If time permits):**

   - Verify equipment is shutdown
   - Verify doors/windows are closed.
   - Verify nuclear materials are secured.
   - Evacuate the building through the nearest exit that you can safely use.
   - Obtain all necessary information pertaining to the incident.
   - Initiate action to protect uninvolved hazardous waste if necessary.

3. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

4. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

   - Zone Wardens and all staff are to remain at the staging area unless directed/released by the Building Emergency Director.
   - If personnel are wearing PPE clothing, or are suspected of being contaminated, isolate them from other building occupants and request they be surveyed by Radiological Control personnel. If possible, direct staff to discard PPE outside exterior doors.

5. **If you discover a fire, the following steps are to be performed:**

   - Sound the alarm.
   - Notify PNNL Operations Center 375-2400 and provide all known information, if the information can be obtained without jeopardizing personnel safety, include the following:

     - name and callback telephone number of person reporting the incident
     - name(s) of chemical(s) involved and amount(s) on fire, or otherwise involved in the incident
     - location of incident (identify as closely as possible and include information about multiple building numbers)
     - time incident began or was discovered
     - where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
     - source and cause, if known
     - name(s) of anyone contaminated or injured in connection with the incident
     - any corrective actions in progress.

   - Fight the fire, (if comfortable in doing so).

6.1.4.1 Explosion

1. **(Signal): None**

2. **Response/Action**

   - Pull Fire Alarm and notify nearby personnel of the emergency.
   - Immediately notify the PNNL Operations Center at 375-2400 and provide all known information, if the information can be obtained without jeopardizing personnel safety, include the following:

     - name and callback telephone number of person reporting the incident
     - name(s) of chemical(s) involved and amount(s) involved in the incident
     - location of incident (identify as closely as possible and include information about multiple building numbers)
     - time incident began or was discovered
     - where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
     - source and cause, if known
     - name(s) of anyone contaminated or injured in connection with the incident
     - anyone else who the discoverer has contacted
     - any corrective actions in progress.

3. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

4. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**
   - If personnel are wearing PPE clothing, or are suspected of being contaminated, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel. If possible, discard PPE outside exterior doors.

   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the Building Emergency Director.

6.1.5 Minor Hazardous Material Spill/Release (radioactive, non-radioactive, toxic, or hazardous material)

NOTE: A spill or release of dangerous waste is considered "minor" if **ALL** of the following are true. If not refer to the following section 6.1.5.1, Major Hazardous Material Spill/Release or Tank Spill.

- The spill/release is either contained or, if outside of a secondary containment, is minor in quantity (generally less than ten (10) gallons of liquid or 100 pounds of solids).
- The composition of the material or waste is known and can be immediately determined from the label, manifest, MSDS, or other records.
- The spill/release does not threaten the health and safety of building occupants such that a building evacuation is necessary.
- Response personnel have appropriate training and equipment to expeditiously remediate the spill or release.

1. **(Signal): NONE**

2. **Response/Action**

- Move personnel away from the substance.
- Notify nearby personnel of the emergency.
- Notify the PNNL Operations Center at 375-2400 and provide the following:
    - name, location and callback telephone number of person reporting the incident
    - name(s) of chemical(s) involved and amount(s) involved in the incident
    - location of incident (identify as closely as possible and include information about multiple building numbers)
    - time incident began or was discovered
    - where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
    - source and cause, if known
    - name(s) of anyone contaminated or injured in connection with the incident
    - any corrective actions in progress
    - anyone else who the discoverer has contacted.
    - any known hazards
    - where and when the chemical condition or spill occurred
    - if any material was released to the environment (e.g. to a stack or sewer system)
    - the status of the situation
- Prevent personnel exposure (e.g., set up barricades).
- Contact the Cognizant Space Manager (CSM).
- Notify the Safety and Health Representative.

- Take steps to contain the spill ONLY IF ALL THE FOLLOWING EXIST:
  - the identity of the substance is known
  - the hazards of the substance are known (flammable, toxic, radioactive, corrosive material) and can either be controlled or they do not present an immediate threat
  - appropriate protective equipment and control/cleanup supplies are readily available
  - the individual(s) performing the task have had training related to spill/leak control and can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

- Do not attempt to clean up a spill if you believe that **any** of the following conditions exist:

  - the identity of the substance is NOT known
  - clean up activities may result in exposures to chemicals above established safety limits
  - the appropriate equipment, experience, or trained personnel are not available.
  - clean up may result in an uncontrolled release of a hazardous material from the building

- Consider performing the following actions:

  - build a containment of absorbent materials and restrict access to the affected area
  - tighten closures, tip the container to stop the leak, use plugging or patching materials, or overpacking
  - transfer contents to appropriate non-leaking containers using appropriate procedures and tools (e.g., for ignitable materials, use non-sparking tools, bonding and grounding of containers, isolation of ignition sources, and use of explosion proof electrical equipment)
  - transfer the leaking container into an overpack container.

6.1.5.1 Major Hazardous Material Spill/Release or Tank Spill (radioactive, non-radioactive, toxic, or hazardous material)

1. **(Signal): NONE**

2. **Response/Action**

- Move personnel away from the substance.
- Notify nearby personnel of the emergency.
- Notify the PNNL Operations Center at 375-2400 and provide the following:
  - name, location and callback telephone number of person reporting the incident
  - name(s) of chemical(s) involved and amount(s) involved in the incident
  - location of incident (identify as closely as possible and include information about multiple building numbers)
  - time incident began or was discovered
  - where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
  - source and cause, if known
  - name(s) of anyone contaminated or injured in connection with the incident
  - any corrective actions in progress
  - anyone else who the discoverer has contacted
  - any known hazards
  - where and when the chemical condition or spill occurred
  - if any material was released to the environment (e.g. to a stack or a sewer system)
  - the status of the situation.

- Prevent personnel exposure (e.g., set up barricades).
- If the spill threatens the health and safety of building occupants such that a building evacuation is necessary, pull the fire alarm.
- Contact the Cognizant Space Manager (CSM).
- Notify the Safety and Health Representative.
- Take steps to contain the spill ONLY IF ALL THE FOLLOWING EXIST:
  - the identity of the substance is known
  - the hazards of the substance are known (flammable, toxic, radioactive, corrosive material) and can either be controlled or they do not present an immediate threat
  - appropriate protective equipment and control/cleanup supplies are readily available
  - the individual(s) performing the task have had training related to spill/leak control and can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

- Initiate actions to mitigate a tank spill/leak using trained personnel:

- Stop the source of the leak if possible (shutting valves, turning off pumps, etc.),
- prevent further additions of liquid to the tank,
- visually inspect the tank system to determine the source of the leak,
- within 24 hours remove as much of the liquid from the tank as is practicable to prevent further leakage,
- remove any leakage contained in a secondary containment within 24 hours or as soon as practicable,
- prevent any further leakage or migration of the leak to soils or surface waters.

- If the fire alarm was pulled, assemble at the Staging Area. Zone Wardens report to the Staging Area Supervisor.
- If personnel are wearing PPE clothing, or are suspected of being contaminated, isolate them from other building occupants and they be surveyed by Radiological Control Personnel. If possible, direct staff to discard PPE outside exterior doors.
- Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the Building Emergency Director.

NOTE: Clean-up materials are located in specific laboratories.

3. **If evacuated, assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

4. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

6.1.6 Dangerous/Mixed Waste Spill

Included in emergency response for Section 6.1.5, "Minor Hazardous Material Spill/Release" and Section 6.1.5.1, "Major Hazardous Material Spill/Release or Tank Spill."

6.1.7 Transportation and/or Packaging Incidents

1. **(Signal): NONE**

2. **Response/Action**

- When a damaged shipment of hazardous material or dangerous waste arrives at the HWTU, the shipment is unacceptable for receipt under the criteria identified in the HWTU permit. Do NOT move the shipment.
- The BED will evaluate the event and initiate appropriate actions for minor events/spills such as over packing damaged containers, re-labeling, tightening caps, etc, using facility expertise and equipment.
- Treat any major release from the package as a hazardous material spill and perform response actions per Section 6.1.5.1, "Major Hazardous Material Spill/Release or Tank Spill."
- Take actions to protect any uninvolved hazardous waste that may be threatened.

6.1.8 Unusual, Irritating, or Strong Odors

1. **(Signal): NONE**

2. **Response/Action**

   a. **If potentially dangerous:**

   - Activate Building Fire Alarm.
   - Notify the PNNL Operations Center at 375-2400.
   - Evacuate building to the Staging Area.

3. **If evacuated, assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

4. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

   NOTE: If an unusual odor is detected and the source is unknown, the Building Emergency Director will determine if the building should be evacuated.

6.1.9 Radiological Material Release

1. **(Signal): NONE**

2. **Response/Action**

- Move personnel away from substance.
- Notify nearby personnel of the emergency.
- Notify the PNNL Operations Center at 375-2400 and provide the following:

  - Name and callback telephone number of person reporting the incident
  - name(s) of material(s) involved and amount(s) involved in the incident
  - location of incident (identify as closely as possible and include information about multiple building numbers)
  - time incident began or was discovered
  - where the materials involved are going or might go, such as into secondary containment, under doors, through air ducts, etc.
  - source and cause, if known
  - name(s) of anyone contaminated or injured in connection with the incident
  - any corrective actions in progress
  - anyone else who has been contacted.

- Prevent personnel exposure (e.g., set up barricades).
- If the release threatens the health and safety of building occupants such that a building evacuation is necessary, pull the fire alarm
- Take steps to contain the release ONLY IF ALL THE FOLLOWING EXIST:

  - the identity of the substance is known
  - the hazards of the substance are known (flammable, toxic, radioactive, corrosive material) and can either be controlled or they do not present an immediate threat
  - appropriate protective equipment and control/cleanup supplies are readily available
  - The individual(s) performing the task have had training related to spill/leak control and can safely perform the action(s) without assistance, or assistance is readily available from other trained personnel.

- Take action to protect any uninvolved hazardous waste if necessary.
- If the fire alarm was pulled, assemble at the Staging Area. Zone Wardens report to the Staging Area Supervisor.
- If personnel are wearing PPE clothing, or are suspected of being contaminated, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel. If possible, direct staff to discard PPE outside exterior doors.
- Zone Wardens and all Staff are to remain at the Staging Area.

NOTE: Clean-Up Materials are located in Specific Laboratories.

3. **If evacuated, assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

4. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

6.1.10 Criticality

1. **(Signal): HOWLER (ah-oo-gah)**

2. **Responses/Action**

   - Leave the building immediately.
   - Zone Wardens should also leave the building immediately without performing accountability sweeps of their zones.
   - Run at least 100 feet directly away from the building, then proceed to the staging area along a path that does not take you closer to the building.

   NOTE: Obstacles located within 100 feet of the building (fences, walls, trenches, etc.,) may prevent running directly away from the building for 100 feet. Choose a path around these barriers that will maximize your distance from the building. When past the obstacle continue directly way from the building until you are 100 feet from the building. See Exhibit 13.4 RPL Staging Area for suggested routes.

3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

   - If personnel are wearing PPE clothing, or are suspected of being contaminated, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel.

   - All building occupants in the staging area must have a quick sort survey by Radiological Control Personnel.

   - Zone Wardens and all Staff are to remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

   - Initiate "Quick-Sort Survey of Personnel" per RCP-8.1.02.

4. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

   NOTE: Instrumentation and procedures shall be provided for determining the radiation dose levels at the staging area and in the evacuated area following a criticality accident. Information should be correlated at a central control point (Incident Command Post).

6.1.11 Reduced Ventilation Flows (due to normal power failure or exhaust fan failure)

1. **(Signal): NONE**

2. **Response/Action (If time permits)**

   - Verify fume hood sashes are closed.
   - Evacuate radiological control areas in an orderly manner.
   - Stage personnel in the main floor lunchroom/lobby.

3. **Personnel exiting Radiological Buffer Areas do so without surveying through the PCMs. If personnel are wearing Personnel Protective Equipment (PPE) clothing, are suspected of being contaminated, or have exited a Radiological Buffer Area, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel.**

4. **Prior to re-entering the facility, perform radiological surveys to detect any spread of contamination as required by Radiological Controls instructions.**

5. **If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."**

6.1.12 Area Evacuation

1. **(Signal): STEADY SIREN (3 to 5 minutes)**

2. **Response/Action**

   - Follow instructions; evacuate through the nearest safe exits.
   - Shut down equipment (if time permits).
   - Secure nuclear materials(s) (if time permits).
   - Direct personnel to remove PPE clothing prior to exiting the Radiological Control Areas, if possible. If not, have personnel discard PPE outside exterior doors, if possible.

3. If classified materials (documents, electronic storage media, test materials, etc.) are removed from the LA or left unsecured within the LA, inform the BED and then call 375-2400 and report that "there is an incident of security concern in RPL, Room ___."

4. Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.

- Zone Wardens and all Staff remain at the Staging Area and follow the instructions of the Building Emergency Director.

6.2 Identification of Hazardous Materials in and Around the Facility

PNNL facilities contain both radioactive and hazardous materials that pose a potential hazard to the public, adjacent facilities, personnel, programs and the environment. Because the location of hazardous materials and equipment within the facility can change on a frequent basis due to specific research needs, a variety of informational tools have been created and integrated into daily operations. These databases are designed to help maintain the safety of all individuals and the environment. Some of the tools available within the facility are:

- Integrated Operations System (IOPS) – The IOPS includes the Hazard Awareness Summary (HAS) for each space in the RPL that has hazards. The HAS can be read on line at the IOPS web site and is posted at the entrance to each IOPS space. The HAS list all of the hazards that have been identified for the space by the space Cognizant Space Manager (CSM). Below each general hazard description, the CSM may have annotated additional remarks containing the specific information relative to hazard interactions in the space.

- Map Information Tool (MIT) – provides the capability to look up information about a specific room within the facility to identify all the hazards contained in that location. This tool also identifies specific space information including the relative location of a space in the RPL, the CSM and contact information, associated IOPS hazards, CMS database chemical inventory, evacuation routes, and emergency equipment locations.

- RPL Laboratory Handbook – contains reference use information and procedures to do work safely in RPL.

- Chemical Management System (CMS) – The Laboratory-wide Chemical Management System provides an effective way to track chemicals, assure that safety and health information for each individual chemical in a given inventory is readily available and up-to-date, and to furnish an overall chemical management system.

6.3 Natural Phenomena

Follow directions given by Crash Alarm telephone or Building Emergency Director. Natural phenomena events, such as an earthquake, may create damage that causes the RPL to classify an emergency. In that event, refer to Exhibit 12.10, "Emergency Checklist for Emergency Management Support Group" for required inspections. In these cases, emergency response actions take precedence over building damage inspections.

6.3.1 Seismic Event

Follow directions given by Crash Alarm telephone or Building Emergency Director. If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900).

6.3.2 Volcanic Eruption/Ashfall

Follow directions given by Crash Alarm telephone or Building Emergency Director. If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900).

6.3.3 High Winds/Tornadoes

Follow directions given by Crash Alarm telephone or Building Emergency Director. If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900).

6.3.4 Flood

Follow directions given by Crash Alarm telephone or Building Emergency Director. If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900).

6.3.5 Range Fire

Follow directions given by Crash Alarm telephone or Building Emergency Director. If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900).

6.4 Security Contingencies

6.4.1 Bomb Threats or Suspicious Objects (e.g., suspicious objects, threats, sabotage)

1. **(Signal): NONE**

2. **Response/Action**

   - When a condition is observed or bomb threat received, notify using landline telephones only, the PNNL Operations Center at 375-2400 and the RPL BED. Do not use a Hanford fire alarm pull box, radios or cellular phones within a 300 foot radius.
   - If necessary, clear the area of personnel.
   - Do not move, open, or otherwise disturb any suspicious objects.
   - If practical, post warnings, place barricades, or stand guard in a sheltered location at the maximum possible distance.
   - Provide emergency responders with appropriate information.

