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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter discusses security; inspection schedules; preparedness and prevention requirements; preventive procedures, structures, and equipment; and prevention of reaction of ignitable, reactive, and incompatible waste at LERF and ETF.

6.1 SECURITY [F-1]

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

6.1.1 Security Procedures and Equipment [F-1a]

The following sections describe the 24-hour surveillance system, barriers, and warning signs used to provide security and to control access to LERF and ETF.

6.1.1.1 24-Hour Surveillance System

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

6.1.1.2 Barrier and Means to Control Entry

The LERF and ETF are protected by the 200 East Area fence. Visitors are required to be escorted. The LERF is surrounded in its entirety by a separate 2.1 meter chain link fence topped with 3 strands of barbed wire extended outward at a 45 angle (referred to as the operational security fence). Access to the LERF is gained through two locked vehicular gates off the perimeter road. Gate keys are retained at the 242-A Evaporator and ETF shift offices.

Persons desiring entry to ETF process area must notify the control room. These persons also must have the appropriate facility-specific training, as defined in the Dangerous Waste Training Plan (Appendix 8A). The ETF personnel monitor all persons entering ETF and notify the Hanford Patrol of any attempted unauthorized entry. Immediate response by protective force personnel maintains the necessary security at the LERF and ETF.

6.1.1.3 Warning Signs

Signs bearing the legend "DANGER--UNAUTHORIZED PERSONNEL KEEP OUT," or an equivalent legend, are posted around the perimeter of LERF and ETF. The signs are in English, legible from a distance of 7.6 meters, and are visible from all angles of approach. In addition to these signs, the fences around the 200 East Area are posted with signs, printed in English, warning against unauthorized entry. These signs also are visible from all angles of approach.

6.1.2 Waiver [F-1b]

Waiver of the security procedures and equipment requirements for LERF and ETF are not requested. Therefore, WAC 173-303-310(1)(a) and (b) are not applicable to LERF and ETF.

6.2 INSPECTION PLAN [F-2]

This section describes the method and schedule for inspections of LERF and ETF. The purpose of inspections is to help ensure that situations do not exist that might cause or lead to the release of dangerous and/or mixed waste that could pose a threat to human health and the environment. Abnormal conditions identified by an inspection will be corrected on a schedule that prevents hazards to workers, the public, and the environment.

6.2.1 General Inspection Requirements [F-2a and F-2a(4)]

The content and frequency of inspections are described in this section. Inspection records are retained at the ETF, or other approved locations, for a minimum of 5 years.

In radioactive areas of the ETF, many inspections are performed remotely. Monitoring instruments are connected to audible alarms and visual indicators track alarm status. The monitoring system provides trending of selected monitoring data, graphics, and equipment summary displays.

A preventive maintenance recall system is employed to direct preventive maintenance activities at the LERF and the ETF. Equipment requiring maintenance is checked as indicated by the maintenance history and the manufacturer's recommendations. The preventive maintenance of certain equipment might not be possible if the LERF or the ETF is in an operational mode. Thus, the preventive maintenance could be performed slightly earlier or later than planned to minimize impact on operations.

Instrumentation at ETF is calibrated regularly to ensure accuracy and reliability. All process control instrumentation is calibrated on a schedule depending on previous calibration experience. An instrument calibration and recall system is employed to manage calibrations.

6.2.1.1 Types of Problems

Key components of the LERF inspection program include the following areas:

- Structural integrity of the basins
- Catch basin secondary containment system integrity
- Evidence of release from basins
- Safety, communications, and emergency equipment.

Key components of the ETF inspection program include the following areas:

- Condition of tanks and ancillary piping
- Condition of containers
- Condition of the process control equipment
- Condition of emergency equipment
- Condition of secondary containment.

Tables 6-1 and 6-2 provide a description of ETF items to be inspected.

6.2.1.2 Frequency of Inspections [F-2a(3)]

The frequency of inspections is based on the rate of possible deterioration of equipment and the probability of a threat to human health or the environment.
While in operation, the LERF is inspected weekly. The LERF also is inspected for run-on, run-off, cover integrity, and erosion problems after significant precipitation events. The ETF is inspected as indicated in Tables 6-1 and 6-2.

6.2.2 Specific Process Inspection Requirements [F-2d]

The following sections describe the specific process inspections performed at LERF and ETF.

6.2.2.1 Container Inspections [F-2d(1)]

Containers are used at the ETF to store solidified secondary waste, such as the powder waste from the thin film dryer and maintenance and operations waste. When containers are being held in the container storage area, the following inspection schedule is maintained:

- Daily visual inspection of container storage area for leaks, spills, accumulated liquids, and open or improperly sealed containers
- Weekly visual inspection of container labels to ensure labels are not obscured, removed, or otherwise unreadable
- Weekly visual inspection for deterioration of containers, containment systems, or cracks in protective coating or foundations caused by corrosion, mishandling, or other factors.

Following the inspections, an inspection datasheet is signed and dated by the inspector and supervisor.

6.2.2.2 Tank Inspections [F-2d(2)]

A description of the tank systems and ancillary equipment at the ETF is given in Chapter 4.0. Inspections and frequencies are given in Tables 6-1 and 6-2. This section includes a brief discussion of the inspections.

6.2.2.2.1 Overfill Protection. Tanks that have the possibility of being overfilled have level instrumentation that alarms before the tanks reach overflow. High tank level alarms annunciate in the control room, allowing operating personnel to take immediate action to stop the vessels from overfilling. These alarms are monitored continuously in the control room during solution transfers.

6.2.2.2.2 Visual Inspections. Visual inspections of tanks and secondary containments are performed to check for leaks, signs of corrosion or damage, and malfunctioning equipment. Inspections are performed on tanks and the secondary containment within the ETF and the surge tank and verification tank and associated secondary containment.

6.2.2.2.3 Secondary Containment Leak Detectors. The surge tank and verification tank secondary containment systems have sloped floors that drain solution to sumps equipped with leak detectors that alarms in the control room. These alarms are monitored continuously in the control room. If an alarm is activated, further investigation is performed to determine if the source is a tank leak or other solution (i.e., precipitation).

6.2.2.2.4 Integrity Assessments. The initial integrity assessment was issued in 1995 (Chapter 4.0). Consistent with the recommendations of the integrity assessment, a periodic integrity assessment program was developed for the ETF tanks and is discussed in detail in section 4.4.2 of Chapter 4.0.

6.2.2.2.5 Effluent Treatment Facility Piping. The ETF employs an extensive piping system. During inspections at the ETF, any aboveground piping is inspected visually for signs of leakage and for general structural integrity. During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

6.2.2.3 Surface Impoundments [F-2d(6)] and Condition Assessment [F-2d(6)(a)]

The following describes the surface impoundment inspections performed at LERF.

6.2.2.3.1 Overtopping Control [F-2d(6)(a)(1)]. Under current operating conditions, 1.34 meters of freeboard is maintained at each LERF basin, which corresponds to a normal operating level of 6.1 meters, or 24.6 million liters. Level indicators at each basin are monitored to confirm that this level is not exceeded.

Before an aqueous waste is transferred into a basin, administrative controls are implemented to ensure overtopping will not occur during the transfer. The volume of feed to be transferred is compared to the available volume in the receiving basin. The transfer is not initiated unless there is sufficient volume available in the receiving basin or a cut-off level is established. The transfer into the basin would be stopped when this cut-off level is reached.

The LERF basins also are provided with floating very low-density polyethylene covers that are designed and constructed to prevent overtopping by the introduction of precipitation and dust into the basins. Overtopping and flow control also are discussed in Chapter 4.0.

6.2.2.3.2 Impoundment Contents [F-2d(6)(a)(2)]. The LERF basins are inspected weekly to assess whether the contents are escaping from a basin. Level indicators are inspected weekly to check for unaccountable change in the level of the basins.

6.2.2.3.3 Leak Detection [F-2d(6)(a)(3)]. The leachate detection, collection and removal system is described in Chapter 4.0. The leachate collection sump pump is activated automatically when the liquid level in the leachate sump reaches a preset level. A flowmeter and totalizer measure the amount of leachate removed. An inspection is performed weekly where the totalizer reading and basin level reading are used to determine the leak rate per wetted surface area. The leak rate is compared to previous rates to see if leakage has increased.

The LERF employs a double-walled transfer piping between 242-A Evaporator and LERF and between LERF and ETF. The WAC 173-303-650 regulations do not require a discussion of piping for surface impoundments. However, for the purposes of comprehensive coverage of the LERF, inspections and integrity assessments are performed on the piping system. Aqueous waste (e.g., process condensate) is transferred from the 242-A Evaporator to the LERF via a buried pipeline. Likewise, aqueous waste is transferred to the ETF via buried pipelines. At the LERF dikes, aboveground piping serves to transfer waste from one basin to another.

The buried pipelines are normally continuously monitored during transfers by a leak detection system (Chapter 4.0). The alarms on the leak detection system are monitored in the 242-A Evaporator and ETF control rooms. As an alternative to continuous leak detection, the transfer lines can be inspected daily during transfers by opening the secondary containment drain lines at the LERF catch basins (for 242-A Evaporator transfers to LERF) and the surge tank (for LERF transfers to ETF) to inspect for leakage. During the routine inspections at LERF, the aboveground piping system is inspected for signs of leakage and for general structural integrity. During the visual inspection, particular attention is paid to valves and fittings for signs of cracking, deformation, and leakage.

6.2.2.3.4 Dike Erosion [F-2d(6)(a)(4)]. The LERF basins and dikes are visually inspected weekly and after storms for severe erosion or other signs of deterioration in the dikes from precipitation, wind, burrowing mammals, or vegetation.

6.2.2.3.5 Structural Integrity [F-2d(6)(b)]. A written certification attesting to the structural integrity of the basin dikes, signed by a qualified, registered professional engineer, is provided in Chapter 4.0.

6.2.2.3.6 Container Inspection [F-2b(1)]. Normal operation of the LERF does not involve the storage of dangerous waste in containers. Therefore, the inspection requirements of this section normally are not applicable to the LERF. Any containerized RCRA-regulated waste that might be generated at LERF will be brought to the ETF and managed in accordance with WAC 173-303-200(1) and is discussed in Section 6.2.2.1.

6.2.3 Inspection Log [F-2b and 2c]

Observations made and deficiencies noted during an inspection are recorded on inspection log sheets (also called turnover sheets). On completion, the log sheet includes the inspector's printed name, signature, date, and time; the log sheet is submitted for review and approval by ETF/LERF management or their designee, as required by operating procedures. Once approved, the log sheet is kept in LERF and ETF files. Inspection records are retained at the ETF, or other approved locations, for a minimum of 5 years. The inspection records are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion to mitigate health risks to workers, maintain integrity of the TSD units, and prevent hazards to public health and the environment.

If while performing an inspection, a leak or spill is discovered, facility management responds per the building emergency plan (Appendix 7A). Action is taken to stop the leak and determine the cause. The waste is removed from the secondary containment in a timely manner that prevents harm to human health and the environment.

6.2.4 Storage of Ignitable or Reactive Wastes [F-2d(3)]

The LERF could receive an aqueous waste that is designated reactive or ignitable. Any aqueous waste exhibiting these characteristics is managed (e.g., through blending in LERF) such that the waste no longer exhibits the reactive or ignitable characteristics.

Though unlikely, the ETF secondary waste might have the characteristics of being reactive or ignitable. The Hanford Fire Department performs annual fire inspections of the ETF using a checklist developed specifically for facilities that handle dangerous and/or mixed waste.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The following sections document the preparedness and prevention measures taken at LERF and ETF.