3. **If a Telephone Bomb Threat is received, record the exact message and attempt to obtain the following information:**

   - When will it go off?
   - Where is it located?
   - What does it look like?
   - What kind is it?
   - Why was it placed?
   - How do you know so much about it?
   - Who put it there?
   - Where are you calling from?
   - What is your name and address?

   NOTE: After receiving the information, notify the PNNL Single-Point-Contact (SPC) 375-2400, give the information obtained from the caller and then notify the BED. If you receive a written bomb threat, notify the PNNL Operations Center at 375-2400 and provide the written bomb threat to the RPL BED who will forward it to the PNNL Subject Matter Expert/Safeguards and Security Management Official.

6.4.2 Hostage Situation/Armed Intruder

1. **(Signal): NONE**

2. **Response/Action**

   - When condition is observed, notify the PNNL Operations Center at 375-2400 and the BED.
   - If necessary, clear the area of personnel.
   - Do not move any suspicious objects.
   - Post warnings, if applicable.
   - Provide emergency responders with appropriate information.

6.4.3 Handling Classified Material During Evacuation Events

1. **(Signal): STEADY SIREN or FIRE/EVACUATION ALARM**

2. **Response/Action**

   Follow instructions; evacuate through the nearest safe exit (Exhibits 13.1, 13.2, 13.3, and 13.4). If time permits,

   - Shut down equipment.
   - Secure nuclear materials or classified test articles.
   - Secure classified documents and electronic storage media (ESM) or take them with you. If you take classified documents with you or leave classified material unsecured within a LA, inform the BED and then call 375-2400 and report that there is an "incident of security concern in RPL, Room _____."
   - If it is not possible to secure tests in progress, leave the classified test article in the Limited Area. Inform the BED and then call 375-2400 and report that there is an "incident of security concern in RPL, Room _____."

3. **Assemble at the Staging Area, located at the Lower South Parking Lot, North End of Lane #9 (Exhibit 13.4). Zone Wardens report to the Staging Area Supervisor.**

   - Zone Wardens and all Staff remain at the Staging Area and follow the instructions of the RPL Building Emergency Director.

   - When the emergency event is over, staff and security personnel will confirm that the test article has not been compromised, and secure the test article.

7.0 Facility Take Cover - Shutdown of HVAC Systems

1. **(Signal): WAVERING SIREN, CRASH PHONE MESSAGE**

2. **Response/Action**

   - Stay inside the RPL Building.
   - Exit Radiological Control Areas in an orderly manner and report to the RPL main floor lunchroom/lobby area.
   - If outside, take cover inside nearest building.
   - Remain in the lunchroom/lobby area and follow the instructions of the RPL Building Emergency Director.

3. **Building Emergency Director (BED) response**

   Secure the facility HVAC system per procedure SOP 325-3, "325 Building Heating and Ventilation (HVAC) Emergency Shutdown," if there is a potential for a hazardous plume to be drawn in the building OR if directed to do so by the Patrol Operations Center (POC) via a Crash Phone message.

8.0 Utility Disconnects

Utility Disconnects may be necessary under extreme emergency conditions. The RPL Building Emergency Director will determine if utility disconnects need to be disconnected/shut. Locations of the utility disconnects or values are described as follows:

8.1 Electrical

The RPL Building Main Electrical Control Center Switchgear is located on the second floor (northwest corner) in Room 904. Extreme caution shall be used if disconnecting this power.

8.2 Potable/Process Water

The internal valves are located in the southwest corner of Room 22 in the basement. The external Post Indicating Valve (black standpipe PIV) is located outside at the southwest corner of the RPL Building.

8.3 Gas Supplies

The Acetylene, Propane, and P-10 Gas distribution systems are located at the northeast end of the North Gas Cylinder Dock. Turn cylinders off as directed by the RPL Building Emergency Director.

8.4 Steam

The high-pressure steam supply valves are located above the Power Operator's workstation entry door on the second floor East Equipment Room. Steam to the RPL may also be isolated using valves inside the Johnson Controls operated 325B Boiler House if access to the RPL is not possible.

8.5 Air

The external high-pressure compressed air supply isolation valve is located northeast of the air receiver tank that is located in the northeast corner of the basement. Compressed air to the RPL may also be isolated using isolation valves associated with the Johnson Controls operated air compressor located outside the RPL at the northeast corner of the RPL if access to the RPL basement is not possible.

To remove all sources (except gas cylinders) of high and low pressure compressed air in the RPL and the RPL Filter Building, compressed air from the emergency air compressor (CA-97-COMP) located in the northeast corner of the basement must also be isolated or the compressor shutdown. Isolation of compressed air from the compressor is accomplished by shutting valve CA-96-VLV, which is located just North of the compressor. The compressor may be shutdown using its control switch adjacent to the compressor or by turning off electrical power to the compressor by

opening breaker "2D' on motor control center SMCC-B-B2 which is located in the northwest corner of the RPL basement. If the basement is not accessible, electrical power to the compressor must be turned off at a breaker upstream of SMCC-B-B2.

8.6 Ventilation

Facility Exhaust and Supply Fan Controls are located:

- at the Power Operator Workstation (Room 900)
- in the North part of the basement, just West of the elevator
- additional exhaust fan controls are on the starter enclosure for each fan in the North portion of the RPL Filter building.

External shutdown of the main exhaust and supply fans may be accomplished under extreme circumstances by removing both normal and standby electrical power from the building. A more controlled external shutdown of the main exhaust and supply fans is a complicated evolution involving multiple operating locations that must be accomplished in a specific sequence under supervision of RPL knowledgeable staff to prevent the risk of loss of building containment due to creation of a positive pressure inside the building

8.7 Fire Protection Supply Water

Fire Suppression Supply Water Post Indicator Valves (Red PIVs) for Riser 1 through 5 are located outside the RPL Building in the following locations:

- Riser #1 PIV, is located at the northwest corner of the RPL Building by the 328 Building boiler annex.
- Riser #2 PIV, is located at the North area inside the fenced area South of the 328 Building.
- Riser #3 PIV, is located at the southwest corner of the RPL Building.
- Riser #4 PIV, is located southeast of the RPL-A annex.
- Riser #5 PIV, is located southeast of the RPL-A annex.

8.8 Dry Pipe OS&Y (Riser #6)

The OS&Y valve for the dry pipe fire suppression system on the North Gas Cylinder Dock is located on the second floor in the East Equipment Room at the North wall. Suppression water for this system is supplied from Riser #2 and may be isolated external to the RPL by shutting the PIV for riser #2.

8.9 RPL Ramp Sump Pump

Water runoff down the RPL basement truck ramp at the southwest corner of the building is collected in a sump at the bottom of the ramp. The associated sump pump empties the sump as needed to prevent it from overflowing into the RPL basement through the rollup door. The sump pump discharges to street in front of RPL.

Potentially contaminated fire suppression water runoff from inside the RPL Basement could also enter this sump be pumped to the street in front off the building resulting in an unacceptable spread of contamination.

The local disconnect for the sump pump is located just west of the sump on the south side of the small storage building (Room 120, old Fluorine Storage Building).

9.0 Termination, Incident Recovery, and Restart

9.1 Termination

The Incident Commander in consultation with the RPL Building Emergency Director will recommend termination of the event when conditions indicate that it is safe to do so. Exhibit 12.14, "Emergency Closeout Checklist," should be completed before any recommendation is made to terminate a declared emergency.

9.2 Recovery

Depending on the circumstances of the event, a recovery team, consisting of the Incident Commander, RPL Building Emergency Director, and appropriate subject matter experts (SMEs), will develop and recommend a recovery plan for restoring the facility to operable status. Emphasis will be placed on the careful cleanup of released material and contaminated debris to minimize further risk to personnel, the public or the environment while preserving evidence at the event scene. All waste materials generated by the cleanup will be containerized in drums or other appropriate containers and stored in an approved storage area pending characterization and determination of the final treatment/disposal requirements. The recovery plan will be reviewed, approved, and meet the requirements of PNNL-MA-110, Section 9.0, Termination, Re-entry, and Recovery.

The BED is responsible for ensuring that emergency equipment is clean and fit for its intended use prior to resumption of operations. Equipment used during an incident will be decontaminated (if practicable) or disposed of as spill debris. Decontaminated equipment will be checked for proper operation prior to storage for subsequent use. Consumables and disposed materials will be restocked. Fire extinguishers will be recharged or replaced.

For emergency events involving the TSD or a 90-day accumulation area, the recovery plan will include the appropriate notification of the Department of Ecology and appropriate local authorities of recovery actions taken, prior to restart. The operator of the TSD will also provide written report to the Department of Ecology within 15 days after the incident.

9.2.1 Emergency Decontamination Facilities

The RPL Facility Personnel Decontamination Room is located in Room 606 has only limited decontamination capability (a small sink). Radiological Control Personnel are the only staff that may perform Personnel Decontamination. The decontamination shower in this room is out of service.

If an evacuation of the RPL Facility occurs and re-entry is not possible to decontaminate affected personnel, Radiological Control Supervision may use the 329 Building Personnel Decontamination Facility. In the event that the affected personnel are injured, they should be transported directly to Kadlec Medical Center. If large group decontamination facilities are required, request assistance from the Hanford Fire Department Mobile Decontamination Facility.

9.2.2 Emergency Radiological Exposure Guidelines

In extremely rare cases, emergency exposure to radiation may be required to rescue personnel or protect major property. Emergency exposure may be authorized in accordance with the provisions contained in 10 CFR 835. The dose limits for personnel performing these operations are listed in Table 9.1.

The lens of the eye dose limit should be three (3) times the listed values. The shallow dose limit to the skin of the whole body and the extremities is ten (10) times the listed values.

Table 9.1. Emergency Dose Limits

Dose Limit (Total Effective Dose Equivalent)	Activity Performed	Conditions
5 rem	All	
10 rem	Protecting major property	Only on a voluntary basis where lower dose limit not practicable
25 rem	Lifesaving or protection of large populations	Only on a voluntary basis where lower dose limit not practicable
> 25 rem	Lifesaving or protection of large populations	Only on a voluntary basis to personnel fully aware of the risk involved

9.3 Restart

Restart of the facility following emergencies will be conducted in a manner consistent with the recovery plan. Before operations are resumed in the facility, all emergency equipment used during the emergency event shall be cleaned and restored to a usable, operable condition. If the event involved a container storage area within the HWTU, the container storage and containment system should be evaluated before restart. If the event involved a tank system leak, repairs must be certified by an independent, qualified, registered professional engineer.

10.0 Emergency Equipment

Support equipment available to assist in responding to an emergency can be found by referring to DOE/RL 94-02, Section 11.2, and the Hanford Fire Department emergency equipment listing in Appendix C of 94-02.

10.1 Fire Control Equipment

- Portable Class ABC Fire Extinguishers are located throughout the facility. Each Class ABC extinguisher is capable of suppressing fires involving ordinary combustible materials, flammable liquids, oils, paints, flammable gases, and fires involving electrical equipment. Class D extinguishers are located in areas vulnerable to Class D fires (e.g., dangerous waste storage room if reactive metals are stored). Manual dry chemical fire extinguishers are installed in the SAL hot cells and are available outside the HLRF A and B hot cells. The fire extinguisher locations are identified on the RPL Building Floor Plans (Appendices 13.3.1, 13.3.2, 13.3.3, 13.3.5, 13.3.6, and 13.3.7).

- The RPL is equipped with an automatic fire detection, alarm, and suppression system. Five wet pipe and one dry pipe sprinkler systems provide automatic fire suppression for the RPL.

- A Mobile Command Post Vehicle can be obtained via Hanford Fire Department (HFD) main telephone number (373-2230). The HFD Battalion Commander will approve and dispatch the vehicle.

10.2 Communications Equipment/Warning Systems

- Fire alarm pull boxes are located throughout the facility. The primary locations are at all Exits of the RPL facility. All locations are shown on the RPL Building Floor Plans (Appendices 13.3.1, 13.3.2, 13.3.3, 13.3.5, 13.3.6, and 13.3.7).

- The Crash Alarm phone is located on the West wall of the North portion of the lobby area of the RPL Building.

- A Criticality Alarm System (CAS) is present in the building. The system is equipped with neutron sensitive criticality detectors. The CAS alarms in locations where the expected dose from an accidental criticality may exceed 12 rads in free air. The system is tested and maintained in accordance with preventive maintenance procedures.

- Other non-emergency communications equipment installed at the RPL include (**Note** - These systems are not considered emergency equipment and may not be available during all types of emergencies):

    - public address system

- commercial telephone system that may also be used to summon assistance during an emergency.

10.3 Personal Protective Equipment (PPE)

Safety showers and eyewash units are installed at several locations throughout the facility, including waste storage areas. All locations are shown on the RPL Building Floor Plans (Appendices 13.3.5, 13.3.6, 13.3.7).

Personnel protective clothing and respiratory equipment is available in the RPL facility for use during both routine and emergency operations. This equipment includes:

- chemically resistant suits, aprons, boots and gloves
- protective glasses
- chemical goggles
- face shields
- full face respirators with extra cartridges
- radiological clothing.

Kits containing a variety of radiation monitoring instruments, forms, and equipment are available for use in an emergency. PNNL maintains these kits, which contain protective apparel, instruments, and equipment for personnel decontamination and other immediate emergency needs. These supplies and equipment are only adequate to fulfill immediate needs during the initial stages of an emergency.

10.4 Spill Control and Containment Supplies

Spill kits are located throughout the facility and are maintained by the Cognizant Space Managers. Additional spill kit materials can be obtained in Room 527. Supplies include absorbent materials for organic and inorganic liquids, diatomaceous earth for liquid waste spills, neutralizing agents for response to acid or caustic spills, containers and salvage containers (overpacks), brooms, shovels, and miscellaneous spill response supplies.

11.0 Evacuation of Persons with a Disability or Visitors

The RPL Building Occupants shall be aware of disabled resident staff that may require assistance in evacuating the building. A Specific Evacuation Plan may be required for disabled staff. Alternate housing for staff that are sensitive to excessive hot or cold conditions (temperately disabled) may be required due to Emergency Response Actions.

NOTE: Alternate Staging Area – In the event of an extended building evacuation during inclement weather, the 3760 Building or other indoor locations deemed safe, may be used for housing staff at the discretion of the Building Emergency Director.

Staff who are planning to bring a disabled visitor to the RPL Building shall contact the RPL Building Emergency Director to determine if a specific evacuation plan will be required.

The safety of RPL Building visitors is the responsibility of the host, who shall assure that visitors are provided a safe and orderly evacuation. The host shall report the visitor status to the appropriate Zone Warden as soon as practical, after the evacuation.

12.0 Exhibits

Exhibit 12.1 – Building Emergency Response Organization
Exhibit 12.2 – Emergency References
Exhibit 12.3 – (Formerly Drawings & Maps – moved to new Section 13)
Exhibit 12.4 – Building Emergency Director Checklist for Hazardous Facilities
Exhibit 12.5 – ICP Communicator Checklist for Hazardous Facilities
Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities
Exhibit 12.7 – Staging Area Supervisor Checklist
Exhibit 12.8 – Zone Warden Checklist
Exhibit 12.9 – Handling of Radiologically Contaminated/Deceased Worker Checklist
Exhibit 12.10 – Emergency Checklist for Emergency Management Support Group
Exhibit 12.11 – Facility Operations Specialist – Checklisted Duties
Exhibit 12.12 – Hanford Emergency Notification Form
Exhibit 12.13 – Hazards Communicator Checklisted Duties
Exhibit 12.14 – Emergency Closeout – Checklisted Duties

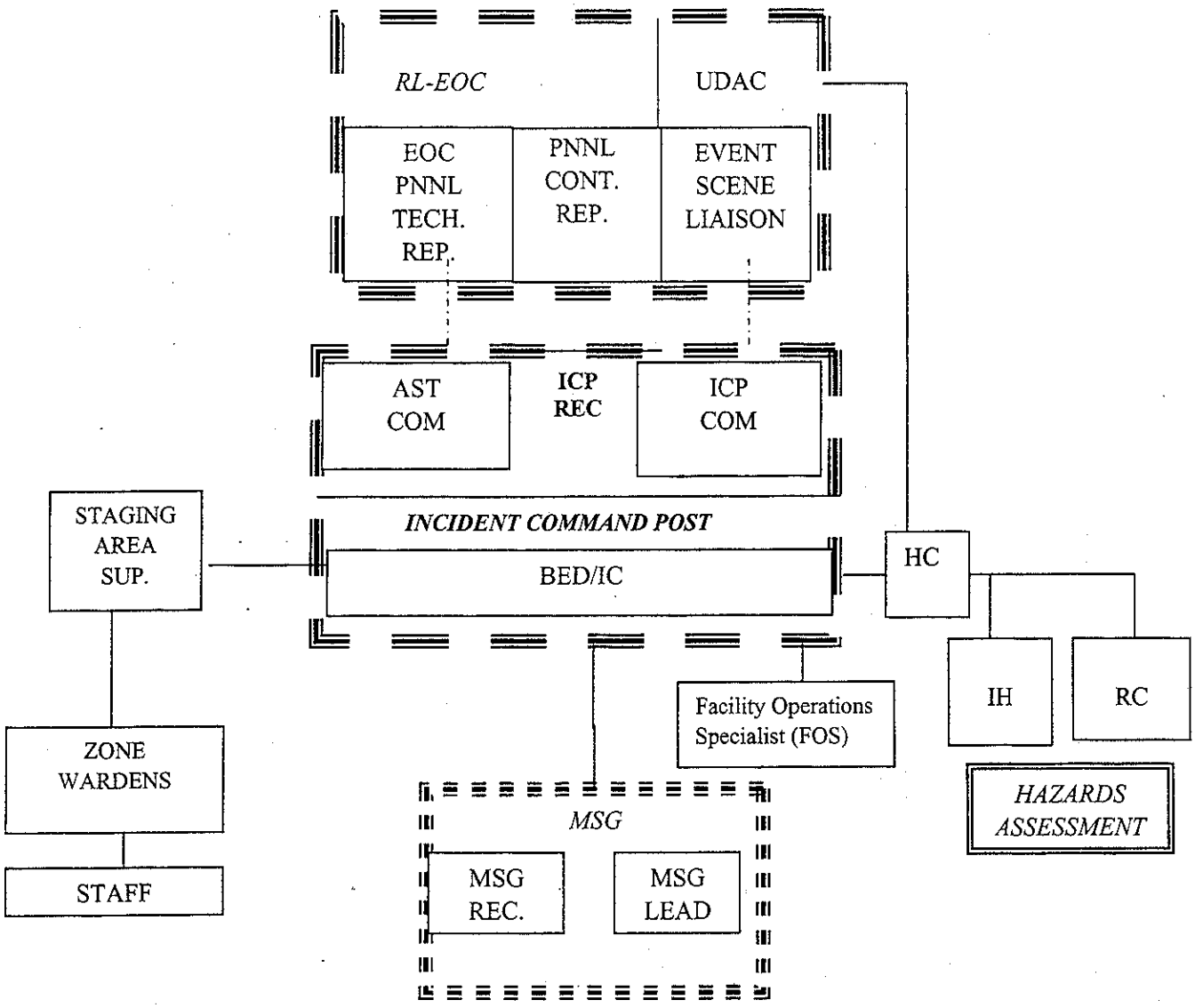
Exhibit 12.1 – Building Emergency Response Organization

BERO Members

BERO Position	Primary Responder	1st Alternate	2nd Alternate
BED*	David Clark	Francis Buck	William (Bill) Buyers
ICP Communicator*	Larry Kuga	Francis Buck	N/A
Assisting Communicator	Maria Olivarez	Andrea Kwiecinski	N/A
ICP Hazards Assessor (Radiological)	Robert Free	Holly Black-Kania	N/A
ICP Hazards Assessor (Chemical)	Todd Haynie	Kevin Sheffield	N/A
ICP Hazards Communicator	Holly Black-Kania	Rob Sitsler	Lindsay Nelsen
ICP Recorder	Robert Schumacher	Andrea Kwiecinski	
MSG Lead*	Larry Maples	Reed Sharp	N/A
MSG Liaison	Mike Moran	Sanjay Sanan	N/A
MSG Recorder	Barbara Ekstrom	Laura Fuher	N/A
Facility Operations Specialist*	Ed Arel	Francis Buck	Sanjay Sanan
Staging Area Supervisor	Karla Smith	Debra Coffey	Robert Schumacher
Zone Wardens	(See Exhibit 12.2.3)		

* These are Testing Designated Positions (TDP) per SBMS subject area *Workplace Substance Abuse.* Any changes to these positions require coordination through the Testing-Designated Position (TDP) Administrator (Jerry Allen).

Exhibit 12.1.1 – BERO - EOC Interface



Legend

AST	Assisting	IH	Industrial Hygienist
BED	Building Emergency Director	MSG	Management Support Group
COM	Communicator	RC	Radiation Control
CONT	Contractor	REC	Recorder
EOC	Emergency Operations Center	REP	Representative
FOS	Facility Operations Specialist	SUP	Supervisor
HC	Hazards Communicator	UDAC	Unified Dose Assessment Cntr
IC	Incident Commander		
ICP	Incident Command Post		

Exhibit 12.2 – Emergency References

ANY EMERGENCY PNNL SINGLE-POINT-CONTACT 375-2400	
Hanford Fire Department	375-2400 If Inoperable 911
Hanford Ambulance	375-2400 If Inoperable 911
Benton County Sheriff	375-2400 If Inoperable 911
PNNL Duty Officer	375-2400
300 Area ONC	376-2900
Off-Normal Event Reporting	375-2400

12.2.1 Building Emergency Director

Building Emergency Director/Emergency Coordinator (BED/EC)
and Alternates Emergency Telephone Numbers
(If unsuccessful using numbers provided below contact
the PNNL Operations Center 375-2400)

RPL Building Emergency Director	
David Clark	376-5746
Cellular Phone	438-4937
Pager	546-3002
RPL Building, First Alternate BED	
Francis Buck	372-3666
Cellular Phone	521-2069
Pager	736-3211
RPL Building, Second Alternate BED	
Bill Buyers	376-5612
Cellular Phone	521-0217
Pager	NA

12.2.2 Zone Warden Assignments

Zone Warden Assignments

Zone 1		
Rooms	200, 201, 201A, 202, 203, 209, 301, 302, 303, 305, 306, 308, 309, 310, 312, 313, 316, 317, 319, 319A, 320, 324, 325, 330, 327, 327A, 700, 701, 702, 703, and 705	
Primary	F. Vaughn Hoopes	376-3089
Secondary	Franciska Steen	376-4327
Zone 2		
Rooms	Elevator, 400, 401, 403, 404, 405, 406, 409, 410, 411, 414, 415, 416, 419, 420, 421, 425, 426, 427, 430, 500, 501, 504, 504A, 505, 506, 507, 510, 511, 514, 515, 516, 517, 520, 524, 525, 527, 527A, 528, 529, 530, 706, 710, 711	
Primary	Randall Scheele	376-0956
Secondary	Joel Tingey	376-2580
Zone 3		
Rooms	600, 601, 603, 604, 607, 608, 609, 610 and 611	
Primary	Clay O'Laughlin	376-0310
Secondary	Jeff Chenault	376-4337
Zone 4		
Rooms	Elevator, 34, 35, 36,40, 40A, 40B, 40C, 42, 43, 43A, 44, 48 50, 50A, 52, 54, 57, 57E, 57W 58,90, 93, 94, 94A, 94B, 95, 96, 96A, 97, 97A, 98, and 45 (the Basement Common Space adjoining these rooms)	
Primary	Matthew Fountain	376-5617
Secondary	Greg Varljen	376-7302

Zone Warden Assignments (cont.)

Zone 4A		
Rooms	22, 22A, 22B, 23, 23A, 23B, 30A, 31, 31A, 32, 33, 55, 55A, 55B, 56, 60, 61, 62, 63, 64, 91, and Basement Common Space adjoining these rooms	
Primary	Greg Varljen	376-7302
Secondary	Todd Haynie	372-3067
Zone 5		
Rooms	5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 25, 26, 27, 28, 70, 72, 74, 76 and 78	
Primary	Jeff Andrie	376-0502
Secondary	John Holland	376-3083
Zone 6		
Rooms	902, 903, 904, 905, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 932, 933, 934, 935, 936, 937, 938, 939, 968, and the South Equipment Room West of Room 930	
Primary	Sandy Fiskum	376-7015
Secondary	Joyce McGuffey	376-4043
Zone 7		
Rooms	940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 954, 955, 956, 957, 958, 960, 961, 964, 965, 967, Second Floor Rest Rooms, Elevator, Elevator Loft, East Equipment Room, and South Mechanical Room East of Room 930, and North Dock/Cylinder Storage Area	
Primary	Gregg Lumetta	376-6911
Secondary	Clark Lindenmeier	376-8419
Zone 8		
Rooms	101, 102, 102A, 103, 104,	

	104A, 105, 106, 107, 108, 108A, 108B, 108C, 108D, 108E, 108F, 108G, 110B, 110D, 110E, 110F, 110G, 120, 121, 204, 205, 206, Men's Change Room, Lunchroom, and Lunchroom Conference Room.	
Primary	Ed Arel	376-2654
Secondary	Lewis Hogan	372-1427
Zone 9		
Rooms	109A, 109B, 109C, 109D, 109E, 109F, 110, 110A, 110C, 111, 111A, 112, 112A, 113, 114, 115, 116, 117, 118, 119, Women's Change Room, Lobby Women's Rest Room, Lobby Men's Rest Room,	
Primary	Tim Reining	376-0310
Secondary	Paul Bredt	376-3777

12.2.3 Staging Area Supervisor and Alternates

Staging Area Supervisors

	Name	**Phone**
Staging Area Supervisor	Karla Smith	373-6481
First Alternate	Deborah Coffey	376-5262
Second Alternate	Robert Schumacher	376-9697

12.2.4 Emergency RPL Facility Contact Phone Numbers

In the event of an Emergency, specific detailed facility information may be needed. Knowledge of the Building, Utilities and Radiation Hazards can be obtained from the staff listed in Table 12.1. (Contact the PNNL Operations Center at 375-2400 if unable to contact these staff members using the numbers provided.)

Table 12.1. Building, Utilities, and Radiation Hazards Emergency Contacts

Title	Name	Work Phone	Cellular & Pager
Utility Operations Work Team Leader	Don Janssen	376-1233	539-4007 85-9673
RPL Building Radiological Control Supervisor	Robert Free	376-2575	521-5916
Nuclear Work Team Leader	Ed Arel	376-2654	430-4992 85-5952
PNNL Operations Center		375-2400	
Fire Protection Engineer (FPE)	Karl Bohlander	372-3177	85-5105
Industrial Hygiene/Occupational Safety	Todd Haynie	372-3067	521-2913
Management Support Group Contact	Larry Maples	372-2786	308-9045
Waste Management			
90-Day Storage (SFO Areas)	Bruce Larue	376-4051	530-2636
90-Day Storage (Non-SFO Areas)	Greg Varljen	376-7302	530-7002
TSDs	Ron Del Mar	376-2822	530-8308
Low-Level Waste	James K. Larsen	376-4176	430-6694
Environmental Compliance Rep	John Holland	376-3083	
Alternate Incident Command Post (ICP) 3760 Building, Room 129		372-0727 372-0801 (Fax) 372-0723	

Exhibit 12.3 – (Formerly Drawings & Maps – Moved to new Section 13)

Exhibit 12.4 – Building Emergency Director Checklist for Hazardous Facilities

The BED manages facility operations and personnel, and is responsible for ensuring implementation of appropriate emergency procedures. Activities include direct configuration control over facility systems and components, allocations of plant personnel to conduct facility specific emergency response actions (within the affected facility boundary), categorization and reporting of the incident, and directing implementation of initial preplanned area/site protective actions. The BED is responsible for completing the following check listed duties for non-declared, RCRA, and DOE declared emergencies as appropriate.

During declared emergencies, when an EAL classification has been made, the shaded duties are required to be implemented.

Maintain a log or assign a log keeper to record your activities, including the date and time information was received or time when an action was taken. The checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

IMMEDIATE ACTIONS

1. _____ Upon initial discovery/notification complete the following:

   - Perform/initiate performance of the response actions in Chapter 6.0 that are applicable to the event.
   - Stop non-emergency activities in the event scene hazard area and monitor systems for potential secondary leaks or pressure buildup.
   - Warn personnel in event scene hazard area.
   - Isolate the impacted area.
   - Minimize exposure by performing those actions necessary to protect human health and/or the environment.
   - As information becomes available, identify the character, source, and amount of released material and evaluate the release situation.
   - Initiate mitigation actions that cannot be delayed without threatening human health and/or the environment.
   - Call 375-2400. Explain the nature of the event, provide the following:
     - Type of assistance needed (fire, medical, security).
     - Your name, location, and recommended route to your location.
     - Call back phone number where BED can be reached.
     - Information related to injuries, contamination and/or exposures. Cellular telephones and radios shall not be used to provide names and payroll numbers of personnel.
     - Request Hanford Fire Department assistance when dealing with unknown materials or hazards.
     - Request Hanford Patrol assistance for roadblocks and other security concerns.
   - Have the Single Point Contact (SPC) notify appropriate State or local agencies if their help is needed to mitigate the event.

- Have the Single Point of Contact (SPC) notify the PNNL Chemical Assessment Committee if Chemical assistance is needed.
- If available, assign and direct a facility knowledgeable person(s) to an upwind location to meet and collocate with arriving emergency responders and perform the Facility Operations Specialist (FOS) checklist.
- If a Facility Operations Specialist is not available, assign personnel to act as the facility point-of-contact at the incident scene hazard area and perform the FOS checklist.

NOTE: Immediate hazardous material responses are handled by the Hanford Fire Department for onsite facilities.

2. _____ Implement protective actions for facility personnel (i.e., take cover/evacuate).

Warning: If evacuating in response to a bomb threat or suspicious device, do not use a Hanford fire alarm pull box to evacuate the building. Assure personnel stage a minimum of 300 feet from the potential hazard and cease use of cellular phones, radios, cordless (portable) phones, portable computing devices or other radio frequency generating devices within a 300-foot radius.

- Assign door monitors as appropriate at access points during a take cover or facility evacuation, to inform personnel of potential hazardous conditions and to protect sensitive materials.
- Evaluate the situation and determine an appropriate staging area location outside any plume pathway.
- During an evacuation, assign staff (e.g., Zone Wardens) to monitor facility access points to prevent unauthorized reentry.
- For a take cover event, secure HVAC per SOP 325-3 as necessary.
- Make initial and periodic facility announcements in order to keep personnel informed.
- If a fire alarm occurs during a take cover, immediately provide personnel for whom you have responsibility, guidance on appropriate action.

The BED (until IC arrives) may permit coordinated personnel movement during protective actions.

3. _____ IF there is a chemical/radiological release that immediately threatens nearby facilities:

- Initiate a take cover for the affected area, by calling 375-2400 or by calling the Patrol Operations Center (POC) at 911 (if using a cell phone to contact the POC dial 373-3800).

Personnel arriving at Hanford Patrol access control points will be required to obtain BED (until IC arrives) approval and safe routes of travel before being allowed to proceed to the ICP.

- Direct the Hanford Patrol to isolate the affected area and relieve door monitors when appropriate.

4. _____ Provide location and recommended safe route to facility operations personnel meeting emergency responders.

5. _____ Establish an initial ICP and report location to the PNNL Operations Center at 375-2400.

- Assign ICP Communicator and begin assigning other initial ICS functions as required to meet the needs of the incident
- Assemble and brief the facility BERO and make initial assignments.
- Inform the SPC of the location of the Facility Operations Specialist (FOS).

6. _____ Refer to the facility EAL criteria (RLEP-1.0-Appendix 1-PNNL.325 in the back of DOE – 0223, Emergency Plan Implementation Procedures) for recognizing and classifying emergencies and/or event classification descriptions for event classification.