6.3.1 Equipment Requirements [F-3a]

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

6.3.1.1 Internal Communications

When operators are present at the LERF, the operators carry mobile (hand-held) two-way radios to maintain contact with 242-A Evaporator and ETF personnel. The operators at LERF are informed of emergency situations (e.g., building and/or area evacuations, take-cover events, high airborne contamination, fire, and/or explosion), and are provided with emergency instructions by several systems. These systems include the mobile two-way radios, and the telephone in the LERF instrument building.

The ETF is equipped with an internal communication system to provide immediate emergency instruction to personnel. The onsite communication system at the ETF includes telephones, mobile two-way radios, a public address system, and alarm systems. The telephone and radio systems provide for intraplant communication as well as external communication. Provisions are made to appropriately respond to various emergencies, including the following alarm-activated emergency situations: building evacuations, fire and/or explosion, loss of essential services, loss of ventilation, radioactive discharges, and high airborne contamination. Chapter 7.0 provides additional information on the response activities.

Immediate emergency instruction to personnel is provided by a public address system via speaker horns and ceiling-mounted speakers located throughout the building. The public address system is coupled to building telephone systems to provide telephone accessed voice paging. The ETF alarms are annunciated via elements of the public address system. The general telephone system, which carries various communication signals (e.g., telephone, crash alarm), is linked to the Hanford Site integrated voice data telecommunications system.

6.3.1.2 External Communications [F-3a(2)]

The LERF and its operators are equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or local emergency response teams, as necessary. External communication is made by either a telephone communication system or mobile two-way radios. The LERF telephone is available in the instrumentation building. Personnel assigned to emergency response organizations are reached in the following ways:

- Telephone number 911--is the contact point for the Hanford Site; on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders

- Telephone number 373-3800--single point of contact for the emergency duty officer; this number can be dialed from any Hanford Site telephone

- Two-way radio system--consists of hand-held; the system accesses the Hanford Site emergency network and can summon the Hanford Fire Department, Hanford Patrol, and/or any other assistance needed to deal with emergencies.

- The ETF is equipped with devices for summoning emergency assistance from the Hanford Fire Department and/or local emergency response teams as necessary. External communication is made via a telephone communication system or two-way radios.

Telephones are provided at numerous locations throughout the ETF. In addition, the following external communication systems are available for notifying persons assigned to emergency response organizations:

- Fire alarm pull boxes and fire sprinkler flow monitoring devices-- connected to a system monitored around the clock by the Hanford Fire Department

- Telephone number 911--contact point for the Hanford Site; on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders

- Telephone number 373-3800--single point of contact for the emergency duty officer; this number can be dialed from any Hanford Facility telephone

- Crash alarm telephone system--consists of selected telephones that automatically are disassociated from the regular system and connected to control stations

- Priority message system (Management Bulletin)--a network of telefax machines used to disseminate information to personnel

- The DOE-RL radio system--radio systems and frequencies available for emergency communications.

6.3.1.3 Emergency Equipment [F-3a(3)]

The LERF and ETF rely primarily on the Hanford Fire Department to respond to fires and other emergencies. The Hanford Fire Department is capable of providing rapid response to fires within the 200 East Area. All LERF and ETF operators are familiar with the LERF and ETF contingency plans (Chapter 7.0) and are trained in the use of emergency pumping, fire, and communications equipment. The Hanford Site maintains a sufficient inventory of heavy equipment (i.e., bulldozers, cranes, road graders) for emergency response.

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment are available at various locations in the ETF.

Fire control equipment is available at the ETF and could include the following:

- Fire extinguishers (all-utility use, dry chemical), good for use on small fires
- Automatic fire suppression systems installed in the ETF control room and electrical room
- Fire alarm pull boxes
- A water spray system is installed in the operating and administrative portions of the ETF.

Respirators, hazardous material protective gear, and special work procedure clothing for ETF personnel are kept in the change room at the ETF. Safety showers are located in convenient locations in the ETF. Portable emergency eye washes are used at the ETF. Water for these devices is supplied from the ETF sanitary water system.

6.3.1.4 Water for Fire Control [F-3a(4)]

A water main is not provided to the LERF. Water for fire control is supplied by the Hanford Fire Department trucks for fires requiring high water volume and pressure. Each fire station normally has a truck equipped with a hydraulically operated aerial ladder, and one pumper (backup fire engine, without a boom, that is used if the aerial ladder is inoperable). Fire engines have a pumping capacity of at least 5,600 liters of water per minute. Other fire protection equipment uses chemicals rather than water as an extinguishing media.

The ETF is serviced by two 12-inch raw water lines that are tied into the 200 East Area raw water distribution grid. These lines provide a looped configuration that supplies two independent sources of raw water for fire protection and raw water uses. Connections from the ETF raw water system supply fire hydrants and the wet-pipe sprinkler system.

In the event that water pressure is lost, the Hanford Fire Department is equipped with fire engines to provide needed water.

6.3.2 Aisle Space Requirement [F-3b]

The operation of the LERF does not involve aisle space. Nevertheless, the LERF and the individual basins are easily accessible to emergency response personnel and vehicles. A 6.1-meter-wide service road runs along the base of the basin area on the east, south, and west sides within the operational security fence.

Aisle spacing at ETF is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association and the Life Safety Code (NFPA 1996) for the protection of personnel and the environment. A minimum 0.76-meter aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

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

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

6.4.1 Unloading Operations, Spill Prevention, and Control [F-4a]

Underground pipelines that transfer aqueous waste to and from the LERF are encased in a secondary pipe. If a leak is detected in a pipeline, flow in the pipeline will be stopped and the cause of the leak investigated and remediated.

If it is required to transfer aqueous waste from one LERF basin to another, submersible pumps are located in risers at the northwest corner of a basin. Valves are closed or opened depending on the direction of the fluid transfer. Pumps are started, providing a cumulative flow of between 2,000 and 3,000 liters per minute into another basin.

The ETF Load-In Station is monitored continuously during tank-filling operations and filling is stopped immediately if leaks occur. Care is taken to ensure that even minor leaks are cleaned up immediately and disposed of in accordance with approved management procedures. Any spill that is determined to be a dangerous waste will be managed according to the requirements of WAC 173-303.

6.4.2 Run-Off [F-4b]

The LERF is constructed and operated to ensure that all aqueous waste is contained within the basins. The basins are designed and operated to prevent overtopping (Section 6.2.2.3.1). Furthermore, the basins are provided with very low-density polyethylene floating covers to prevent the introduction of precipitation into the basins. The basins also are graded to ensure that all precipitation outside the basins is directed away from the surface impoundments.

The basins are constructed so that the top of the basin dikes are approximately 3 meters abovegrade. The exterior side slopes of the basins have a 2.25 (horizontal) to 1 (vertical) slope. Run-on of precipitation to the basins from the surrounding area is not possible because the surrounding area slopes away from the LERF.
Dangerous waste and hazardous chemical handling areas at the ETF are designed to contain spills, leaks, and wash water, thereby preventing run-off and subsequent releases. All dangerous and/or mixed waste

loading and unloading areas are provided with secondary containment structures as described in Chapter 4.0.

6.4.3 Water Supplies [F-4c]

The LERF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The LERF is monitored closely during operation to detect abnormal conditions (e.g., leaks), and regularly inspected to detect equipment and structural deteriorations that could allow possible water supply contamination. The basins are provided with a leachate collection system that is designed to contain any leachate generated. These systems, in conjunction with the double-composite liner system and underlying low permeable clay liner, ensure that should a release occur, the release will be fully contained within the basin configuration and, therefore, water supplies will be protected. Appendix 7A provides information on procedures that are implemented if a release is detected at the LERF.

There are no drinking water wells near the ETF. Therefore, a release would not immediately contaminate drinking water supplies. The ETF uses operating practices, structures, and equipment to prevent the contamination of natural water supplies (i.e., groundwater and surface water). The ETF is monitored during operation to detect abnormal conditions, and is inspected regularly to detect equipment and structural deteriorations that could allow spills to the environment. Areas in contact with dangerous and/or mixed waste are monitored continuously during operation through a series of level and pressure indicators, leak detection alarms, equipment failure alarms, and control panel readouts. In addition, the ETF is inspected regularly for the presence of leaks or other offnormal conditions wherever possible (in all areas that can be safely entered).

In addition to detailed operating practices, structures and equipment are used at the ETF to prevent contamination of water supplies. The structures and equipment designed to prevent contamination of water supplies are the same as the structures and equipment used to prevent run-off from dangerous and/or mixed waste handling areas.

6.4.4 Equipment and Power Failure [F-4d]

The storage function of the LERF is not affected by loss of power and a temporary loss of power would not pose a threat to the environment. Loss of electrical power would not cause the storage of the waste to be jeopardized. For process condensate transferred from the 242-A Evaporator, appropriate valving procedures are followed to ensure a smooth restart of the flow to the LERF in the event of a power failure at the 242-A Evaporator. Pump equipment failure is addressed by operations personnel at the 242-A Evaporator.

The ETF does not have a standby power source. Power to selected lighting, computers, and process controls is configured with an uninterruptible power supply. During partial loss of normal power, the effected pumps and subsystems will be shut down. Complete loss of power to the ETF shuts down the entire ETF except for the instruments in the control room connected to the uninterruptible power supply. Redundant pumps allow the process to continue to operate when only one component is out of service.

When power at the ETF is lost, the valves assume a fail-safe position to allow the process to remain in a safe shutdown mode until restoration of power. This action allows the operators to perform equipment surveys during shutdown and to confirm that there are no safety issues because the ETF is shut down. Because a power failure would also shutoff flow into the ETF, there will not be any increase in volume in any of the holdup basins, tanks, or other systems.

A combination of reliability, redundancy, maintenance, and repair features are used in the ETF equipment and systems to minimize random failure of equipment. For crucial systems such as ventilation filters, redundant trains are provided to mitigate equipment and system failure. Spare parts are maintained for essential production and safety equipment.

6.4.5 Personnel Exposure [F-4e]

At the LERF and ETF, operating practices, structures, and equipment are used to prevent undue exposure of personnel to dangerous and/or mixed waste. Protective clothing and equipment are used by all personnel handling waste. All operations are conducted so that exposure to dangerous and/or mixed waste, and hazardous and radioactive materials are maintained ALARA.

Protective clothing and equipment are prescribed for personnel handling chemicals or dangerous waste. Before the start of any operation that could expose personnel to the risk of injury or illness, a review of the operation is performed to ensure that the nature of hazards that might be encountered is considered and appropriate protective gear is selected. Personnel are instructed to wear personal protective equipment in accordance with training, posting, and instructions.

A change trailer at LERF is located between basins 42 and 43. In addition, the change trailer has an operations office for working with procedures. Exits within the change trailer are clearly marked. A storage building is located within the perimeter fence, northwest of the basins. The LERF storage building also is provided with separate storage areas for clean and contaminated equipment. A decontamination shower and decontamination building is located at the 272-AW Building, approximately 1.6 kilometers from the LERF or at the ETF.

The ETF has eyewash stations and safety showers in convenient locations for use by personnel. The following structures and equipment were incorporated into the ETF design to minimize personnel exposure.

- Offices, control room, clean- and soiled-clothes storage areas, change rooms, and the lunchroom are situated to minimize casual exposure of personnel.

- Building exit pathways are located to provide rapid egress in emergency evacuations.

- Emergency lighting devices are located strategically throughout the ETF.

- Audio and/or visual alarms are provided for all room air samplers, area alarms, and liquid monitors. Visual readouts for these alarm systems are located in less contaminated areas to minimize exposure to personnel.

- Areas for decontaminating and maintaining equipment are provided in contaminated areas to limit the spread of contamination to uncontaminated areas such as the control room.

- Instrument interlock systems are provided that automatically return process operations to a safe condition if an unsafe condition should occur.

- The ETF ventilation systems are designed to provide air flow from uncontaminated zones to progressively more contaminated zones.

Whenever possible, exposures to hazards are controlled by accepted engineering and/or administrative controls. Protective gear is used where effective engineering or administrative controls are not feasible.

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

Typically aqueous waste managed at the LERF or ETF does not display the characteristics of reactivity or ignitability. Any aqueous waste streams exhibiting these characteristics are blended or mixed at LERF to a concentration where the waste no longer exhibits reactive or ignitable characteristics.

No incompatible aqueous waste is expected to be stored or treated at the LERF or ETF (Chapter 3.0). Therefore, the requirements of WAC 173-303-806(4)(a) are not applicable.

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Table 6-1. Visual Inspection Schedule for the ETF.

(Sheet 1 of 2)

1	Item	Inspection	Frequency	Inspected by
2	Main Treatment Train			
3	Surge tank system	Inspect area for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily	Process operator
4	Rough filter	Inspect for leaks.	Daily*	Process operator
5	Ultraviolet oxidation system	Inspect module for leaks. Inspect peroxide storage tank, ancillary equipment for leaks.	Daily*	Process operator
6	pH adjustment tank	Inspect tank and ancillary equipment for leaks.	Daily*	Process operator
7	H_2O_2 decomposer	Inspect tank and ancillary equipment for leaks.	Daily*	Process operator
8	Fine filter	Inspect module for leaks.	Daily*	Process operator
9	Degasification system	Inspect module for leaks. Note any unusual noises or vibration from the degasification blower.	Daily*	Process operator
10	Reverse osmosis system	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps.	Daily*	Process operator
11	Polishers	Inspect tanks and ancillary equipment for leaks.	Daily*	Process operator
12	Effluent pH adjustment tank	Inspect tank and ancillary equipment for leaks.	Daily*	Process operator
13	Verification tanks	Inspect tanks and ancillary equipment for leaks. Note any unusual noises or vibration from the system pumps. Inspect secondary containment system for signs of deterioration.	Daily	Process operator
14	Secondary Treatment Train			
15	Secondary waste receiving tank	Inspect tank and ancillary equipment for leaks.	Daily	Process operator
16	ETF evaporator	Inspect tank and equipment for leaks. Note any unusual noises or vibration from the system pumps or compressor.	Daily*	Process operator
17	Concentrate tank	Inspect tank and ancillary equipment for leaks.	Daily*	Process operator
18	Thin film dryer	Inspect tanks and ancillary equipment for leaks (viewed through camera). Note any unusual noises or vibration from the system pumps or blower.	Daily*	Process operator
19	Container handling	Inspect area for spills, leaks, accumulated liquids.	Daily	Process operator
20	Container handling	Inspect for deterioration of containers and secondary containment, including corrosion and cracks in secondary containment foundation and coating. Inspect container labels to ensure that they are readable.	Weekly	Process operator

Table 6-1. Visual Inspection Schedule for the ETF.
(Sheet 2 of 2)

Item	Inspection	Frequency	Inspected by
Resin dewatering	Inspect module for leaks. Note any unusual noises or vibration form the system pumps or blower.	Daily*	Process operator
Support Systems			
Vessel ventilation system	Inspect filters (HEPA and pre-filters), check vessel off-gas pressures, system flow, and discharge temperatures.	Daily	Process operator
Sump tank system	Inspect sump trenches for unexpected liquids which indicate spills or leaks from process equipment.	Daily	Process operator
Safety Systems			
Eye wash stations	Check status; check for adequate pressure.	Monthly	Process operator
Safety showers	Check status; check for adequate pressure.	Monthly	Process operator
Emergency Systems			
Fire extinguishers	Check for adequate charge.	Monthly	Process operator
Emergency lighting	Test operability.	Monthly	Process operator
Processing Area			
Uninterruptible power supply	Check output voltage and visually inspect battery pack for corrosion and leakage. Check indicator lights for fault conditions.	Annually	Electrician/ process operator

* Stated inspection frequency to be performed only during ETF operations.

HEPA – High efficiency particulate air

Table 6-2. Inspection Plan for Instrumentation Monitoring

(Sheet 1 of 2)

Item	Inspection	Frequency	Inspected by
	Main Treatment Train		
Leak detector LAH-20B009	Monitor for leakage in the surge tank drainage sump.	Continuously	Computer Process Operator
Level alarm LAH-60A013	Monitor surge tank level to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60C-111	Monitor liquid levels in the pH adjustment tank to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60F-101	Monitor liquid levels in the first RO feed tank to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60F-201	Monitor liquid levels in the second RO feed tank to prevent overflow.	Continuously	Computer Process Operator
Level alarms LAHL-60F-211	Monitor liquid levels in the effluent pH adjustment tank to prevent overflow.	Continuously	Computer Process Operator
Level transmitter LAHX-60H001A/B/C	Monitor liquid level in verification tanks to prevent overflow.	Continuously	Computer Process Operator
Leak detector LAH-20B010	Monitor for leakage in the verification tank drainage sump.	Continuously	Computer Process Operator
	Secondary Treatment Train		
Level alarm LAHL-60I-001A/B	Monitor liquid levels in secondary waste receiver tanks A and B to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60J-001A/B	Monitor liquid levels in concentrate tanks A and B to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60I-107	Monitor liquid levels in the evaporator tank to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60J-036	Monitor liquid levels in the spray condenser tank to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAHL-60I-108	Monitor liquid levels in the distillate flash tank to prevent overflow.	Continuously	Computer Process Operator
Level alarm LAH-60I-119	Monitor liquid levels in the entrainment separator tank to prevent overflow.	Continuously	Computer Process Operator
Level transmitter LAH-20B001	Monitor liquid level in sump tank No. 1 to prevent overflow.	Continuously	Computer Process Operator
Level transmitter LAH-20B002	Monitor liquid level in sump tank No. 2 to prevent overflow.	Continuously	Computer Process Operator

Table 6-2. Inspection Plan for Instrumentation Monitoring
(Sheet 2 of 2)

Item	Inspection	Frequency	Inspected by
Leak detector LAH-20B003	Monitor for leakage to sump No. 1.	Continuously*	Computer Process Operator
Leak detector LAH-20B005	Monitor for leakage to sump No. 2.	Continuously*	Computer Process Operator
Leak detector	Monitor for leakage from pipeline between ETF and load-in station.	Continuously*	Computer Process Operator
Leak detector	Monitor for leakage from pipeline between ETF and LERF.	Continuously*	Computer Process Operator
Leak detector	Monitor for leakage from pipeline between LERF and the 242-A Evaporator.	Continuously*	Computer Process Operator

* In the event of a malfunction of one of the electronic leak detectors, daily visual inspections will be performed while the facilities are in operation.

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7.0 CONTINGENCY PLAN [G] 7-1

APPENDIX

7A BUILDING EMERGENCY PLAN FOR THE LIQUID EFFLUENT RETENTION FACILITY AND 200 AREA EFFLUENT TREATMENT FACILITY .... APP 7A-i

TABLE

7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3) T7-1

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7.0 CONTINGENCY PLAN [G]

The WAC 173-303 requirements for a contingency plan are satisfied in the following documents: Portions of the *Hanford Emergency Response Plan* [Attachment 4 of the Hanford Facility RCRA Permit (DW Portion)] and portions of the *Building Emergency Plan for the Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility* (Appendix 7A).

The unit-specific building emergency plan also serves to satisfy a broad range of other requirements [e.g., Occupational Safety and Health Administration standards (29 CFR 1910), TSCA (40 CFR 761) and U.S. Department of Energy Orders]. Therefore, revisions made to portions of this contingency plan document that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to WAC 173-303-830 or Hanford Facility RCRA Permit (DW Portion) Condition I.C.3. Table 7-1 identifies which portions of the Building Emergency Plan are written to meet WAC 173-303 contingency plan requirements.

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Table 7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3). (sheet 1 of 2)

Requirement	Attachment 4 of the HF RCRA Permit (DW Portion).	Building Emergency Plan
-350(3)(a) - A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360.	X[1] Section 1.3.2	X[1] Section 7.1 through 7.3
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[1] Section 1.3.2	X[1,2] Section 7.2
-350(3)(c) - A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Table 3-1	
-350(3)(d) - A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application.		X[3] Section 13.0
-350(3)(e) - A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	X Hanford Fire Department: Appendix C	X Section 9.0

Table 7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3). (sheet 2 of 2)

Requirement	Attachment 4 of the HF RCRA Permit (DW Portion).	Building Emergency Plan
-350(3)(f) - An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[4] Figure 5-2	X[5] Section 1.5

[1]The *Hanford Emergency Response Plan* contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required if emergency planning activities are addressed. If other credible scenarios exist or if emergency procedures at the unit are different, the language contained in the Building Emergency Plan will be used during an event by a Building Emergency Director.

[2]This requirement only applies to TSD units which receive shipment of dangerous or mixed waste defined as off-site shipments in accordance with WAC 173-303.

[3]Emergency Coordinator names and home telephone numbers are maintained separate from any contingency plan document, on file in accordance with Hanford Facility RCRA Permit, DW Portion, General Condition II.A.4. and is updated, at a minimum, on a monthly basis.

[4]The Hanford Facility (sitewide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[5]An evacuation route for the TSD unit must be provided. Evacuation routes for occupied buildings surrounding the TSD unit are provided through information boards posted within buildings.

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14.0 PART B CERTIFICATION [K]
Modification D 14-3

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14.0 PART B CERTIFICATION [K]
Modification D

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.

Owner/Operator — Date: 5/22/98
John D. Wagoner, Manager
U.S. Department of Energy
Richland Operations Office

Co-operator* — Date: May 14, 1998
H. J. Hatch,
President and Chief Executive Officer
Fluor Daniel Hanford Company

Note: This certifies the following: Chapter 1.0 (Part A), Revision 0A; Chapter 4.0 (Process Information), Revision 0A, Chapter 7.0 (Contingency Plan), Revision 0A; Appendix 3A (Waste Analysis Plan for Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility), Revision 0A; Appendix 7A (Building Emergency Plan for 200 Area Effluent Treatment Facility and Liquid Effluent Retention Facility, HNF-IP-0263-ETF), Revision 4.

* Fluor Daniel Hanford, Inc. is responsible for information presented in Chapters 1.0 through 4.0 and 6.0 through 15.0, including the associated appendices.

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APPENDIX 3A

WASTE ANALYSIS PLAN FOR LIQUID EFFLUENT RETENTION FACILITY AND 200 AREA EFFLUENT TREATMENT FACILITY

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METRIC CONVERSION CHART

Into metric units — Out of metric units

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

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

1.0 INTRODUCTION

In accordance with the federal and state regulations set forth in 40 Code of Federal Regulations (CFR) 264.13 and in Washington State Department of Ecology (Ecology) *Dangerous Waste Regulations*, Washington Administrative Code (WAC) 173-303-300, this waste analysis plan (WAP) has been prepared for operation of the Liquid Effluent Retention Facility (LERF) and the 200 Area Effluent Treatment Facility (ETF) located in the 200 East Area on the Hanford Site, Richland, Washington.

The purpose of this WAP is to document the sampling and analytical methods, and describe the procedures which are utilized for all dangerous wastes that are managed in the specific treatment storage, and disposal (TSD) units identified in the Part A, Form 3, permit application for the LERF and the ETF (DOE/RL-97-03). This WAP also documents the requirements for generators of aqueous wastes that will be sent to the LERF or ETF for treatment. Throughout this WAP, the term generator includes any Hanford Site unit, including TSD units, whose process produces an aqueous waste.