If the event is a transportation event, the BED is responsible for event classification if it occurs within the facility boundary and the materials are under PNNL control and ownership (i.e., transporter has not yet accepted responsibility by signing shipping paperwork). If the event is OUTSIDE of the facility boundary, the EDO is responsible for event classification.

IF the EAL criteria is met:

- Direct the ICP Communicator to implement ICP Communicator Checklist.
  NOTE: If the ICP Communicator is not available, delegate completion of the Hanford Emergency Notification form to the ONC and provide the necessary information.
- Assure the POC has implemented onsite protective actions.
- Review items 1-9 on the Hanford Emergency Notification form once completed. Correct any discrepancies as necessary.
- Sign in approval block and note time of declaration of event classification.
- Return RL Notification form to ICP communicator for transmittal to ONC.
- Proceed to Step #7.

IF the EAL criteria is not met:

- Assure the ONC (376-2900) is notified for evaluation of event against "not classified event" notification criteria. Review the appropriate occurrence reporting procedure(s) or process, for notifications, which must be completed within 30 minutes of discovery.
- Proceed to step #7.

Note: It is possible when comparing event indications to an EAL set to discover that the EAL criteria were previously met, but those conditions no longer exist. If there is no threat to workers or the public, then the incident may be a transitory event and reported under the Abnormal Event criteria.

7. _____ IF incident involves a spill, release, fire, or explosion, or exceeds environmental permits,

   THEN notify the Environmental Support Contact (EMSD) at 375-2966 or 375-2400 to initiate regulatory required notifications and follow your contractor specific spill/release notification process or procedure. (Contact the SPC for a Prime Contractor specific single-point-of-contact if necessary).

8. _____ Provide initial briefing to IC and ICP personnel including:

   - Potentially affected personnel
   - Incident and facility conditions
   - Notifications (environmental/emergency and person or agency contacted)
   - Protective actions implemented
   - Status of event classification
   - Mitigation efforts underway
   - Accountability status of facility personnel
   - Status of injured, contaminated or exposed personnel
   - Status of assigned ICS functions
   - Status of equipment (shutdown, running. Isolated, etc.)
   - Status of current personal protective equipment (PPE)
   - Witnesses or involved personnel location
   - Location of established road blocks by facility personnel
   - Location of staging area if facility is evacuated
   - Current and forecasted meteorological conditions

At the completion of turnover from the BED to the IC, the IC shall assume responsibility for command and control of the incident; the BED retains responsibility for classification until the EOC is declared operational.

FOLLOW-UP ACTIONS

9. _____ Assure occurrence reporting requirements per the appropriate contractor procedure in accordance with DOE-0223, RLEP 3.24, "Notification, Reporting, & Processing of Operations Information" are initiated.

10. _____ Confirm that facility personnel accountability has been conducted and evacuated personnel have been moved to a safe location.

11. _____ Coordinate the establishment of operations protocols with the IC based on the availability of personnel.

    - Discuss location of Resource Staging Area.
    - Assist IC in assigning other functional components of the ICP, as necessary.

12. _____ Consider if the event area needs to be secured to preserve evidence (for significant events) by eliminating any unnecessary disturbance of physical evidence.
    - Witnesses to the event may be able to provide critical information to emergency responders.
    - Document your initial observations.

13. _____ Contact the PNNL Operations Center and direct the following:

    - Inform the RL ICP Representative of facility incident status and location of the ICP.
    - If the facility RL ICP Representative is not available, direct the SPC to contact the divisional on-call DOE representative listed in the Site Weekly On-Call Directory.
    - If the Site Weekly On-Call List is not available, contact the ONC (dial 376-3030).

14. _____ IF the IC directs you to conduct a turnover briefing with the SED,

    THEN dial 376-6185 and provide a briefing as previously outlined above.

15. _____ For an ALERT level emergency or greater, assure the Hazard Communicator is in communication with UDAC and using their checklist

16. _____ Upon RL-EOC becoming operational, transfer the responsibility for event classification and ensuring the implementation of onsite protective actions to the SED after providing turn over briefing.

17. _____ Assure the IC is kept informed on the status of facility personnel and activities.

18. _____ IF any personnel are deceased, injured, contaminated, potentially exposed, or transported by ambulance and the RL-EOC is not activated,

THEN notify the EDO, via the ONC (at 376-2900) to have the Health Advocate notified.

- Cellular telephone or radio users shall not use the name(s) or payroll number(s) of involved personnel.
- Refer to Exhibit 12.9, "Handling of Radiologically Contaminated/Deceased Worker Checklist"

19. _____ IF any personnel are deceased, injured, contaminated, potentially exposed, or transported by ambulance and the RL EOC is activated:

    THEN verify with the Liaison Officer (EDO) at the ICP that the following notifications were made:
    - Employee line managers
    - Employee Health Advocate
    - Cellular telephone or radio users shall not use the name(s) or payroll number(s) of involved personnel
    - Refer to Exhibit 12.9, "Handling of Radiologically Contaminated/Deceased Worker Checklist"

20. _____ Participate in ICP briefings as required (IC may have BED lead ICP briefings).

21. _____ Discuss event reclassification with the IC and Liaison Officer (EDO), and provide recommendation to the SED (dial 376-6185) if warranted by incident conditions.

22. _____ When the incident is stabilized, participate in a debriefing with the IC and take actions to return facility to normal operations.

23. _____ If evacuating the facility due to a natural phenomena have the Operations Center report the evacuation to the ONC at 376-2900.

    NOTE: Refer to Exhibit 12.14 "Emergency Closeout Duties" for checklist items to consider before any recommendation is made to terminate a declared emergency.

24. _____ When incident is stabilized, refer to RLEP 3.4, Event Termination, Reentry and Recovery, to coordinate termination of the emergency.

25. _____ Assure all hazardous material generated is handled appropriately and that incompatible waste is handled or stored in the area until necessary cleanup has occurred.

26. _____ Assure the Environmental Support Contact is notified (375-2966) or (375-2400) to initiate EPA and Ecology notification if the event involved a hazardous material spill/release and that the event is logged in the HWTU operating record.

27. _____ When the emergency event has ended, verify there has not been a compromise regarding an incident of security concern.

28. _____ Verify re-entry into the facility is controlled by assigned staff (i.e. Zone Wardens) to check badging.

29. _____ Assure that any emergency equipment used during the emergency is cleaned and restored to a ready condition after the emergency is terminated and prior to operations being resumed in the facility.

30. _____ If a facility that has reportable quantities of Special Nuclear Material (SNM) has been completely evacuated, then notify the on-call security representative who will contact the Manager, Safeguard and Security. A physical inventory of the SNM may be required before restoring normal operations to the facility.

31. _____ Upon event termination, turnover a copy of all logs to the Liaison Officer or IC designee.

Exhibit 12.5 – ICP Communicator Checklist for Hazardous Facilities

The ICP Communicator must assure that the IC and BED are aware of all transmitted and received information. As a precautionary measure, the BED assures that this position is staffed for all events, however for the purposes of this checklist, the ICP Communicator is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. During DOE declared emergencies the shaded duties are required to be implemented. Maintain a log of ICP communications to record activities, including date and time when information was received and time when actions were taken. The checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Upon notification, and after receiving safe routes of travel, respond to the ICP as soon as practical and receive incident status from the BED.

   - Assist the BED with event communications.
   - If directed to place a 375-2400 call, be prepared to provide the following:
     - Type of assistance needed (include a request for response of an Incident Commander)
     - Your name, location, and safe routing directions to event location
     - Request for HFD assistance when dealing with unknown materials or hazards
     - Request for Hanford Patrol assistance for roadblocks and other security concerns
     - Call back phone number where BED or ICP Communicator can be reached
     - Information related to injuries, contaminations, and exposures. Cellular telephones or radios shall not be used to provide names and payroll numbers of personnel
     - Location where responding emergency personnel can make contact with the Facility Operations Specialist (FOS).

2. _____ Get a current copy of Hanford Emergency Notification Form (RL-F-5540.1).

3. _____ Get current area meteorological data.

   - Contact the Pacific Northwest National Laboratory Weather Station (373-2710 or 373-2716 – 24 hours Mon-Fri, 0600-1400 hrs on weekends/holidays).
   - Record the wind speed (in miles/hour), direction (from/to), and stability class on the Hanford Emergency Notification Form.
   - If meteorological data is not available, enter the words "Not Available" in Section 8 of the Hanford Emergency Notification Form.
   - Provide meteorological data to ICP Hazards Assessors.

4. _____ Complete items 1 – 9 of Hanford Emergency Notification Form, as known.

   - Obtain BED review, signature, and time of declaration of classification.

   NOTE: For DOE Alert level or higher declared events, Event Classifier reporting duties are no longer required.

5. _____If no EAL criteria is met:

   - Assure the ONC (376-2900) is notified for evaluation of the event against "not classified event" notification criteria. Review the appropriate occurrence reporting procedure or process for notifications, which must be reported within 30 minutes of discovery.

6. After BED approves the Hanford Emergency Notification Form, complete the following actions to transmit the information to the ONC:

   - FAX completed Hanford Emergency Notification form to the ONC on 376-3781 (IF Fax is unavailable make notification via 911 call.
   - Dial 911 and make notification of declared emergency (Cell Phone dial 373-3800)
   - Wait for the POC to initiate the POC/ONC conference bridge, and provide the ONC Duty Officer the information listed in items 1 – 9 from the Hanford Emergency Notification Form.
   - Confirm with POC that they are initiating onsite protective actions and the ONC is initiating offsite notifications.

7. _____ Verify the POC knows the location of the ICP.

8. _____ IF during the incident, the emergency class is upgraded AND the RL EOC is NOT operational,

   THEN repeat checklisted duties 2 – 6 above.

   - You will check "Reclassification" in Section 4
   - You will enter the appropriate number in the "No. ____" section found on the upper right hand side of the form.

9. _____ Establish the ERO Communication Line.

   - Dial 372-8145.
   - Identify yourself as the ICP Communicator.
   - When the RL-EOC Event Scene Liaison comes on the line you will hear a series of beeps.
   - Serve as the ICP Communicator providing continuous incident status over the ERO Communication Line.

10. _____ When the RL EOC is activated, inform the BED and IC.

11. _____ Provide the RL-EOC Event Scene Liaison a status on the following:

    - Protective actions implemented by facility.
    - Protective action requested of other organizations (i.e., HPD, HFD).
    - Incident conditions.

- Mitigative actions.
- Injured, deceased, contaminated, or potentially exposed personnel, and personnel transported by ambulance (only identify individuals by name when using a hard line telephone system).

12. _____ Direct information requests from the RL-EOC to the IC and BED.

NOTE: If the EOC is manned, the Assistant Communicator should establish a communications link with the PNNL Technical Support Representative – (376-7148)

13. _____ Relay ICP requests for resources over the ERO Communication Line.

- Most resource requests should be provided to you to pass over the communication line, however, other ICP functions (i.e., Logistics, Planning) may make resource requests over this line if necessary.

14. _____ Participate in ICP briefings as required.

15. _____ Upon event termination, turn over a copy of all logs to the Liaison Officer or IC designee.

NOTE: The primary line to the PNNL Operations Center is 375-2400. The secondary line is 375-9959.

Exhibit 12.6 – ICP Hazards Assessor Checklist for Hazardous Facilities

This checklist has two parts: 1) Radiological Hazards Assessor and 2) Chemical Hazards Assessor.

12.6.1 Part 1, Radiological

The Radiological Hazards Assessors are responsible for coordinating and ensuring accomplishment of radiological control functions throughout the scene. This position reports to the Operations Section Chief at any assigned location. The affected facility's radiological control manager or equivalent will fill this position. The Hazards Assessor is responsible for implementing the following check listed duties for non-declared RCRA and DOE Declared emergencies, as appropriate. During Hazardous Material Operational Emergencies, the shaded duties are required to be implemented. Maintain a log or assign a log keeper to record your activities (include date and time), conversations and both directives given and received. Verify that a log of RCT activities is maintained. The checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Upon notification, and after receiving safe routes of travel, report to the assigned location.

Specifically request the location and any pertinent information related to personnel who may have received a radiological exposure.

2. _____ Verify the following initial tasks are completed:
   - Perform initial assessment of hazards (i.e., source term identified, stack samples collected)
   - Estimate boundary of plume
   - Identify radiological constituents
   - Coordinate PPE requirements for personnel entering plume
   - Assist in development of monitoring requirements to detect radiological material
   - Understand known radiological and weather conditions
   - Consider physical source term (steam, pressure systems, etc.).

3. ___ Establish monitoring to assure initial and ongoing personnel radiological safety throughout incident scene.
   - This should be discussed with the ICP (Hanford Fire Dept.) Safety Officer and consider Chemical Hazard Assessor information if applicable.
   - Monitor emergency worker exposures and boundaries.
   - Evaluate and determine need to perform habitability surveys throughout the incident scene. Habitability may include dose and contamination surveys, and if applicable, a high volume air sample.

- Inform the Operations Section Chief of habitability survey results and recommend moving any resources out of an area that is above background.
- Verify potentially exposed personnel are surveyed and interviewed to reduce the possibility of cross-contamination at the event scene.

4. _____ Verify that RCT resources are available to the Operations Section Chief to perform ingress and egress surveys as required, monitor and post boundary of the radiological release in the vicinity of the affected area.

   - For additional RCT resources, contact the on-call Radiological Control Manager via the PNNL weekly on-call list.

5. _____ Support survey teams as required, providing safe routes of travel, recommended PPE, and necessary monitoring equipment.

6. _____ Under the direction of the Operations Section Chief, verify that RCTs are available to control access, monitor for, and post the boundary of the radiological release in the vicinity of the affected facility. If a release is found, assure appropriate grab air samples are taken.

   - If the release is projected to go beyond the affected facility boundary, the event has likely required an RL-EOC activation, and will require implementation of RLEP 3.16, Hanford Plume Assessment, and Tracking.

7. _____ Provide radiological control support for mitigation activities throughout the event's duration.

8. _____ Assure surveys and exposure evaluation of potentially contaminated/exposed personnel inside the affected facility boundary.

   - If the number of contaminated personnel exceeds available decontamination capability, initiate a response in accordance with RLEP 3.17, Large Group Survey Sort and Decontamination.
   - If there is an injured and contaminated worker that needs transportation to a local hospital, verify that the POC is notified. The POC will in turn contact the AMH On-Call Physician to implement RLEP 3.18.
   - If there is a contaminated/deceased worker, assure that a recovery and decontamination plan is developed as described in Exhibit 12.9 of the BEP.

9. _____ Provide radiological control support for contaminated and injured personnel (facility Radiological Control Technician is to accompany personnel to hospital in ambulance).

10. _____ **IF** the incident involves a transportation incident on the Site,

    THEN attempt to locate shipping papers or manifests to assure the contents of the shipment can be verified.

11. _____ Review safety and health issues, concerns, and survey priorities with the survey team members.

12. _____ Verify the data received has been converted to factor in the efficiency of the instrument or measurement (i.e., cpm to dpm, and air samples in mCi/cc).

13. _____ Verify that communication of incident scene radiological data with UDAC Hazards Communicator includes maps or drawings of the affected scene.

14. _____ Throughout the incident and as information becomes available, communicate with the ICP Hazards Communicator to provide information to the UDAC.

15. _____ Upon event termination, turn over all logs to the Liaison Officer or IC designee.

16. _____ Coordinate replenishing emergency response equipment.

12.6.2 Part 2, Chemical

Maintain a log or assign a log keeper to maintain a log of your activities (including date and time), conversations and both directives given and received. The checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Upon notification, and after receiving safe routes of travel, report to the assigned location.

Specifically request the location and any pertinent information related to personnel who may have received a chemical exposure.

2. _____ Support the Operations Section Chief to provide chemical monitoring for purposes of initial hazard evaluation ("size up") to protect emergency responders, ICP habitability, and to monitor habitability changes in the incident scene.

3. _____ Recommend and execute chemical sampling strategies for purposes of incident characterization, determination of employee exposure, and subsequent analysis of the incident.

4. _____ **IF** the incident involves a transportation incident on the Site:

   THEN attempt to locate shipping papers or manifests to verify the contents of the shipment can be verified.