The TSD units include a surface impoundment (LERF) which provides treatment and storage, a tank system at the ETF which provides treatment and storage, and a container management area at the ETF which provides drum storage and treatment. Additionally, this WAP discusses the sampling and analytical methods the treated effluent (treated aqueous waste) that is discharged from the ETF as a non-dangerous, delisted waste to the State-Approved Land Disposal Site (SALDS). Specifically, the WAP delineates the following:

- Influent Waste Acceptance Process - determines the acceptability of a particular aqueous waste at the LERF or ETF pursuant to applicable permit conditions, regulatory requirements, and operating capabilities prior to acceptance of the waste at the LERF or ETF for treatment or storage. See Section 2.0.

- Special Management Requirements - identifies the special management requirements for aqueous wastes managed in the LERF or ETF.
  See Section 3.0.

- Influent Aqueous Waste Sampling and Analysis - describes influent sampling and analyses used to characterize an influent aqueous waste to ensure proper management of the waste and for compliance with the special management requirements. Also includes rationale for analyses. See Section 4.0.

- Treated Effluent Sampling and Analysis - describes sampling and analyses of treated effluent (i.e., treated aqueous waste) for compliance with State Waste Discharge Permit (Ecology 1995a) and Final Delisting [40 CFR 261, Appendix IX, Table 2 (EPA, 1995)] limits. Also includes rationale for analyses. See Section 5.0.

- ETF Generated Waste Sampling and Analysis - describes the sampling analyses used to characterize the secondary waste streams generated from the treatment process and to characterize waste generated from maintenance and operations activities . Also includes rationale for analyses. See Section 6.0.

- Quality Assurance and Quality Control - ensures the accuracy and precision of sampling and analysis activities. See Section 7.0.

This WAP is designed to meet the specific requirements of the following:

- Land Disposal Restrictions Treatment Exemption for the LERF under 40 CFR 268.4, U.S. Environmental Protection Agency, December 6, 1994 (Appendix C)

- Final Delisting for the ETF, 40 CFR 261, Appendix IX, Table 2 (EPA 1995)

- Washington State Waste Discharge Permit, No. ST 4500, as amended, (Ecology 1995a)

- *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste*, Hanford Facility Permit WA7890008967, September 28, 1994 (Ecology 1994).

This plan also was designed to include the specific elements of a WAP, as identified in the *Dangerous Waste Permit Application Requirements* (Ecology 1996a). Groundwater monitoring is addressed in separate plans. A copy of this WAP will be available at the ETF at all times.

Throughout this WAP, reference is made to radioactive waste. Although the treatment and storage of radioactive waste (i.e., source, special nuclear, and by-product materials as defined by the *Atomic Energy Act of 1954*) are not within the scope of the *Resource Conservation and Recovery Act* (RCRA) *of 1976*, as amended or WAC 173-303, information is provided for general knowledge where appropriate. Additionally, the conditions of the Washington State Discharge Permit, No. ST 4500 (Discharge Permit) are included in this WAP for completeness, though they also are not within the scope of RCRA or WAC 173-303. Therefore, revisions of this WAP that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology. However, any revisions to this WAP will be incorporated into the Hanford Dangerous Waste Permit at least annually through the modification process.

1.1 LIQUID EFFLUENT RETENTION FACILITY AND EFFLUENT TREATMENT FACILITY DESCRIPTION

The LERF and ETF comprise an aqueous waste treatment system located in the 200 East Area (Figure 1-1). Both LERF and the ETF may receive aqueous waste through several inlets. The ETF generally receives aqueous waste directly from the LERF. However, aqueous waste also can be transferred from the Load-In Station to the ETF. The Load-In Station is located just east of the ETF and currently consists of two 37,854-liter storage tanks and a pipeline that connects to either LERF or the ETF through fiberglass pipelines with secondary containment.

The LERF can receive aqueous waste through four inlets. First, aqueous waste can be transferred to LERF through a pipeline from the 200 West Area. Second, aqueous waste can be transferred through a pipeline that connects LERF with the 242-A Evaporator. Third, aqueous waste also can be transferred to LERF from a pipeline that connects LERF to the Load-In Station at the ETF. Finally, aqueous waste can be transferred into LERF through a series of sample ports located at each basin.

The LERF consists of three lined surface impoundments with a nominal capacity of 29.5 million liters each. Aqueous waste from LERF is pumped to the ETF through a double-walled fiberglass pipeline. The pipeline is equipped with leak detection located in the annulus between the inner and outer pipes. Each basin is equipped with six available sample risers constructed of 6-inch perforated pipe. A seventh sample riser in each basin is dedicated to influent waste receipt piping, and an eighth riser in each basin contains liquid level instrumentation. Each riser extends along the sides of each basin from the top to the bottom of the basin. Detailed information on the construction and operation of the LERF is provided in Chapter 4.0 of the *Hanford Facility Dangerous Waste Permit Application, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility* (DOE/RL-97-03).

The ETF was designed to treat the contaminants anticipated in process condensate (PC) from the 242-A Evaporator and other aqueous wastes from the Hanford Site. Section 1.2 provides more information on the sources of these wastes.

The capabilities of the ETF were confirmed through pilot plant testing. A pilot plant was used to test surrogate solutions that contained constituents of concern anticipated in aqueous wastes on the Hanford Site. The pilot plant testing served as the basis for a demonstration of the treatment capabilities of the ETF in the *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72). The pilot plant test data also were used to establish that the ETF provides 'best available treatment and all known, available, and reasonable methods of treatment' (BAT/AKART), as required in the permitting of the ETF under the state water quality and wastewater discharge permit regulations (WAC 173-200 and WAC 173-216, respectively).

The ETF consists of a primary and a secondary treatment train (Figure 1-2). The primary treatment train removes or destroys dangerous and mixed waste components from the aqueous waste. In the secondary treatment train, the waste components are concentrated and dried into a powder. This waste is containerized, and transferred to a waste treatment, storage, and/or disposal (TSD) unit.

Each treatment train consists of a series of operations. The primary treatment train includes the following:

- Surge tank
- Rough filter
- Ultraviolet light oxidation (UV/OX)
- pH adjustment
- Hydrogen peroxide decomposer
- Fine filter
- Degasification
- Reverse osmosis (RO)
- Polisher [ion exchange (IX) column]
- Final pH adjustment and verification.

The secondary treatment train uses the following systems:

- Secondary waste receiving tanks
- Evaporator (mechanical vapor recompression)
- Concentrate tank
- Thin film dryer

- Container handling
- Supporting systems.

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. The secondary waste treatment system typically receives and processes by-products generated from the primary treatment train. However, in an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train. Detailed information on the treatment trains and the unit operations is provided in Chapter 4.0 of the dangerous waste permit application for the LERF and ETF (DOE/RL-97-03).

The treated effluent is contained in verification tanks where the effluent is sampled [PERMIT REQUIRED CHANGE], and held until the analytical results confirm that the effluent meets the 'delisting' criteria. Under 40 CFR 261, Appendix IX, Table 2, the treated effluent from the ETF is considered a delisted waste; that is, the treated effluent is no longer a dangerous or hazardous waste subject to the hazardous waste management requirements of RCRA. The treated effluent is discharged under the Discharge Permit as a nondangerous, delisted waste to the SALDS, located in the 600 Area, north of the 200 West Area (Figure 1-1).

1.2 SOURCES OF AQUEOUS WASTE

The ETF was intended and designed to treat a variety of radioactive and/or aqueous mixed wastes. However, during the initial phases of developing the dangerous waste permit application for the LERF and ETF, PC from the 242-A Evaporator was the only mixed waste identified for storage and treatment in the LERF and the ETF. As cleanup activities at Hanford progress, many of the aqueous wastes generated from site remediation and waste management activities will be sent to the LERF and ETF for treatment and storage.

The PC is a dangerous waste because it is derived from a listed, dangerous waste stored in the Double-Shell Tank (DST) System and because of the ammonia content. The DST waste is transferred to the 242-A Evaporator where the waste is concentrated through an evaporation process. The concentrated slurry waste is returned to the DST System, and the evaporated portion of the waste is recondensed, collected, and transferred as PC to the LERF.

Other aqueous wastes that will be treated and stored at the LERF and ETF include, but are not limited to the following Hanford wastes: contaminated groundwater from pump-and-treat remediation activities such as groundwater from the 200-UP-1 Operable Unit; water from deactivation activities such as water from the spent fuel storage basins at deactivated reactors (e.g., N Reactor); laboratory aqueous waste from unused samples and sample analyses; and leachate from landfills, such as the Environmental Restoration Disposal Facility.

Most of these aqueous wastes will be accumulated in batches in a LERF basin for interim storage and treatment through pH and flow equalization before final treatment in the ETF. However, some aqueous wastes, such as 200-UP-1 Groundwater, may flow through LERF en route to the ETF for final treatment. The constituents in these aqueous wastes are common to the Hanford Site and were considered in pilot plant testing or in vendor tests, either as a constituent or as a family of constituents.

Some of the aqueous wastes could contain tritium, a radioactive isotope of hydrogen. Because there is no economically, viable treatment technology available to remove tritium, tritium is not reduced in the treated effluent discharged to the SALDS.

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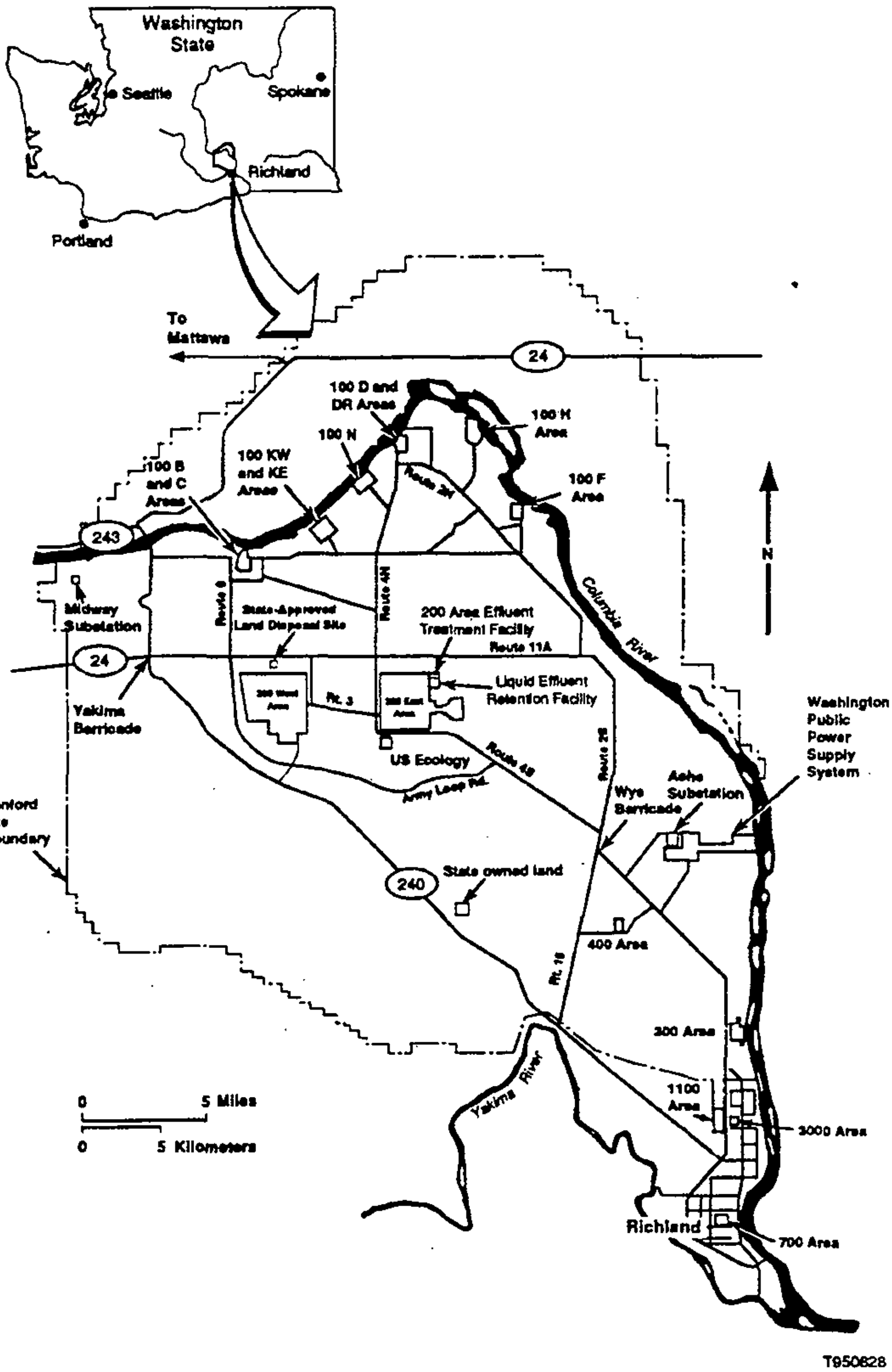

Figure 1-1. Location of the Liquid Effluent Retention Facility, the 200 Area Effluent Treatment Facility, and the State-Approved Land Disposal Site.

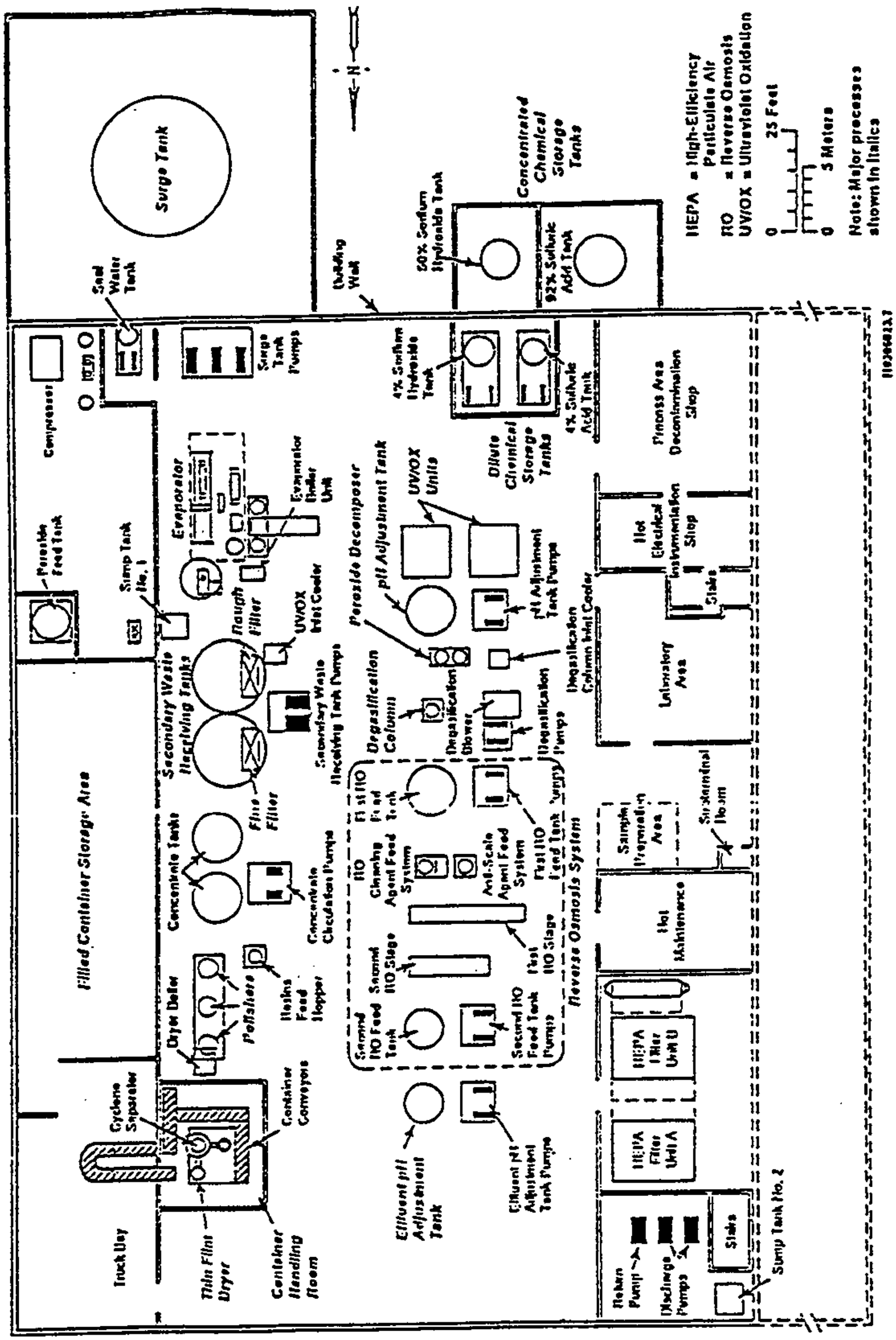

Figure 1-2. 200 Area Effluent Treatment Facility Floor Plan.

2.0 INFLUENT WASTE ACCEPTANCE PROCESS

Throughout the acceptance process, there are certain criteria that must be met for an influent waste (i.e., aqueous waste) to be accepted. These criteria are identified in the following sections and summarized in Table 2-2. It should be noted that if an aqueous waste initially does not meet these criteria, it is not necessarily rejected. In many instances, the ETF process or the LERF and ETF permits can be modified to accommodate the treatment and storage of that waste. A discussion of the re-evaluation process is provided in Section 2.3.

The first step in the waste acceptance process is for the generator to provide information on the influent waste stream. At this stage, the generator will work with LERF/ETF personnel to define what information must be provided to determine the acceptability of an aqueous waste for the treatment, storage, or disposal at the LERF and the ETF. At a minimum, the information required by WAC 173-303-300(2) will be obtained, which includes sampling and analysis of the aqueous waste stream. The LERF/ETF management will evaluate, on a case-by-case basis, whether the aqueous waste stream is acceptable for storage and treatment. The waste acceptance process contains the following steps.

Acceptance Process is performed as follows.

- Waste information--the generator of an aqueous waste works with LERF/ETF personnel to provide detailed information on the waste stream, i.e., a waste characterization.

- Waste management decision process--LERF/ETF management decision is based on a case-by-case evaluation of whether an aqueous waste stream is acceptable for treatment or storage, or whether to reject a stream. In addition, any special management practices required for an accepted stream may be specified at this time. The evaluation is divided into two categories.

  - **Regulatory acceptability**--a review to determine if there are any regulatory concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or ETF; e.g., treatment would meet permit conditions that would be in compliance with applicable regulations.

  - **Operational acceptability**--an evaluation to determine if there are any operational concerns that would prohibit the storage or treatment of an aqueous waste in the LERF or ETF; e.g., determine treatability and compatibility or safety considerations.

  Specific waste acceptance criteria are defined within the individual discussions on regulatory and operational acceptability.

Re-evaluation Process is performed to ensure the characterization is accurate and current. This process also provides a mechanism for re-evaluating an aqueous waste stream that does not meet the waste acceptance criteria.

Record Information/Decision Process--provides that information used in the decision, the evaluation, and the decision are documented as part of the ETF Operating Record.

2.1 ACCEPTANCE PROCESS

When an aqueous waste stream is identified for treatment or storage in the LERF or ETF, the generator is required to characterize the waste and document the characterization on an aqueous waste profile sheet (WPS). This requirement is the first waste acceptance criterion. The LERF and the ETF personnel work with the generators to ensure that the necessary information is collected for the characterization of a waste stream (i.e., the appropriate analyses or adequate process knowledge), and that the information provided on the WPS is complete. The completed WPS is maintained at the ETF.

2.1.1 Waste Characterization

Because the constituents in the individual aqueous waste streams vary, each stream is characterized and evaluated for acceptability on a case-by-case basis. The generator is required to designate an aqueous waste which generally will be backed up by analytical data. However, a generator may use process knowledge to substantiate the waste designation, or for general characterization information. Examples of acceptable process knowledge include the following:

- Documented data or information on processes similar to that which generated the aqueous waste stream

- Information/documentation that dangerous waste constituents are from specific, well documented processes, e.g., F-listed wastes

- Information/documentation that sampling/analyzing a waste stream would pose health and safety risks to personnel

- Information/documentation that the waste does not lend itself to collecting a laboratory sample.

When a generator submits process knowledge for the characterization of a dangerous and/or mixed waste stream, the process knowledge is reviewed by LERF and ETF personnel as part of the waste acceptance process. Specifically, LERF and ETF personnel review the generator's processes to verify the integrity of the process knowledge, and determine whether the process knowledge is current and consistent with current regulations. The final decision on the adequacy of the process knowledge is determined by LERF/ETF management or their designee. The persons reviewing generator process knowledge and those making decisions on the adequacy of process knowledge are trained according to the requirements of the Dangerous Waste Training Plan [Chapter 8.0 of the dangerous waste permit application for the LERF and ETF (DOE/RL-97-03)].

The generator is also responsible for identifying those Land Disposal Restrictions (LDR) that would be applicable to the influent aqueous waste as part of the characterization, as require under 40 CFR 268.40 and WAC 173-303-140. Because the ETF is a Clean Water Act - equivalent TSD unit (40 CFR 268.37(a)), the generator is not required to identify the underlying hazardous constituents (40 CFR 286.48).

When analyzing an aqueous waste stream for characterization, a generator is required to use the target list of parameters identified in Table 4-1 (Section 4.0). The corresponding analytical methods are provided in Appendix B. The generator may use process knowledge in lieu of some analyses, as determined by LERF/ETF management or their designee, if the process knowledge is adequate (as described above). For example, if a generator provides information that the process generating an aqueous waste does not include or involve organic chemicals, analyses for organic compounds likely would not be required. Additional analyses could be required if historical information and/or process knowledge indicate that an aqueous waste contains constituents not included in the target list of parameters.

The LERF and ETF personnel will work with the generator to determine which analyses are appropriate for the characterization. This approach ensures that the waste analyses adequately characterize the aqueous waste and defines the constituents of concern in a cost effective manner. The characterization and historical information are documented in the WPS, which is discussed in the following section.

2.1.2 Aqueous Waste Profile Sheet

The WPS documents the characterization of each new aqueous waste stream. The profile includes a detailed description of the volume, source, regulatory history, and the chemical and physical nature of the aqueous waste. For an aqueous waste to be accepted for treatment or storage in the LERF or the ETF, each new waste stream generator is required to complete and provide this form to LERF and ETF. Each generator also is required to provide the analytical data and process knowledge used to designate the aqueous waste stream, and to determine the chemical and physical nature of the waste. An example of a typical WPS is provided in Appendix A. This form could be modified to accommodate changes in regulations, operational concerns at the LERF or ETF, Hanford Facility needs, or other needs. However, the basic elements of the example form (e.g., waste source information) will be maintained in any future revision.

The LERF and the ETF management determine whether the information on the WPS is sufficient. The LERF and ETF management use this information to evaluate the acceptability of the aqueous waste for storage and treatment in the LERF and the ETF, and to determine if the aqueous waste can be handled properly.