5. _____ Request chemical data and obtain a Material Safety Data Sheet (MSDS) for the involved chemical(s) and verify a copy is provided to the HFD Medical Staff and Safety Officer.

6. _____ In conjunction with the Radiological Hazards Assessor, make recommendations on respiratory protection equipment and other PPE for chemical and physical hazards to the ICP (Hanford Fire Department) Safety Officer.

7. _____ Support the HFD in the on-scene assessment and methodology for decontamination of ambulatory and non-ambulatory patients and/or equipment when the event involves chemical or mixed hazards.

Note: Decisions related to the transport of injured and contaminated patients will be based on an evaluation of their medical condition. Patients exhibiting life threatening or unstable physiological conditions will be transported without delay.

8. _____ Recommend additional resource needs (IH support, equipment or PPE) to the Operations Section Chief.

9. _____ Address safety and health issues of emergency response team.

10. _____ Communicate with the IC, BED, HazMat Team, Safety Officer and others as necessary.

11. _____ Participate in ICP briefings as required.

12. _____ Throughout the incident and as information becomes available, communicate with the ICP Hazards Communicator to provide information to the UDAC.

13. _____ Upon event termination, turn over all logs to the Liaison Officer or IC designee

14. _____ Coordinate replenishing emergency equipment.

Exhibit 12.7 – Staging Area Supervisor Checklist

The Facility Staging Area Supervisor is responsible for coordination of actions at the facility staging area. This position is staffed by a facility representative. The list below is not designed to be all encompassing, nor is it necessary to perform each of these actions in sequence. The Facility Staging Area Supervisor is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. Maintain a log of your activities or assign a log keeper, including the date and time information was received or time when action was taken. This checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Upon notification of an emergency event requiring facility personnel to evacuate, proceed to the RPL staging area with the appropriate tools and information to perform the Staging Area Supervisor duties.

2. _____ Verify through the BED that the staging area is in a safe location.

   - For CRITICALITY events, coordinate with radiological controls staff to organize a "Quick-Sort Survey of Personnel" exiting the RPL per RCP-8.1.02.

   WARNING: If evacuating in response to a bomb threat or suspicious device, do not use a Hanford fire alarm pull box to evacuate the building. Personnel stage a minimum of 300 feet from the potential hazard and cease use of cellular telephones, radios, cordless (portable) telephones, portable computing devices, or other radio frequency generating equipment within a 300 foot radius.

3. _____ Segregate personnel, who could be potentially contaminated, who did not survey when exiting RCA, or are in personal protective equipment (PPE). Direct RCTs to survey personnel.

4. _____ Collect personnel accountability status (including staff, disabled staff, or visitors that require aid, rescue, or assistance for evacuation) from Zone Wardens at staging area and report status to the BED within 30 minutes of the emergency being declared.

5. _____ Verify that the Zone 2 and Zone 8 Zone Wardens turned on the flashing red access warning lights identified in the Zone Warden Checklist.

6. _____ Query staff at staging area to determine if hazardous processes are on going in the facility and notify BED.

7. _____ Query staff at the staging area to determine if they have any important medical conditions (pregnancy, heart problems, diabetes, etc.), medications or health concerns that needs to be reported to the BED.

8. _____ Query staff at staging area to determine if there are any security issues. Have LA's and classified documents been secured prior to exiting? Verify that the BED has been informed of any security issues.

9. _____ Determine if any personnel were injured or potentially exposed to hazardous materials. Communicate any positive responses to the BED.

10. _____ Contact the BED to determine if the Northwest corner of the RPL needs to be manned.

    - Assign a Zone Warden to man the Northwest corner of RPL if necessary to control re-entry to the facility.

11. _____ Confirm that the Radiological Hazard Assessor has verified habitability at the staging area and ICP.

12. _____ Update personnel on the event status on a periodic basis.

13. _____ If notified to evacuate the 300 Area, identify all personnel with vehicle keys in their immediate possession. Match up people with rides. Verify destination and route with each driver.

14. _____ Use government vehicles to transport personnel in PPE, if possible. Reserve vehicles for personnel with late shutdown duties.

15. _____ When directed by the BED, coordinate relocation of personnel to the alternate staging area identified by the BED.

16. _____ Perform turnover of all information listed above with the fire department staging officer upon his arrival.

17. _____ Upon event termination, turn over all logs to the IC/Liaison Officer or IC designee.

Exhibit 12.8 – Zone Warden Checklist

1. _____ Zone Wardens activate flashing red access warning lights in the following Zones:
   - Zone 2 – turn on the flashing red light that is mounted on the wall across from the elevator.
   - Zone 8 - turn on the flashing red light that is mounted on the cabinet to the right, inside the West shop door.
2. _____ For your zone determine if all personnel have left:
   - their assigned work areas in the facility
   - unoccupied spaces, such as stairwells, corridors, elevators, and closets.
3. _____ Perform a thorough room-by-room search (if safe to do so) to provide a high degree of assurance that the facility is free of personnel.
4. _____ Report the occupancy/accountability status to the Staging Area Supervisor (including whether or not there are staff, disabled staff, or visitors are still in the building that require, aid, rescue, or assistance with evacuation.
5. _____ Notify the SAS if there are disabled persons in your zone that require assistance for a safe and orderly evacuation.
6. _____ Upon event termination, turn over all logs to the Liaison Officer or IC designee.

Exhibit 12.9 – Handling of Radiologically Contaminated/Deceased Worker Checklist

1. _____ Verify a plan is developed to assess victim(s) and surrounding area contamination levels, without compromising the event scene evidence.

2. _____ If the Emergency Operations Center (EOC) is activated, assure that victim and event scene data is communicated to the EOC and Unified Dose Assessment Center as described in RLEP 1.1. If not activated, assure that the victim and event scene information is communicated to the Patrol Operations Center (POC). Assure that the POC informs the Department of Energy Senior Management Duty Officer, on-call Hanford Site Occupational Medical Contractor (HSOMC) provider, line manager(s) for affected employee(s) or Health Advocate, and the appropriate points of contact for all other contractors.

3. _____ Upon the Coroners arrival, provide a briefing on radiological conditions and proper personal protective equipment required (if necessary) to enter the area of the victim(s).

4. _____ Discuss and implement a plan to decontaminate the victim with input from coroner, event contractor Human Resources, and Radiological Control as a minimum. The plan should consider the following factors:

   - Determine mutually agreeable level of decontamination (Non detectable or ALARA) Consider the residual radiation level 30 centimeters from the body, and/or where the radioactivity is found on or in the deceased worker.
   - Determine with assistance from the event contractor Human Resources if there are any societal, religious, and/or cultural implications.
   - Request input from the Radiological Control organization concerning the application of the NCRP 37 and 65 recommendations.
   - Consider the type and composition of casket and funeral (open or closed casket), if known.
   - Consider movement of deceased worker when appropriate.
   - Consider cold storage if decontamination cannot be readily completed.
   - Arrange for disposition and disposal of contaminated biological wastes.
   - Consider the radiological, biological, and other hazards to attending personnel.
   - Determine method(s) of decontamination (consider use of the Hanford Fire Department Mobile Decontamination Facility).
   - Evaluate the event investigation implications.

5. _____ Verify decontamination of the victim is completed in accordance with the decontamination plan.

6. _____ Move the victim to appropriate staging area if in a radiation or contamination area, while awaiting transportation to designated funeral home.

7. _____ Clean the area and handle, label, and dispose of the decontamination waste as biological hazardous material. The waste is disposed as radiological waste but labeled as biological hazardous material.

8. _____ Verify that the AMH psychologist is notified and dispatched to address the workers who decontaminated the worker and were involved in the incident, if needed.

9. _____ Maintain a chronological log of all interfaces and activities. Collect and maintain copies of documentation and activity logs from the event.

10. _____ Upon event termination, turn over all logs to the Liaison Officer or IC designee.

Exhibit 12.10 – Emergency Checklist for Emergency Management Support Group

The Management Support Group will use the following checklist to support the BED in managing the administrative aspects of the event.

Item	Yes	No	Comment
Has 375-2400 been notified? (Use 375-9959 if 375-2400 is unavailable)			
Has the MSG Liaison received safe routes of travel and been directed to the ICP?			
Have all building occupants been accounted for? PNNL staff? PNNL visitors? Other Contractor personnel? Consultants, vendors, others?			
Have any persons received injuries or been subjected to conditions requiring medical attention? If Yes, has medical attention been arranged?			
Has the BED classified the event? Alert Site General			
Has activation of the EOC been requested?			
Do any persons require medication for non-event reasons (e.g., heart medicine)?			
Has access control been initiated by the appropriate Law Enforcement Agency?			
Has the Area Operations Manager/Building Manager been notified? Has he reported to the event scene?			
Has a location for the ICP been established?			
Has location for the Management Support Group been established and communicated to the appropriate Fire Department, Law Enforcement Agency, and the PNNL Technical Rep. in the EOC (376-7148) (if activated)?			
Has an open line between the ICP Communicator and the Event Scene Liaison in the EOC been established?			
Has the Emergency Duty Officer made contact with the BED?			

Item	Yes	No	Comment
Has the event log been set up?			
Have the appropriate essential personnel been notified? (See paragraph 5.5.8 of PNNL-MA-110)			
Are additional staff required for support? Line Management? Clerical? Technical? Other?			
Has the Incident Commander established a schedule for periodic briefings?			
Are additional RCTs required?			
Is there a need for a facility inventory? Chemical-hazardous, toxic, flammable? Radio chemical? Nuclear or fissile material? If inventory information is required, contact the following: Chemical inventory – 376-0812 – 372-1043 or 375-6315 Nuclear/fissile – Safeguards & Security Duty Officer or Cognizant operations staff			
Has Public Relations been notified?			
Coordinate with Lab leadership to determine if BMI should be notified. (614) 424-4444			
Has DOE Headquarters been notified?			
Has EOC contacted other facilities not immediately involved?			
Is technical or operational spokesperson needed? If so, has he/she been contacted?			
Has Program Manager been notified?			
Will relief staff be required for the Incident Command Post (Event and Support Teams)?			
Is transportation needed? Available?			
Is there a need for additional equipment or supplies (including food)?			

Item	Yes	No	Comment
Has PNNL Security made arrangements with Patrol for access of special equipment (radios, cellular telephones)?			
Has the need for a facility(s) HVAC system shutdown been analyzed?			
Do subgroups need to be developed to assist with special activities that may need to occur (e.g., identifying essential personnel, accountability, termination and recovery efforts, etc.)?			
Has the impact to all work or projects in PNNL facilities been considered if the work force is reduced to only essential personnel (e.g., rad work, security/classified work, etc.)?			
Has the necessary line management been contacted to assure research project equipment is in a safe condition?			
Are event termination, recovery and reentry plans, checklists/procedures being developed?			
Has the necessary administrative support been acquired?			
Has the following been planned for a partial evacuation (essential personnel only)? 1. Determining who is essential. 2. Identify the staging location for essential personnel. 3. Notify essential personnel to report to work (recorded message, EOC media release, direct phone call, etc.), route of access, staging location, and person to report to. 4. Communicate list of essential personnel to the POC (911 or 373-3800) 5. Controlling accountability and assignment of staged essential personnel. 6. Activating the EEMT (PNNL-MA-110, Section 5.5.8). **NOTE:** Communications has a prepared email message to assist in performing this activity.			
Are there adequate controls established to prevent unauthorized Building/Site access entry and/or work initiation?			
Have preservation of evidence activities at the event/crime scene occurred (for significant events)?			

Item	Yes	No	Comment
For mass casualties, has HR been directed to the Red Cross Family and Friends Support Center?			
Has consideration for establishing shifts of emergency personnel (EOC/MSG) been made?			
Are additional radiation instruments required? What type? How many of each type?			
Is the Hazardous Materials (HazMat) team needed?			
Has the need for a Post-Natural Phenomena Hazard Building Inspection been evaluated? If yes, a Post-Natural Phenomena Hazard Building Inspection is needed: • Have the buildings been classified in one of the following four categories: o INSPECTED (Green Placard) – No apparent hazard found, although repairs may be required. No restriction on use or occupancy. o RESTRICTED USE (Yellow Placard) – Dangerous condition believed to be present. Entry permitted for emergency purposes only. No usage on a continuous basis is allowed. o UNSAFE (Red Placard) – Extreme hazard, may collapse. Unsafe for occupancy or entry. No admittance except by authorized personnel. o AREA UNSAFE (Red Placard) – Designated area is unsafe. No admittance except by authorized personnel. • Has the ONC been notified? • Have the buildings been posted with placards? • Has the status of building inspections and availability of inspection personnel been reported to the Hanford EOC? • Is there a need to request additional inspection resources from the Hanford EOC?			

Exhibit 12.11 – Facility Operations Specialist – Checklisted Duties

The individual, either the BED, or designee, when assigned by the BED, is responsible to accomplish/direct immediate mitigative actions at the event scene that cannot be delayed without threatening human health and/or the environment. The Facility Operations Specialist (FOS) is responsible for meeting emergency responders at the event scene and providing information on event status and initial actions that are underway. The FOS is responsible for implementing the following check listed duties for non-declared, RCRA, and DOE declared emergencies, as appropriate. Maintain a log or assign a log keeper to record your activities, including time and date information was received or time when action was taken. This checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Obtain briefing on operational/mitigative activities and obtain any necessary facility specific procedures, utility disconnects, etc.

2. _____ Following BED briefing, and after receiving safe routes of travel and a radio, respond to a safe location upwind of the event scene.

   - Communicate the location of event scene to the BED.
   - Verify personnel who were in the immediate area are accounted for and located in a safe, upwind area
   - Verify that first aid is administered as-soon-as possible
   - Begin segregation of any contaminated personnel
   - STOP non-emergency activities in the event scene hazard area
   - WARN personnel in the event scene hazard area
   - ISOLATE the impacted area
   - MINIMIZE exposures.

3. _____ Meet emergency personnel responding to the event scene and provide information on event status and initial actions underway. Collocate with the HFD/Hanford Patrol Operations Section Chief upon their arrival and act as the facility point-of-contact at the incident scene hazard area.

4. _____ Assist the HFD/Hanford Patrol Operations Section Chief with development of a mitigation plan by providing facility expertise.

5. _____ Identify, contact, and supervise additional facility personnel as required to Support Operations Section activities.

6. _____ Coordinate with HFD/Hanford Patrol Operations Section Chief to assure that all facility emergency responders are wearing appropriate PPE for assigned tasks.

7. _____ Upon event termination, turn over all logs to the IC/Liaison Officer or IC designee.

Exhibit 12.12 –Hanford Emergency Notification Form

RL-F-5540.1
(06/03)

U.S. DEPARTMENT OF ENERGY
HANFORD EMERGENCY NOTIFICATION FORM

No. _____

1 NOTIFICATION PROVIDED BY: Name: _____ Phone: (509) _____

2 AREA AND FACILITY: _____ 3 TYPE EVENT: a. ☐ Emergency b. ☐ Exercise/Drill

4 CLASSIFICATION/STATUS:

a. ☐ Initial Classification b. ☐ Reclassification c. ☐ Termination d. ☐ PAR Change/Addition e. ☐ Information

5 EMERGENCY CLASSIFICATION LEVEL AND OFFSITE PROTECTIVE ACTION RECOMMENDATIONS:

AREA	a. ☐ ALERT	b. ☐ SITE AREA EMERGENCY	c. ☐ GENERAL EMERGENCY
☐ 100	None	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.	• Evacuate Columbia River from Vernita Bridge to Leslie Groves Park. • Evacuate Section 5, east of Hwy. 24.
☐ 200	None	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.	• Evacuate Columbia River from Vernita Bridge to Leslie Groves Park. • Evacuate Sections 5, 6, and 7.
☐ 300	None	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.	• Evacuate Columbia River from Vernita Bridge to Leslie Groves Park. • Evacuate 2.2 mile radius.
☐ 400	None	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.
☐ 600	None	None	Evacuate Columbia River from Vernita Bridge to Leslie Groves Park.