2.2 WASTE MANAGEMENT DECISION PROCESS

All aqueous waste under consideration for acceptance must be characterized using analytical data and process knowledge. This information is used to determine the acceptability of an aqueous waste stream. The LERF and ETF Facility Manager or their designee is responsible for making the decision to accept or reject an aqueous waste stream. The management decision to accept any aqueous waste stream is based on an evaluation of regulatory acceptability and operational acceptability. Each evaluation uses acceptance criteria, which were developed to ensure that an aqueous waste is managed in a safe, environmentally sound and compliant manner. The following sections provide detail on the acceptance evaluation and the acceptance criteria.

In many instances, an aqueous waste that does not meet one of the waste acceptance criteria is not necessarily rejected. Section 2.3 discusses the process for re-evaluating an aqueous waste that does not initially meet the waste acceptance criteria. However, the final decision to reject an aqueous waste is made by LERF and ETF management. An aqueous waste stream could be rejected for one of the following reasons:

- The paperwork and/or laboratory analyses from the generator are insufficient

- Discrepancies with the regulatory and operational acceptance criteria cannot be reconciled, including:

  - An aqueous waste is not allowed under the current Discharge Permit or Final Delisting, and LERF/ETF management elect not to pursue an amendment, or the permit and Delisting cannot be amended (Section 2.2.1)

  - An aqueous waste is incompatible with LERF liner materials or with other aqueous waste in LERF and no other management method is available (2.2.2).

- Adequate storage or treatment capacity is not available.

2.2.1 Regulatory Acceptability

Each aqueous waste stream is evaluated on a case-by-case basis to determine if there is any regulatory concerns that would preclude the storage or treatment of a waste in the LERF or the ETF. Before an aqueous waste can be treated in either the LERF of the ETF, the regulatory history must be determined. Information on the regulatory history of an aqueous waste is documented in the WPS. This information is used to confirm that treating or storing the aqueous waste in the LERF or the ETF is allowed under and in compliance with WAC 173-303, dangerous waste permit application for the LERF and ETF, the Final Delisting for the ETF, and the Discharge Permit for the ETF.

2.2.1.1 Dangerous Waste Regulations/Permits. Before an aqueous waste stream is sent to the LERF or the ETF, the generator will characterize and designate the stream with the appropriate dangerous/hazardous waste numbers according to WAC 173-303-070. The Part A, Form 3, permit applications for the LERF and the ETF, and the Final Delisting for the ETF identify the specific waste numbers for dangerous/mixed waste that can be managed in the LERF and the ETF. Dangerous waste designated with waste numbers not specified in the Part A, Form 3, permit applications can not be treated or stored in the LERF or the ETF, until the Part A, Form 3, permit application is modified.

Additionally, aqueous wastes designated with listed waste numbers identified in the Final Delisting will be managed in accordance with the conditions of the delisting, or an amended delisting. Accordingly, the acceptance criteria in this evaluation are satisfied through compliance with the Part A, Form 3, permit applications and the Final Delisting.

2.2.1.2 State Waste Permit Regulations/Permit. Compliance with the Discharge Permit constitutes another waste acceptance criterion. In accordance with the conditions of the Discharge Permit, the constituents of concern in each new aqueous waste stream must be identified. The regulatory history and characterization data provided by the generator are used to identify these constituents. A constituent of concern, under the conditions of the Discharge Permit, in an aqueous waste stream is defined as any contaminant with a maximum concentration greater than one of the following:

- Any limit in the Discharge Permit (Ecology 1995a)
- Groundwater Quality Criteria (WAC 173-200)
- Final Delisting levels (EPA 1995)
- Background groundwater concentrations as measured at the ETF disposal site.

The conditions of the Discharge Permit also require a demonstration that the ETF can treat the constituents of concern to below discharge limits.

2.2.2 Operational Acceptability

Because the operating configuration or operating parameters at the LERF and ETF can be adjusted or modified, most aqueous waste streams generated on the Hanford Site can be effectively treated to below Delisting and Discharge Permit limits. Because of this flexibility, it would be impractical to define numerical acceptance or decision limits. Such limits would constrain the acceptance of appropriate aqueous waste streams for treatment at the LERF and ETF. The versatility of the LERF and ETF is better explained in the following examples:

- The typical operating configuration of the ETF is to process an aqueous waste through the UV/OX unit first, followed by the RO unit. However, high concentrations of nitrates may interfere with the performance of the UV/OX. In this case, the ETF could be configured to process the waste in the RO unit prior to the UV/OX unit.

- For a small volume aqueous waste with high concentrations of some anions and metals, the approach may be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from the ETF evaporator and thin-film dryer) would be send to the primary treatment train.

- An aqueous waste with high concentrations of chlorides and fluorides may cause corrosion problems when concentrated in the secondary treatment train. One approach is to adjust the corrosion control measures in the secondary treatment train. An alternative may be to blend this aqueous waste in a LERF basin with another aqueous waste which has sufficient dissolved solids, such that the concentration of the chlorides in the secondary treatment train would not pose a corrosion concern.

- Some metal salts (e.g., barium sulfate) tend to scale the RO membranes. In this situation, descalants used in the treatment process may be increased.

- Any effluent that does not meet these limits in one pass through the ETF treatment process is recycled to the ETF for re-processing.

There are, however, some aqueous wastes whose chemical and physical properties would preclude that waste from being treated or stored at the LERF or ETF. Accordingly, an aqueous waste is evaluated to determine if it is treatable, if it would impair the efficiency or integrity of the LERF or ETF, and if it is compatible with materials in these units. This evaluation also determines if the aqueous waste is compatible with other aqueous wastes(s) managed in the LERF.

The waste acceptance criteria in this category focus on determining treatability of an aqueous waste stream, and on determining any operational concerns that would prohibit the storage or treatment of an aqueous waste stream in the LERF or the ETF. The chemical and physical properties of an aqueous waste stream are determined as part of the waste characterization, and are documented on the WPS and compared to the design of the units to determine whether an aqueous waste stream is appropriate for storage and treatment in the LERF and the ETF.

2.2.2.1 Treatability. The process of determining treatability involves two steps. The first step is to establish the treatment efficiencies for the constituents of concern in an influent aqueous waste. The treatment efficiencies must be sufficient such that the treated effluent will meet the Discharge Permit and Delisting limits. The pilot plant testing provided destruction and removal (i.e., treatment) efficiencies for most of the anticipated constituents in aqueous waste streams at the Hanford Site, and are documented in the *200 Area Effluent Treatment Facility Delisting Petition* (DOE/RL-92-72). Information or studies from the vendors of the individual treatment units studies may also be used on a case-by-case basis to develop treatment efficiencies for the ETF or for the individual treatment units. [Chapter 4.0 of the dangerous waste permit application for the LERF and ETF (DOE/RL-97-03) provides a detailed discussion of the individual treatment units.] Treatment efficiencies also may be determined or confirmed by ETF operating data.

The second step in determining treatability is to identify those physical and chemical properties in an aqueous waste that would interfere with, or foul the ETF treatment process. This step focuses on the potential of a waste stream to interfere with the destruction efficiency of organic compounds in the UV/OX system, rejection rates of the RO membranes, or foul the filtration systems. Generally, the operating parameters or operating configuration at the LERF or ETF can be adjusted or modified to accommodate these properties. However, in those cases where a treatment process or operating configuration cannot be modified, the aqueous waste stream will be excluded from treatment or storage at the LERF or ETF.

Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., an aqueous waste which contains sludge). This evaluation will also consider the whether blending or mixing two or more aqueous waste streams will result in the formation of a precipitate. However, because the waste streams managed in the LERF and ETF are generally dilute, the potential for mixing waste streams an forming a precipitate is low, no specific compatibility tests are performed. If necessary, filtration at the waste source could be required before acceptance into LERF.

To determine if an aqueous waste meets the criterion of treatability, specific information is required. Treatment efficiencies will be developed from characterization data provided by the generator. Generators will also provide characterization data to identify those physical and chemical properties that would interfere with, or foul the ETF treatment process. In some instances, process knowledge may be adequate to identify a chemical or physical property that would be of concern. For example, the generator could provide process knowledge that the stream has two phases (an oily phase and an aqueous phase). In this case, if the generator could not physically separate the two phases, the aqueous waste stream would be rejected because the oily phase could compromise some of the treatment equipment. Typically, analyses for the following parameters are required to evaluate treatability and operational concerns:

- total dissolved solids
- total organic carbon
- total suspended solids
- magnesium
- potassium
- barium
- nitrate
- sulfate
- manganese
- specific conductivity
- pH.
- calcium
- sodium
- silica
- iron
- chloride
- aluminum
- phosphate

- bromide
- gross beta
- gross alpha
- gamma.

These constituents are identified in Table 2-2.

2.2.2.2 Compatibility.

Corrosion Control. Because of the materials of construction used in the ETF, corrosion is generally not a concern with new aqueous waste streams. Additionally, these waste streams are managed in a manner that minimizes corrosion. To ensure that a waste will not compromise the integrity of the ETF tanks and process equipment, each waste stream is assessed for its corrosion potential as part of the compatibility evaluation. This assessment usually focuses on chloride and fluoride concentrations; however, the chemistry of each new waste also is evaluated for other parameters that could cause corrosion.

Compatibility with Liquid Effluent Retention Facility Liner and Piping. As part of the acceptance process, the criteria of compatibility with the LERF liner materials is evaluated for each aqueous waste stream. The evaluation for liner compatibility is documented as part of the waste acceptance process. The chemical parameters or constituents considered for liner compatibility are identified in Table 2-1. The analytical methods for these parameters and constituents are provided in Appendix B.

The high-density polyethylene liners in the LERF basins potentially are vulnerable to the presence of certain constituents that might be present in some aqueous waste. Using EPA Method 9090 (EPA 1996), the liner materials were tested to evaluate compatibility between aqueous waste stored in the LERF and synthetic liner components. Based on the data from the compatibility test and vendor data on the liner materials,. several constituents and parameters were identified as potentially harmful (at high concentrations) to the integrity of the liners. From these data and the application of safety factors, concentration limits in Table 2-1 were established.

Except for PC, the strategy for protecting the integrity of a LERF liner is to establish upfront that an aqueous waste is compatible before the waste is accepted into LERF. Characterization data on each new aqueous waste stream are compared to the limits outlined in Table 2-1 to ensure compatibility with the LERF liner material before acceptance into the LERF.

PC from each 242-A Evaporator campaign is sampled and analyzed, and the results compared to the limits in Table 2-1 to ensure continued compatibility with the liner. Additionally, before a waste stream is processed at the 242-A Evaporator, DST analytical data are reviewed and administrative and process controls developed and implemented to ensure that PC is compatible with the LERF liner. For flow-through aqueous wastes like the 200-UP-1 Groundwater, characterization data will be reviewed quarterly to ensure that liner compatibility is maintained.

In some instances, process knowledge may be adequate to determine that an aqueous waste is compatible with the LERF liner. In those instances where process knowledge is adequate, the waste characterization would likely not require analysis for these parameters and constituents.

Compatibility with Other Waste. Some aqueous wastes, especially small volumes, are accumulated in the LERF with other aqueous waste. Before acceptance into the LERF, the aqueous waste stream is evaluated for its compatibility with the resident aqueous waste(s). The evaluation focuses on the potential for an aqueous waste to react with another waste (40 CFR 264, Appendix V, "Examples of Potentially Incompatible

Wastes"). Though the potential for problems associated with commingling aqueous wastes is very low, this evaluation confirms the compatibility of two or more aqueous wastes from different sources. No specific analytical test for compatibility is performed.

If it is determined that an aqueous waste stream is incompatible with other aqueous waste streams, alternate management scenarios are available. For example, another LERF basin that contains a compatible aqueous waste(s) might be used, or the aqueous waste stream might be fed directly into the ETF for treatment. In any case, potentially incompatible waste streams are not mixed, and all aqueous waste is managed in a way that precludes a reaction, degradation of the liner, or interference with the ETF treatment process.