6 TYPE OF INCIDENT: *check all that apply*

a. ☐ Fire b. ☐ Explosion c. ☐ Radiological d. ☐ Security e. ☐ Hazardous Materials f. ☐ Electrical g. ☐ Other

EAL No.: DOE-0223, RLEP 1.0, Appendix 1-_____ Table _____

Description of Incident: _____

7 RELEASE TO THE OUTSIDE ENVIRONMENT INFORMATION:

a. ☐ No Release (No indicators)
b. ☐ Unknown (Indicators of possible release, but not confirmed)
c. ☐ Confirmed Release
- Estimated Start Time of Release: _____
☐ Airborne ☐ Spill ☐ to Columbia River
d. ☐ Release Terminated - Time: _____

8 METEOROLOGICAL DATA:

Wind Speed _____ mph
Wind Direction: from _____
Precipitation: ☐ Yes ☐ No
Stability Class:
A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐

9 PROGNOSIS OF SITUATION:

a. ☐ Unknown b. ☐ Stable c. ☐ Escalating d. ☐ Improving

FOR EOC USE ONLY

10 ADDITIONAL OFFSITE PROTECTIVE ACTION RECOMMENDATIONS:

_____

APPROVED: _____ DATE: _____ TIME: _____

Exhibit 12.13 –ICP Hazards Communicator – Checklisted Duties

During Hazardous Material Operational emergencies, the shaded duties are required. Maintain a log or assign a log keeper to record your activities, including date and time information was received or time when action was taken. The checklist is not meant to be performed step-by-step, but is to be used as a reference document, as appropriate to the incident.

1. _____ Convey a safe route of travel for emergency responders to the FOS/BED

2. _____ Contact the UDAC Hazards Communicator on 376-7367 after an emergency has been declared.

> The UDAC is normally staffed approximately 30 minutes after event classification (Alert, Site Area, and General Emergency). This communication is not required to remain open, however the UDAC Hazards Communicator will establish a communications protocol with the ICP Hazards Communicator.

3. _____ Provide the UDAC Hazards Communicator with incident scene radiological or chemical data as reported by Hazards Assessor(s).

   - Verify personnel contamination data is communicated to UDAC
   - Verify laboratory data is communicated to UDAC when available
   - Communicate, verbally and by faxing, survey team findings and any other pertinent information, using maps or drawings of the affected scene.

> UDAC uses the data to refine calculations for offsite impacts. This data is vital for refining consequence assessments to determine if additional onsite and offsite protective action recommendations are required.

4. _____ Respond to requests for information from UDAC and convey requests for information to the Hazards Assessor(s) for response.

5. _____ Contact the PNNL Exposure Evaluator (376-2222) if requested to by the Radiological Hazard Assessor to evaluate personnel contamination levels and exposures.

6. _____Upon event termination, turn over all logs to the Liaison Officer or IC designee.

Exhibit 12.14 – Emergency Closeout – Checklisted Duties

The following emergency closeout check listed items are to be referred to by the BED, Operations Section Chief, FOS, and the IC before recommending termination of a declared emergency.

Criteria	Criteria Met Date/Time or NA
1. Initiating Condition is (circle one): (a) stabilized (b) corrected	
2. Radiation or hazardous material exposure levels within the affected facility are corrected, stable or decreasing with time.	
3. Fires are extinguished, flooding conditions are under control.	
4. Damage to facilities and/or process-related systems and equipment are stabilized or corrected.	
5. Injured personnel have been properly treated and/or transported to medical facilities.	
6. Check with Cognizant Space Managers to determine if operations of a hazardous nature were in progress at the time of the evacuation. If so, coordinate with the Safety Advisor and determine the actions necessary before a general staff re-entry occurs.	
7. Fire, flood, earthquake, or similar emergency conditions no longer constitute a hazard to critical systems/equipment or to personnel.	
8. Security of the affected facilities is controlled. **NOTE**: **IF** a facility that has reportable quantities of special nuclear material (SNM) has been completely evacuated, **THEN** notify the on-call security representative who will contact the manager, Safeguards and Security. A physical inventory of SNM may be required before restoring normal operations to the facility.	
9. Release of hazardous material offsite or beyond controlled areas onsite have ceased or are controlled within permissible regulatory limits, and the potential for an uncontrolled release is low.	
10. Management agreement for termination of the emergency condition.	
11. Notification of emergency condition termination to PNNL Control Room.	
12. Upon facility re-entry, access control has been established to prevent inadvertent or uncontrolled entry into (1) the event scene and (2) areas that were contaminated during the event.	
13. Operators will verify that the fire doors are open for remaining staff to re-enter the laboratories and office areas.	
14. Operations reviews current facility system conditions to determine if there is any significant system degradation and reports status back to the BED or IC.	
15. Operations performs a walk down of all mechanical level spaces looking for abnormal conditions and reports status back to the BED or IC.	
16. Existing conditions no longer meet the established Emergency Action Levels for the facility/site and it appears unlikely that conditions will deteriorate.	
17. See that any waste that is incompatible with the release material is NOT treated, stored, or disposed of until cleanup procedures are completed.	
18. Before operations are resumed, all emergency equipment used shall be cleaned and restored to a usable, operable condition.	
IC/BED _____ (Signature) _____ (Date)	

13.0 Building Maps

Exhibit 13.0 – Evacuation Routes/Emergency Equipment Locations
Exhibit 13.1 – Evacuation Routes – 1st Floor
Exhibit 13.2 - Evacuation Routes – 2nd and 3rd Floors
Exhibit 13.3 - Evacuation Routes – Mezzanine and Basement
Exhibit 13.4 - RPL Staging Area
Exhibit 13.5 - Emergency Equipment Locations – Basement
Exhibit 13.6 - Emergency Equipment Locations – 1st Floor
Exhibit 13.7 - Emergency Equipment Locations – 2nd Floor
Exhibit 13.8 - Location of RPL in the 300 Area

Exhibit 13.1 - Evacuation Routes – 1st Floor

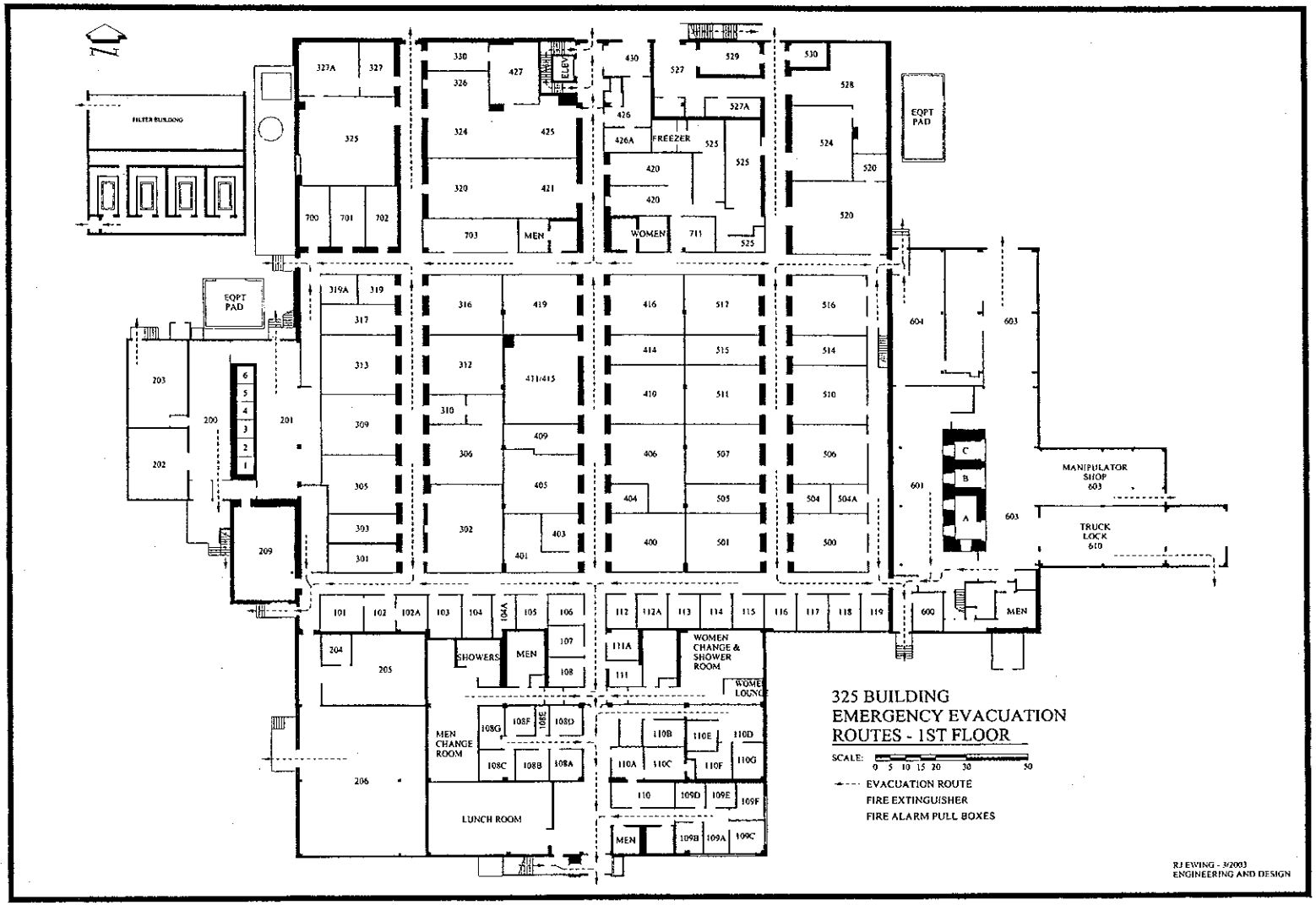


Exhibit 13.2 - Evacuation Routes – 2nd and 3rd Floors

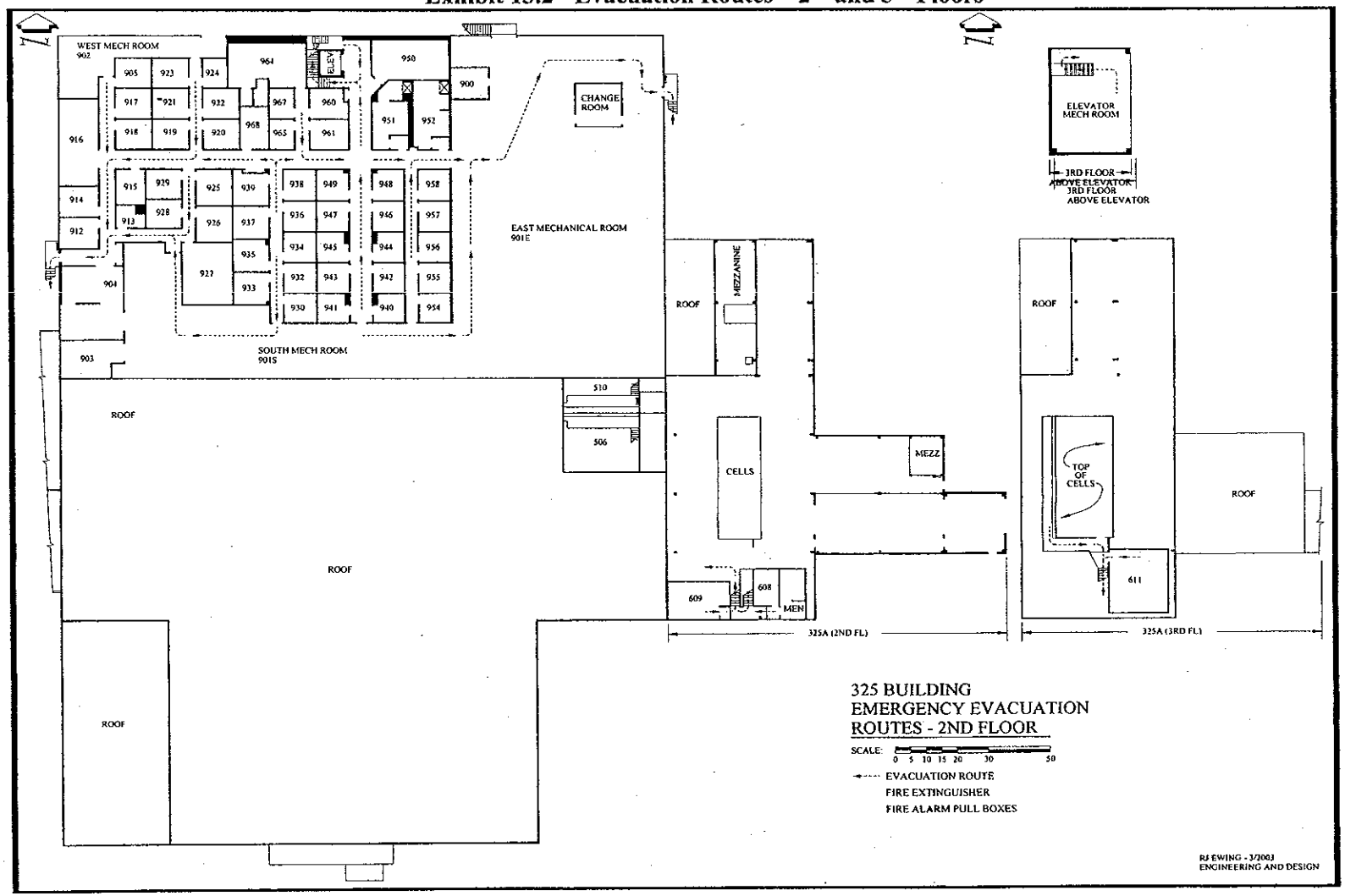


Exhibit 13.3 - Evacuation Routes – Mezzanine and Basement

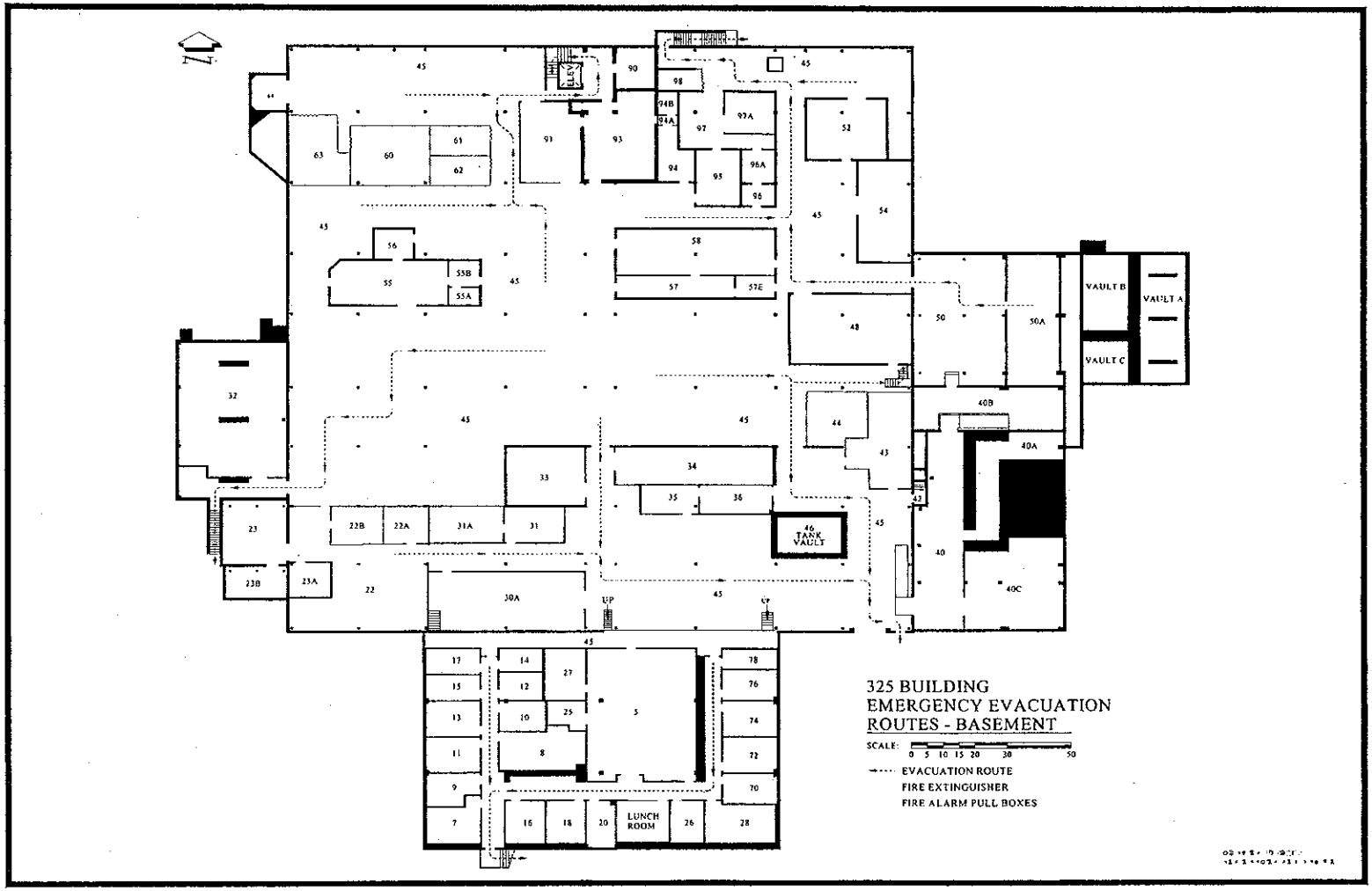


Exhibit 13.4 - RPL Staging Area

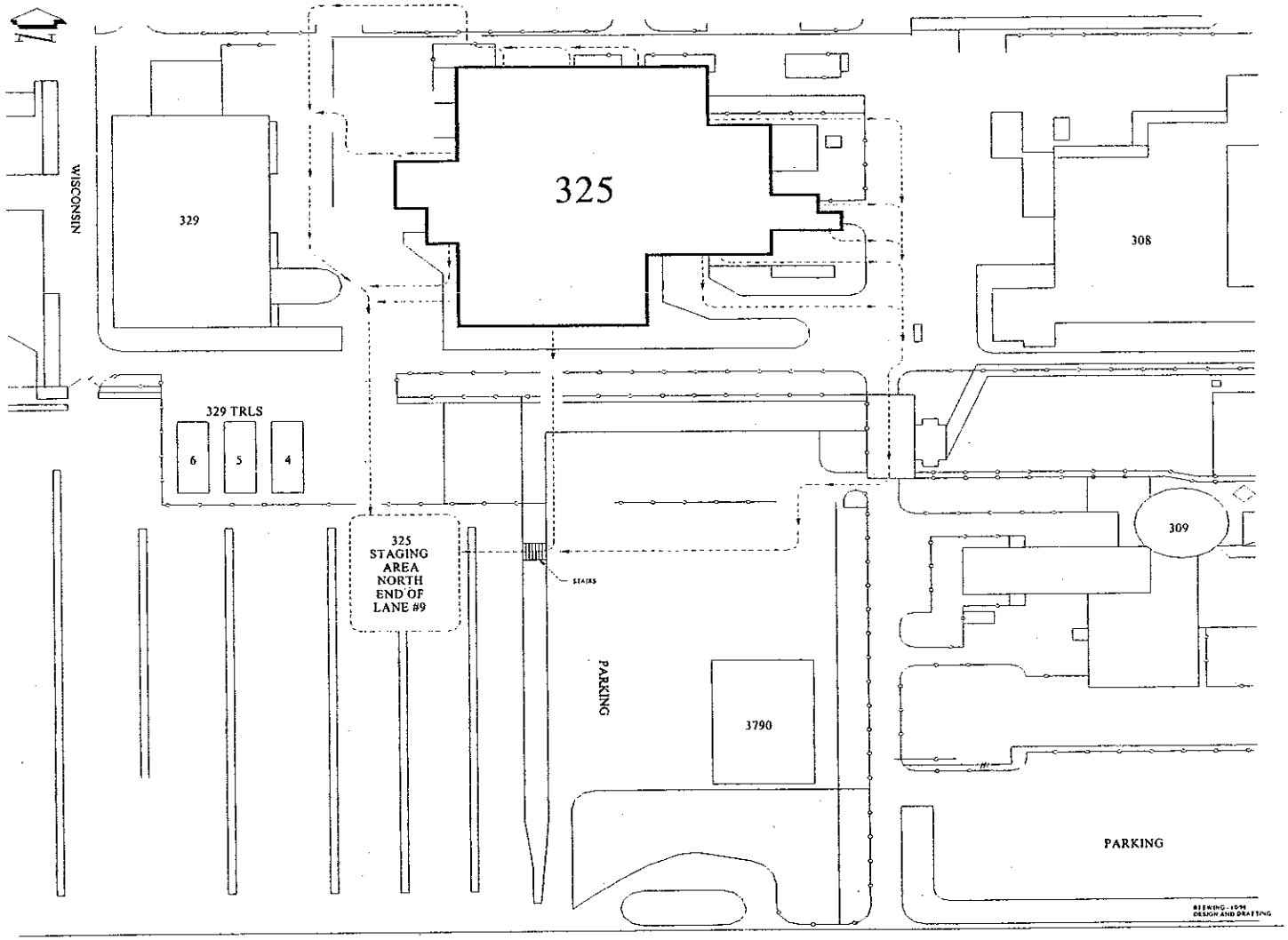
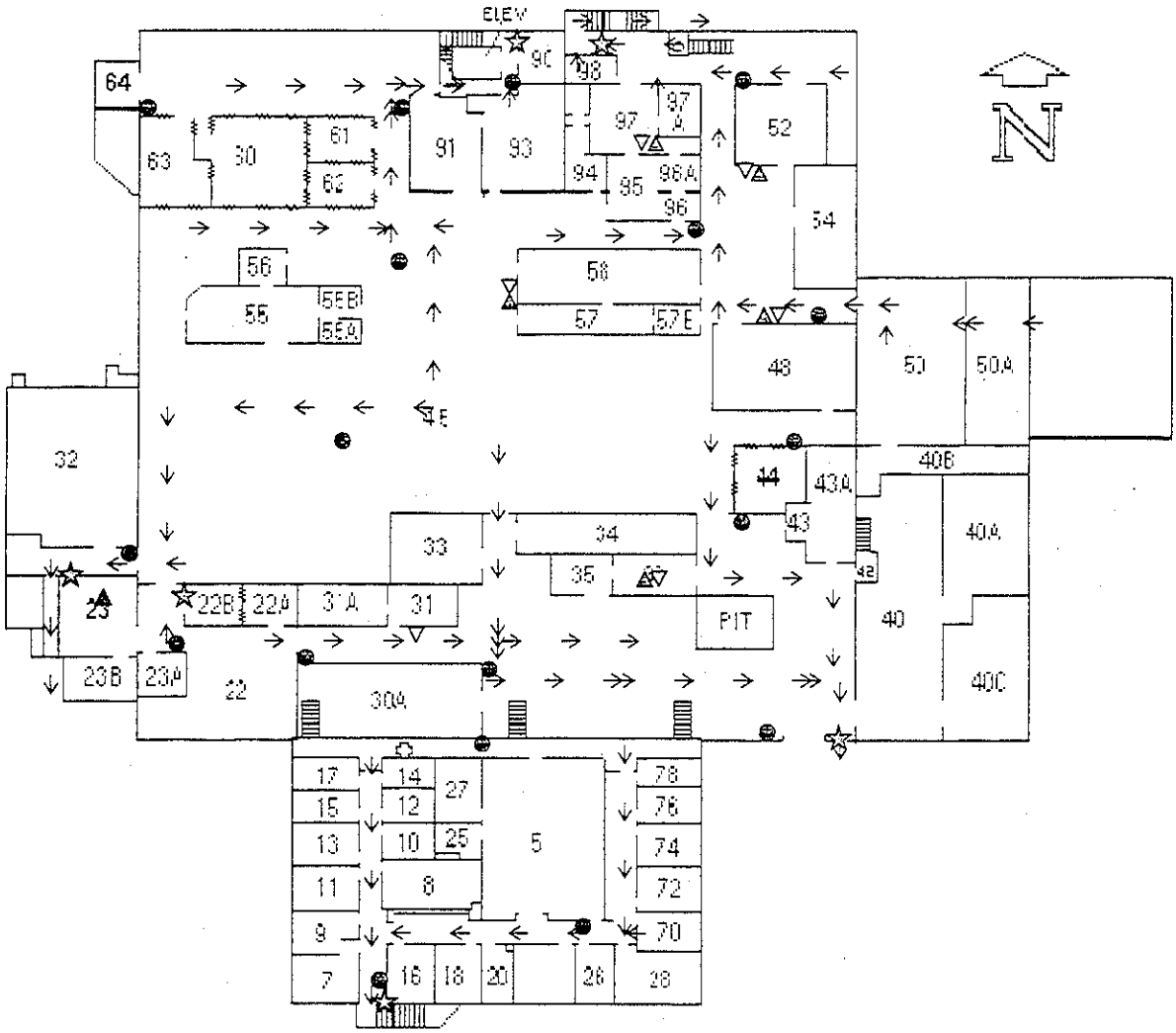
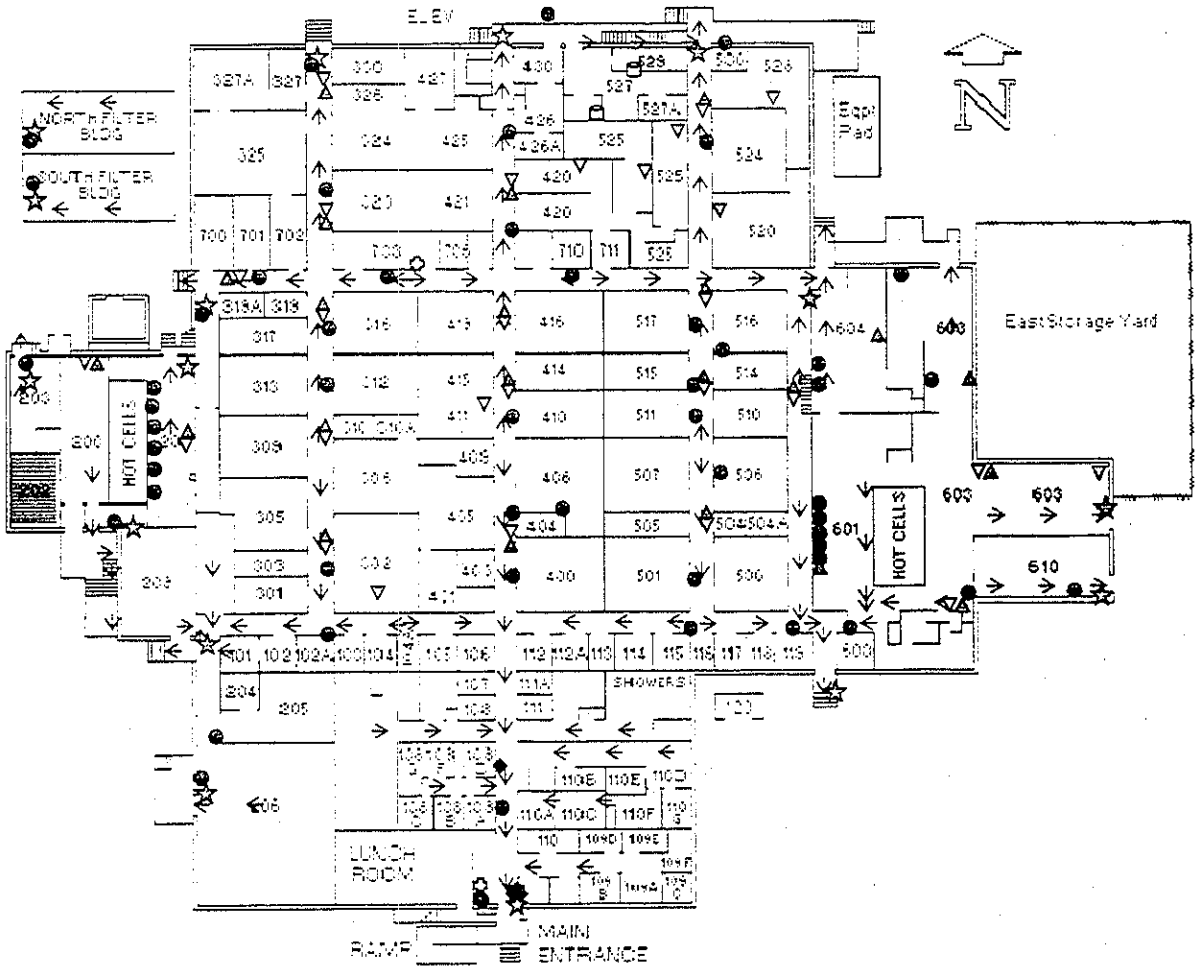


Exhibit 13.5 - Emergency Equipment Locations – Basement



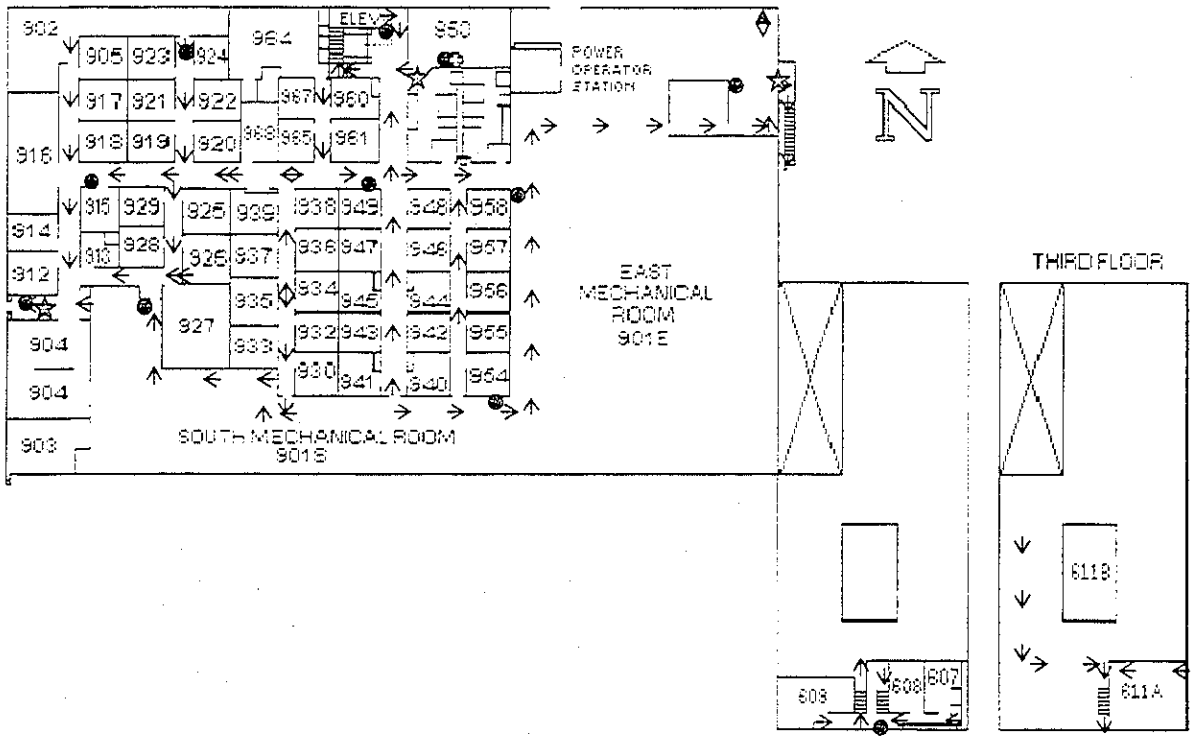
	AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
	EYE WASH STATION
	FIRE ALARM PULL BOX
	FIRE EXTINGUISHER (ABC)
	FIRST AID STATION
	SAFETY SHOWER
	SPILL KIT
	90 Day Storage Area