2.3 RE-EVALUATION PROCESS

In accordance with 40 CFR 264.13 and WAC 173-303-300(4)(a), an influent aqueous waste will be re-evaluated as necessary to ensure that the characterization is accurate and current. At a minimum, an aqueous waste stream will be re-evaluated in the following situations.

- The LERF and the ETF management has been notified, or has reason to believe that the process generating the waste has changed.

- The LERF and the ETF management notes a increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.

In these situations, LERF and ETF management will review the available information. If existing analytical information is not sufficient, the generator may be asked to review and update the current waste characterization, to supply a new WPS, or re-sample and re-analyze the aqueous waste, as necessary. Other situations that might require a re-evaluation of a waste stream are discussed in the following sections.

2.3.1 Re-Evaluation for Aqueous Wastes not Meeting Waste Acceptance Criteria

An aqueous waste that does not meet one of the acceptance criteria is not necessarily rejected. Several options are available in the event that an aqueous waste is not acceptable following an initial evaluation. For example, a more extensive evaluation could be required to determine if the ETF process can be modified to treat an aqueous waste to required discharge levels. Additionally, a more extensive evaluation might be required to determine if a modification of the Discharge Permit or the Final Delisting is required and is feasible (e.g., to treat waste with new listed waste numbers).

2.3.2 Re-Evaluation for Treated Effluent not Meeting 200 Area Effluent Treatment Facility Permit Limits

If the treated effluent does not meet the Discharge Permit and Delisting limits in one pass through the ETF treatment process, the acceptability of the influent aqueous waste would be re-evaluated. This situation generally would apply to large volumes of aqueous waste (such as 200-UP-1 Groundwater) or to aqueous waste that is sent to the LERF or the ETF in batches on some frequency (such as monthly transfers of an aqueous waste). Small volumes of aqueous waste generally would be reprocessed until permit limits are met.

2.3.3 Re-Evaluation Requirements for Flow-Through Aqueous Waste

Aqueous waste like the 200-UP-1 Groundwater is unique because of the constant-flow source, and because the waste is pumped into a LERF basin throughout the lifetime of the pump-and-treat remediation activity. Also, rather than being accumulated in the LERF in a batch mode, this aqueous waste will generally flow through the LERF to the ETF for final treatment. Though this aqueous waste has been characterized upfront for acceptability, special sampling and analysis requirements must be met during the pump-and-treat operation to ensure that it continues to meet acceptance criteria.

Accordingly, flow-through wastes like the 200-UP-1 Groundwater are, and will be sampled quarterly to update the initial characterization. This on-going characterization is monitored by the LERF and the ETF personnel. If the data from a sampling event suggest that contaminant concentrations have increased beyond that described in the initial characterization, the acceptability of the waste stream will be re-evaluated. Details on the sampling and analysis of flow-through aqueous waste, like the 200-UP-1 Groundwater, are provided in Section 4.0.

2.4 RECORD/INFORMATION AND DECISION

The information and data collected throughout the acceptance process, and the evaluation and decision on whether to accept an influent aqueous waste stream for treatment or storage in the LERF or the ETF are documented as part of the ETF Operating Record, which is maintained at the ETF. Specifically, the Operating Record contains the following components on a new influent aqueous waste stream:

- The signed WPS for each aqueous waste stream and analytical data

- Process knowledge used to characterize a dangerous/mixed waste (under WAC 173-303), and information supporting the adequacy of the process knowledge

- The evaluation on whether an aqueous waste stream meets the waste acceptance criteria, including:
  - The evaluation for regulatory acceptability including appropriate regulator approvals
  - the evaluation for liner compatibility and for compatibility with other aqueous waste.

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Table 2-1. General Limits for Liner Compatibility.

Chemical Family	Constituent(s) or Parameter(s)[a]	Limit (mg/L)[b] (sum of constituent concentrations)
Alcohol/glycol	benzyl alcohol, 1-butanol	500,000
Alkanone[c]	acetone, 2-hexanone, methyl ethyl ketone, methyl isobutyl ketone, and 2-pentanone	200,000
Alkenone[d]	none targeted	NA
Aromatic/cyclic hydrocarbon	acetophenone, benzene, chlorobenzene, cresol, 1,4-dichlorobenzene, 2,4-dinitrotoluene, di-n-octyl phthalate, naphthalene, tetrahydrofuran, toluene, xylene	2000
Halogenated hydrocarbon	carbon tetrachloride, chloroform, 1,2-dichloroethane, 1,2-dichloroethene, 1,1-dichloroethylene, methylene chloride, tetrachloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, trichloroethylene, vinyl chloride	2000
Aliphatic hydrocarbon	hexachloroethane	500,000
Ether	2-butoxyethanol	2000
Other hydrocarbons	dimethylnitrosamine, tributyl phosphate	2000
Oxidizers	none targeted	NA
Acids, Bases, Salts	ammonium	100,000
pH	pH	$0.5 < pH < 13.0$

[a] Analytical methods for the parameters and constituents are provided in Appendix B.

[b] Analytical data for a chemical family (as indicated) are summed using the following 'sum of the fraction technique'. The individual constituent concentration, sum concentration (for families), and pH values for a waste stream are then evaluated against the compatibility limit.

$$\sum_{n=1}^{i} \left(\frac{Conc_n}{LIMIT_n}\right) \leq 1$$

where i is the number of organic constituents detected

[c] Ketone containing saturated alkyl group(s).

[d] Ketone containing unsaturated alkyl group(s).

mg/L = milligrams per liter.

Table 2-2. Waste Acceptance Criteria.

General criteria category	Criteria description
1. Characterization	A. Each generator must provide an aqueous waste profile.
	B. Each generator must designate the aqueous waste stream.
	C. Each generator must provide analytical data and/or process knowledge.
2. Regulatory acceptability	A. The LERF and ETF can store and treat influent aqueous wastes with waste numbers identified in the Part A, Form 3, permit applications for the LERF and the ETF, and the Final Delisting for the ETF.
	B. The aqueous waste must in compliance with conditions of the Discharge Permit.
3. Operational acceptability	A. Determine whether an aqueous waste stream is treatable, considering: 1. Whether the removal and destruction efficiencies on the constituents of concern will be adequate to meet Discharge Permit and Delisting levels. 2. Other treatability concerns; analyses for this evaluation may include: total dissolved solids silica total organic carbon potassium total suspended solids sodium specific conductivity barium calcium nitrate magnesium chloride manganese phosphate bromide sulfate gross alpha gross beta gamma iron aluminum
	B. Determine whether an aqueous waste stream is compatible, considering: 1. Whether an aqueous waste stream presents corrosion concerns; analysis may include chloride and fluoride 2. Whether an aqueous waste stream is compatible with LERF liner materials, compare characterization data to the liner compatibility limits (Table 2-1). 3. Whether an aqueous waste stream is compatible with other aqueous waste(s). (A 40 CFR 264 Appendix V type of comparison will be employed).

3.0 SPECIAL MANAGEMENT REQUIREMENTS

Special management requirements for aqueous wastes that are managed in the LERF or ETF are discussed in the following sections.

3.1 MONITORING THE VARIABILITY OF PROCESS CONDENSATE

The Discharge Permit (Ecology 1995a, Section S5) requires sampling of PC in the LERF basins until sufficient data are collected to adequately assess the variability of ammonia and total Kjeldahl nitrogen (TKN), strontium-90, and iodine-129. The PC will be analyzed for these parameters to assess the range of concentrations present in the PC and the results reported to Ecology. In addition, the 10 highest concentrations of tentatively identified compounds (TICs) will be reported from each PC sampling event, as required by the discharge permit. Tentatively identified compounds are non-targeted organic compounds or fragments of compounds with unique chromatographic spectra that are qualitatively identified by comparing them to standard databases of spectra. Because these compounds are identified qualitatively, their concentration only can be estimated.

Reports have been submitted to Ecology that included the results of ammonia and TKN analysis, detections of strontium-90 and iodine-129, and the 10 highest TICs. The data in these reports suggested that there is very little variability in the PC.

3.2 CONDITIONS ON PROCESS CONDENSATE FOR NEWLY IDENTIFIED WASTE NUMBERS

In January 1995, the U.S. Department of Energy, Richland Operations Office (DOE-RL) notified Ecology and the U.S. Environmental Protection Agency that small amounts of listed waste might have been introduced to the DST System, upstream of the LERF and the ETF. This listed waste previously had not been identified in the Dangerous Waste Part A, Form 3, permit applications for the DST System, LERF, or ETF. In a March 7, 1995 letter from Ecology to DOE-RL (Ecology 1995b), Ecology exercised its enforcement discretion with respect to the designation of this waste so long as several conditions are met. As long as these conditions are met, the waste numbers will not be included in the Part A, Form 3s, for the LERF or the ETF. These conditions only apply to PC. The constituents vanadium, formate, and cyanide will be analyzed in the PC to meet these conditions.

3.3 LAND DISPOSAL RESTRICTION COMPLIANCE AT LIQUID EFFLUENT RETENTION FACILITY

Because LERF provides treatment through flow and pH equalization, a surface impoundment treatment exemption from the land disposal restrictions was granted in accordance with 40 CFR 268.4 (EPA 1994 and Ecology 1996b). This treatment exemption is subject to several conditions, including a requirement that the WAP address the sampling and analysis of the treatment 'residue' [40 CFR 268.4(a)(2)(i) and WAC 173-303-300(5)(h)(i) and (ii)] to ensure it meets applicable treatment standards. Though the term 'residue' is not specifically defined, this condition further requires that sampling must be designed to represent the "sludge and the supernatant" indicating that a residue may have a sludge (solid) and supernatant (liquid) component.

Solid residue is not anticipated to accumulate in a LERF basin for the following reasons:

- Aqueous waste streams containing sludge would not be accepted into LERF under the acceptance criteria of treatability (Section 2.2.2.1)

- No solid residue was reported from PC discharged to LERF in 1995

- The LERF basins are covered and all incoming air first passes through a breather filter

- No precipitating or flocculating chemicals are used in flow and pH equalization.

Therefore, the residue component subject to this condition is the supernatant (liquid component). As indicated above, solids are not anticipated to accumulate in a LERF basin. Additionally, an aqueous waste stream is evaluated for the potential to deposit solids in a LERF basin (i.e., an aqueous waste which contains sludge). If necessary, filtration at the waste source could be required before acceptance into LERF. The contingency for removal of solids will be addressed during closure [as indicated in the Closure Plan, Chapter 11.0 of the dangerous waste permit application for LERF and ETF (DOE/RL-97-03)].

The conditions of the treatment exemption also require that treatment residues (i.e., aqueous wastes) which do not meet the LDR treatment standards "must be removed at least annually" [40 CFR 268.4(a)(2)(ii)]. To address the conditions of this exemption, an influent aqueous waste is sampled and analyzed and the LDR status of the aqueous waste is established as part of the acceptance process. The LERF basins are then managed such that any aqueous waste(s) which exceeds an LDR standard is removed annually from a LERF basin, except for a heel of approximately 1 meter. A heel is required to stabilize the LERF liner. The volume of the heel is approximately 1.9 million liters.

4.0 INFLUENT AQUEOUS WASTE SAMPLING AND ANALYSIS

The following sections provide a summary of the sampling procedures, frequencies, and analytical parameters that will be used in the characterization of influent aqueous waste (Section 2.0) and in support of the special management requirements for aqueous waste in the LERF (Section 3.0).