Exhibit 13.6 - Emergency Equipment Locations – 1st Floor



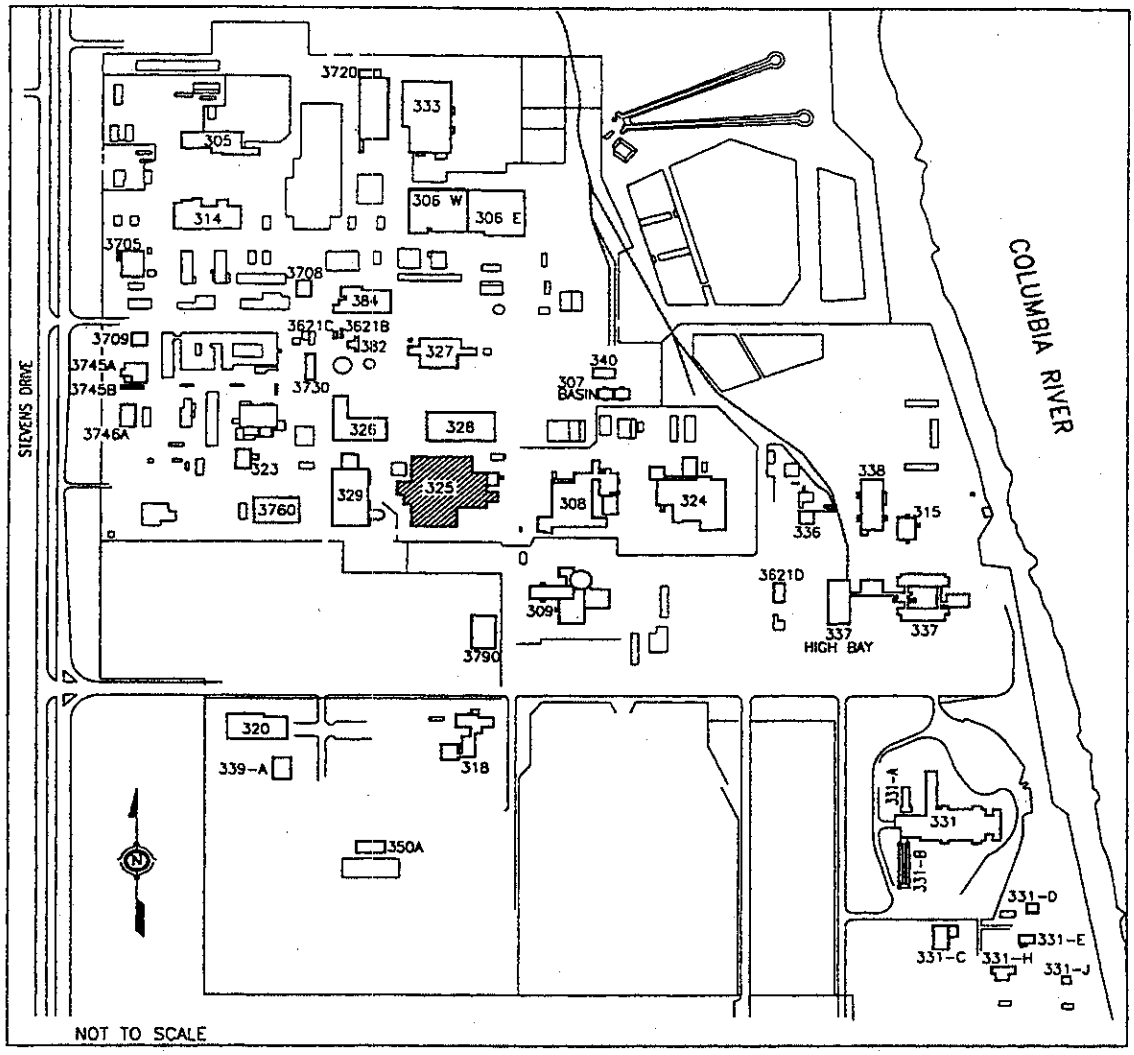
♡	AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
▽	EYE WASH STATION
✱	FIRE ALARM PULL BOX
◉	FIRE EXTINGUISHER (ABC)
✚	FIRST AID STATION
△	SAFETY SHOWER
▭	SPILL KIT
■	90 Day Storage Area

Exhibit 13.7 – Emergency Equipment Locations – 2nd & 3rd Floors



	AUTOMATED EXTERNAL DEFIBRILLATOR (AED)
	EYE WASH STATION
	FIRE ALARM PULL BOX
	FIRE EXTINGUISHER (ABC)
	FIRST AID STATION
	SAFETY SHOWER
	SPILL KIT
	90 Day Storage Area

Exhibit 13.8 - Location of RPL in the 300 Area



14.0 Emergency Action Levels

14.1 300 Area Protective Actions

300 Area Onsite Protective Actions		
	Action	**Implemented By**
Alert/Site Area/ General Emergency	• Shelter or evacuate affected facility personnel as directed by Crash Phone message.	Facility
	• Shelter 300 Area and adjacent 600 Area • Restricts access at ▪ Energy Northwest (WNP-1) Access Road and Route 4S, ▪ Horn Rapids intersection with George Washington Way ▪ Horn Rapids intersection with Stevens Drive	Patrol (POC) (Quick Reaction Checklist)
	• Plan for subsequent 300 Area evacuation as required.	Hanford EOC (RLEP 3.2 or 3.6)
300 Area Offsite Protective Actions & Recommendations		
Alert	• None	N/A
Site Area Emergency	• Implement evacuation of Columbia River from Vernita Bridge to Leslie Groves Park. • Close Highway 240	Counties (RLEP 3.3) Washington State Patrol (RLEP 3.8, Appendix H)
General Emergency	• Implement evacuation of Columbia River from Vernita Bridge to Leslie Groves Park. • Evacuate 2.2 mile radius. • Close Highway 240	Counties (RLEP 3.3) Benton/Franklin Counties Washington State Patrol (RLEP 3.8, Appendix H)

14.2 RPL EALs

The Emergency Action Level (EAL) Tables are published in DOE-0223, Emergency Plan Implementation Procedure for RPL, and can be accessed from the RPL Operating Envelope web site: http://wwwi.pnl.gov/rpl/operating/

Procedure Revision History

Date	Rev. #	Description
4/01/03	0	• Revised and edited for annual update, including insertion of history page.
7/30/03	0	• Made the following name changes to the RPL BEP and distributed changes to all holders of controlled copies: 1. In Exhibit 12.1 on page 52 change the MSG Lead 1st and 2nd alternates to Larry Maples and Reed Sharp respectively. 2. Change the primary warden for Zone 4 to Todd Haynie, 372-3067. 3. Change the secondary warden for zone 4A to Todd Haynie, 372-3067. 4. In Table 12.1 on page 59, change the 90-Day Storage Emergency Contact to Raymond D. Bell, Work Phone: 376-2321, Cell Phone: 521-4505.
9/03/03	0	Replaced Larry Page with Tracy Eaton on pages 52 and 57.
9/11/03	0	Replaced Shane Loper with Greg Varljen as Secondary Zone Warden for Zone 4 and Primary Zone Warden for Zone 4A on pages 56 and 57.
9/30/03	0	Insert Maria Olivarez as the 1st Alternate for Assisting Communicator and the ICP Recorder in Exhibit 12.1. (sma)
11/17/03	0	Change William Buyers' cellular telephone number to his current number. (sma)
11/21/03	0	Replaced Katherine Carson with Darlene Winter as Primary Zone Warden and replaced Tracy Eaton with Katherine Carson as Secondary Zone Warden for Zone 7 on page 57. (sma)
3/30/04	0	Annual BEP update (nem-m)
5/6/04	0	Update Evaluation Routes – 2nd and 3rd Floors map, correction of room numbers. (sma)
7/7/04	0	Made the following change to section 9.2.1 Emergency Decontamination Facilities: The RPL Facility Personnel Decontamination Room is located in Room 606 has only limited decontamination capability (a small sink). Radiological Control Personnel are the only staff that may perform Personnel Decontamination. The decontamination shower in this room is out of service. If an evacuation of the RPL Facility occurs and re-entry is not possible to decontaminate affected personnel, Radiological Control Supervision may use the 329 Building Personnel Decontamination Facility. In the event that affected personnel are injured, they should be transported directly to Kadlec Medical Center. If large group decontamination facilities are required, request assistance from the Hanford Fire Department Mobile Decontamination Facility. (lef)
8/11/04	0	Replace Tracy Eaton with Jason Armstrong as ICP Hazards Communicator

		Remove Stan Jones as BED and ICP Communicator Alternates. Also on Exhibit 12.2.1. Remove Teresa Schlotman as the Primary SAS and move the alternates up one step. Put Andrea Kwiecinski in as Primary ICP recorder and move Bob and Maria to alternates. Remove Abby Nicholson and Scott Nickerson as ICP Chemical Hazards Assessor alternates. On Exhibit 12.2.4, Change "RPL Facility Project Manger" to "Nuclear Work Team Leader" and add Environmental Compliance Rep. as John Holland in the Waste Management block. Replace Wayne Larson as TSD POC (Table 12.1) and replace with Ron Del Mar. (lef)
8/25/04	0	Fix name spelling of Andrea "Kwiecinski" as ICP Recorder (lef)
9/28/04	0	Made the following name changes to the RPL BEP and EIPs: Change assisting Communicator to Maria Olivarez, remove alternates Change ICP Chemical Hazards Assessor to Kevin Sheffield. Change ICP Communicator to Holly Black-Kania. Change MSG Recorder (1st Alternate) to Mary Bradshaw. Zone Warden changes: Zone 4A primary to Matthew Fountain; Zone 6 Secondary: Joyce McGuffey : Zone 7 Primary : Gregg Lumetta, Secondary : Clark Lindenmeier : Zone 9 Secondary ; Paul Bredt : Move the North Dock/Cylinder Storage Area from Zone 2 to Zone 7. Staging Area Supervisor; Move Bob Schumacher to 2nd Alternate and put Debra Coffey as the 1st Alternate. Throughout document, change PNNL SPC or PNNL Single Point Contact to PNNL Operations Center. Change RPL Facilities Project Manager to Nuclear Work Team Leader. Change RPL Building Ventilation & Power Operations Supervisor to Utility Operations Work Team Leader.
10/19/04	0	Remove 43, 45, 63, 517, and 601 from the list of 90-day waste accumulation sites from the second paragraph in section 3.6 on the bottom of page 16. Also change the 1st Alternate MSG Recorder to Laura Fuher. (lef)
11/01/04	0	Replace HEHF with new Hanford medical contractor AMH. Update ICP Hazards Assessor: 1-Todd Haynie, #2- Kevin Sheffield (lef)
3/21/05	1	2005 Annual Update: 1. Standardized appearance of the word AH-OO-GAH throughout the BEP. 2. Section 2. Added Acronyms section. 3. Section 3.1.1, added information on preservation of evidence to BED

		responsibilities. Added Testing Designated Position (TDP) requirement to BED position responsibilities. 4. Section 3.2.1, added TDP requirement to the ICP position responsibilities. 5. Section 3.2.8, added TDP requirement to the MSG Lead position responsibilities. 6. Section 3.2.5, Created new description for MSG Liaison duties. Renumbered remaining sections in chapter. 7. Section 3.2.8, added the words criticality alarms in zone warden indication of hazards. 8. Section 3.2.9, added TDP requirement to the FOS position responsibilities. 9. Section 3.3, Individual Staff Responsibilities, added information regarding discarding PPE on building evacuations and PCM use for fire/criticality. 10. Sections 5.5 Criticality, added editorial comment. 11. Section 6.1.1, item 3, added "If the RPL has a loss of electrical power and Standby Power is still available, assemble in the Lunch Room. Personnel exiting Radiological Buffer Areas do so without surveying through the PCMs. If personnel are wearing Personal Protective Equipment (PPE) clothing, are suspected of being contaminated, or have exited a Radiological Buffer Area, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel. a. Refer to Section 6.1.11 for Reduced Ventilation Flows. 12. Section 6.1.10, Criticality, removed the last sentence from item 3, bullet 1. 13. Section 6.1.10 new item 3: Personnel exiting Radiological Buffer Areas do so without surveying through the PCMs. If personnel are wearing Personal Protective Equipment (PPE) clothing, are suspected of being contaminated, or have exited a Radiological Buffer Area, isolate them from other building occupants and request they be surveyed by Radiological Control Personnel. 14. Section 6.3 Natural Phenomena, to each event added the words "If evacuating the facility, have 375-2400 report the evacuation to the ONC (376-2900)." 15. Section 8. Utility Disconnects: Added information on the Ramp Sump Pump local disconnect location. 16. Exhibit 12.1, Updated BERO members. Added new position of MSG Liaison 17. Section 12.2.1, Updated BED name (David Clark) and phone numbers. Added Bill Buyers contact info as 2nd alternate BED. Added and * to TDP positions with the note to coordinate changes in these positions with the TDP Administrator. 18. Section 12.2.4, Added MSG Contact name and phone number to the emergency contact list. 19. Exhibit 12.4, BED Checklist – a. Step 1, added requests for Hanford Fire department and Hanford Patrol for certain events. RLEP 1.1, Checklist 3.1

consistency.

b. Step 2, added additional equipment to note regarding building evacuation due to bomb threats. RLEP 1.1, Checklist 3.1 consistency.
c. Step 2, added new bullet regarding actions for evacuation while under a take cover. RLEP 1.1, Checklist 3.1 consistency.
d. Step 6, added info regarding transportation events and event classification. Also added box with RCRA criteria. RLEP 1.1, Checklist 3.1 consistency.
e. Step 8, minor wording change. RLEP 1.1, Checklist 3.1 consistency.
f. Step 12 (new) regarding preservation of evidence at event scene. RLEP 1.1, Checklist 3.1 and MA-110, Exhibit A.16 consistency.
g. Renumbered all steps after 12.

20. Exhibit 12.5, ICP Communicator Checklist-
    a. Inserted new step 5, related to actions required if event does NOT reach EAL criteria. PNNL-MA-110, Exhibit A.17 consistency.
    b. Renumbered remaining steps.
    c. Step 15, editorial change coy to copy.
21. Exhibit 12.6, ICP Hazard Assessor Checklist
    a. Step 3, minor editorial change, RLEP 1.1, Checklist 3.9 consistency.
    b. Step 8, minor editorial change, RLEP 1.1, Checklist 3.9 consistency.
    c. Part 2, Step 8, added not regarding decision to transport injured and contaminated personnel. RLEP 1.1, Checklist 3.9 consistency.
22. Exhibit 12.7, Staging Area Supervisor Checklist-
    a. Step 2, Revised Warning regarding use of additional electronic equipment in bomb threats. RLEP 1.1, Checklist 3.11 consistency
    b. Added new step 7 to query staff regarding medications or medical conditions of which the BED needs to be made aware. Renumbered remaining steps. Change requested by SAS.
    c. Added new step to remind SAS to have RHA confirm habitability of staging area and ICP.
23. Exhibit 12.10, MSG Checklist
    a. Added a step to have the MSG Liaison get safe route of travel and be dispatched to ICP.
    b. Added new step for notifying BMI.(Their emergency number is (614) 424-4444)
    c. Added new step related to preservation of evidence.
24. Exhibit 12.11, Facility Operation Specialist Checklist
    a. Step 2, added statement to remind FOS to communicate

		location of event scene operations to the BED. RLEP 1.1, Checklist 3.13 consistency. 25. Exhibit 12.13, ICP Hazard Communicator checklist- a. Step 2 and 3, added shading to text boxes. RLEP 1.1, Checklist 3.10 consistency. b. Added new step 5 to provide PNNL exposure evaluator number for the hazard communicator if needed. 26. Exhibits 13.5, 6, 7 added new emergency equipment maps from the MIT. 27. Exhibit 14.1, 300 Area Protective Actions, revised table per RLEP 1.1, Appendix C, added 300 Area offsite Protective Actions & Recommendations. (nmm/lef)
4/15/05	1	Fixed page numbering to start at page 2 on second page. Updated Bill Buyers phone number to 376-5612. lef