4.1 SAMPLING PROCEDURES

With a few exceptions, generators are responsible for the characterization, including sampling and analysis, of an influent aqueous waste. PC is either sampled at the 242-A Evaporator or accumulated in a LERF basin following a 242-A Evaporator campaign and sampled. Flow-through aqueous wastes, such as the 200-UP-1 Groundwater, will be characterized before acceptance; however, these aqueous wastes will also be sampled at LERF quarterly. Other exceptions will be handled on a case-by-case basis and the operating record will be maintained at the unit for inspection by Ecology. The following section discusses the sampling locations, methodologies, and frequencies for these aqueous wastes. Aqueous waste generators are referred to WAC 173-303-110(2) (40 CFR 261, Appendix I) for the sampling procedures that are applicable to their waste. For samples collected at the LERF and ETF, unit-specific sampling protocol is followed. The sample containers, preservation materials, and holding times for each analysis are listed in Appendix B.

4.1.1 Batch Samples

In those cases where an aqueous waste is sampled in a LERF basin, samples are collected from four of the six available sample risers located in each basin, i.e., four separate samples. Though there are eight sample risers at each basin, one is dedicated to liquid level instrumentation and the other is dedicated as an influent port. Operating experience indicates that four samples adequately capture the variability of an aqueous waste stream. Specifically, sections of stainless steel (or other compatible material) tubing are inserted into the sample riser to an appropriate depth. Using a portable pump, the sample line is flushed with the aqueous waste and the sample collected. The grab sample containers typically are filled for volatile organic compounds (VOC) first, followed by the remainder of the containers for the other parameters.

Several sample ports are also located at the ETF, including a valve on the recirculation line at the ETF surge tank, and a sample valve on a tank discharge pump line at the ETF Load-In Station. All samples are obtained at the LERF or ETF are collected in a manner consistent with SW-846 procedures (EPA 1986).

4.1.2 Flow-Through Samples at the Liquid Effluent Retention Facility

Flow-through samples are collected from a valve located at a transfer pipeline connection to the LERF. Samples of flow-through aqueous wastes, such as 200-UP-1 Groundwater, are collected quarterly or more frequently if there is change in the source (e.g., a change in the well-head), or if it is determined that there is an increase in the concentration of contaminants beyond the range described in the initial characterization. For flow-through grab samples, VOC sample containers are typically filled first, followed by the remainder of the containers for the other parameters.

4.2 ANALYTICAL RATIONALE

As stated previously, each generator is responsible for designating and characterizing an aqueous waste stream. Accordingly, each generator samples and analyzes an influent waste stream using the target list of parameters (Table 4-1) for the waste acceptance process. At the discretion of the LERF and ETF management, a generator may provide process knowledge in lieu of some analyses as discussed in Section 2.1.1. The LERF and ETF personnel will work with the generator to determine which parameters are appropriate for the characterization.

The analytical methods for these parameters are provided in Appendix B. All methods for nonradioactive parameters are EPA methods. Additional analyses may be required if historical information and process knowledge indicate that an influent aqueous waste contains constituents not included in the target list of parameters. For example, if process knowledge indicates that an aqueous waste contains a parameter that is regulated by the Groundwater Quality Criteria (WAC 173-200), that parameter(s) would be added to the suite of analyses required for that aqueous waste stream.

The analytical data for the parameters presented in Table 4-1, including VOC, SVOC, metals, anions, general chemistry parameters, and radionuclides are used to define the physical and chemical properties of the aqueous waste to:

- Set operating conditions in the LERF and ETF (e.g., to determine operating configuration - refer to Section 2.2.2)

- Identify concentrations of some constituents which may also interfere with, or foul the ETF treatment process (e.g., fouling of the RO membranes - refer to Section 2.2.2)

- Evaluate LERF liner and piping material compatibility

- Determine treatability to evaluate if applicable constituents in the treated effluent will meet Discharge Permit and Delisting limits

- Estimate concentrations of some constituents in the waste generated in the secondary treatment train (i.e., dry powder waste).

Some analyses also are required to address special conditions (Section 3.0) or for other specific purposes as indicated below:

- Formate analysis is required for compliance with special conditions for PC (refer to Section 3.2).

- Total Kjeldahl nitrogen (TKN) analysis required under the Discharge Permit to meet special conditions for PC (until discharge permit is modified, refer to Section 3.1).

- Total dissolved solids analysis to predict volume of powder waste from the secondary treatment train.

- Radionuclide analyses are used for inventorying radionuclides as necessary to demonstrate compliance with U.S. Department of Energy Orders (including DOE Orders 5480.5 and 5480.23) and monitoring for some radionuclides required for compliance with Discharge Permit.

Table 4-1. Target Parameters for Influent Aqueous Waste Analyses.
(sheet 1 of 2)

VOLATILE ORGANIC COMPOUNDS	SEMIVOLATILE ORGANIC COMPOUNDS
Acetone	Acetophenone
Benzene	Benzyl alcohol
1-Butyl alcohol (1-Butanol)	2-Butoxyethanol
Carbon tetrachloride	Cresol (o, p, m)
Chlorobenzene	1,4-Dichlorobenzene
Chloroform	Dimethylnitrosamine (N-Nitrosodimethylamine)
1,2-Dichloroethane (total)	Di-n-octyl phthalate
1,1-Dichloroethylene	Hexachloroethane
2-Hexanone	Naphthalene
Methyl ethyl ketone (2-Butanone)	Tributyl phosphate
Methyl isobutyl ketone (Hexone, 4-Methyl-2-pentanone)	
2-Pentanone	
Tetrachloroethylene	
Tetrahydrofuran	
Toluene	
1,1,1-Trichloroethane	
1,1,2-Trichloroethane	
Trichloroethylene	
Vinyl chloride	

Table 4-1. Target Parameters for Influent Aqueous Waste Analyses.
(sheet 2 of 2)

TOTAL METALS	RADIONUCLIDES
Aluminum	Gross alpha
Antimony	Gross beta
Arsenic	Americium-241
Barium	Antimony-125
Beryllium	Carbon-14
Cadmium	Cerium/Praseodymium-144
Calcium	Cesium-134
Chromium	Cesium-137
Copper	Cobalt-60
Iron	Curium-244
Lead	Europium-154
Magnesium	Europium-155
Manganese	Gamma
Mercury	Iodine-129
Nickel	Neptunium-237
Potassium	Niobium-94
Selenium	Plutonium-238
Silicon	Plutonium-239/240
Silver	Radium-226
Sodium	Ruthenium-103
Uranium	Ruthenium-106
Vanadium	Strontium-90
Zinc	Technicium-99
	Tin-113
	Tritium
	Zinc-65
ANIONS	**GENERAL CHEMISTRY PARAMETERS**
Bromide	Ammonia
Chloride	Total Kjeldahl nitrogen
Fluoride	Cyanide
Formate[1]	pH
Nitrate	Total suspended solids
Nitrite	Total dissolved solids
Phosphate	Total organic carbon
Sulfate	Specific conductivity

[1] - Parameter only required for 242-A Evaporator process condensate (refer to Section 3.2).

5.0 TREATED EFFLUENT SAMPLING AND ANALYSIS

The treated aqueous waste, or effluent, from the ETF is collected in three 2,540,000-liter verification tanks before discharge to the SALDS. To determine whether the Discharge Permit early warning values and enforcement limits and the Delisting criteria are met, the effluent routinely is sampled at or before the verification tanks. The sampling and analyses performed are described in the following sections.

5.1 RATIONALE FOR EFFLUENT ANALYSIS PARAMETER SELECTION

The parameters measured in the treated effluent are required by the following regulatory documents:

- Delisting criteria from the Final Delisting (EPA 1995)
- Effluent limits from the State Waste Discharge Permit (Ecology 1995a)
- Early warning values from the State Waste Discharge Permit (Ecology 1995a).

The Final Delisting provides two testing regimes for the treated effluent. Under the initial verification testing regime, the first three verification tanks must be sampled and analyzed, and the data submitted to the U.S. Environmental Protection Agency (EPA). Following EPA approval, the subsequent verification testing regime is implemented, where every 10th tank is analyzed for the delisting constituents. If the concentration of any analyte is found to exceed a Discharge Permit enforcement limit or a Delisting criterion, the contents of the verification tank are reprocessed and/or re-analyzed. If the concentration of any analyte exceeds an early warning value, as a monthly average from treated effluent that is discharged, an early warning value report is prepared and submitted to Ecology.

5.2 EFFLUENT SAMPLING STRATEGY: METHODS, LOCATION, ANALYSES, AND FREQUENCY

Effluent sampling methods and locations, the analyses performed, and frequency of sampling are discussed in the following sections.

5.2.1 Effluent Sampling Method and Location

Samples of treated effluent are collected and analyzed to verify the treatment process using ETF-specific sampling protocol. These verification samples can be collected at two locations. At the first sampling location, a representative grab sample is collected from a sampling port on the verification tank recirculation line. The second sampler is located upstream of the verification tanks where flow proportional composite samples are collected for all analyses except VOC analysis. For VOCs, a zero-headspace, time proportional sampler capable of collecting a sample over a multiple-day period is used. Appendix B presents the sample containers, preservatives, and holding times for each parameter monitored in the effluent.

5.2.2 Analyses of Effluent

The parameters required by the current Discharge Permit and Delisting conditions are presented in Table 5-1. The analytical methods and PQLs associated with each parameter are provided in Appendix B. The methods and PQLs are equivalent to those used in the analysis of influent aqueous waste. With the exception of formic acid (analyzed as formate), analyses for the constituents associated with the newly listed waste numbers (Section 3.2) already are required analyses in the effluent. An analysis for formate is not required unless this constituent is identified in the influent aqueous waste.

5.2.3 Frequency of Sampling

Treated effluent is tested for all parameters listed in Table 5-1 on a frequency consistent with the conditions of the Discharge Permit and the Final Delisting. This effluent must meet the Discharge Permit and Delisting limits associated with these parameters. Under normal operating conditions, grab samples are collected from each verification tank. When a composite sample is called for, the sample is collected over the period required to fill one verification tank.

During operation of the ETF, if one or more of the constituents exceeds a Delisting criterion, the Delisting conditions require the analysis of samples from the following two verification tanks volumes before effluent can be discharged. Treated effluent that does not meet Delisting criteria and Discharge Permit is not discharged to the SALDS and is recycled for further treatment.

Table 5-1. Rationale for Parameters to Be Monitored in Treated Effluent.
(sheet 1 of 3)

Parameter	Final Delisting[1]	Discharge Permit[2]	
		Enforcement Limit	Early Warning Value
VOLATILE ORGANIC COMPOUNDS			
Acetone	X		
Benzene	X		X
1-Butyl alcohol	X		
Carbon tetrachloride	X	X	
Chlorobenzene	X		
Chloroform	X		X
1,2-Dichloroethane	X		
1,1-Dichloroethylene	X		
Methyl ethyl ketone (2-Butanone)	X		
Methyl isobutyl ketone (4-methyl-2-Pentanone)	X		
Tetrachloroethylene	X	X	
Tetrahydrofuran			X
Toluene	X		
1,1,1-Trichloroethane	X		
1,1,2-Trichloroethane	X		X
Trichloroethylene	X		
Vinyl chloride	X		
SEMIVOLATILE ORGANIC COMPOUNDS			
Acetophenone			X
Benzyl alcohol	X		
Cresol (total)	X		
1,4-Dichlorobenzene	X		

Table 5-1. Rationale for Parameters to Be Monitored in Treated Effluent.
(sheet 2 of 3)

Parameter	Final Delisting[1]	Discharge Permit[2]	
		Enforcement Limit	Early Warning Value
Dimethylnitrosamine		X	
Di-n-octyl phthalate	X		
Hexachloroethane	X		
Naphthalene	X		
Tributyl phosphate	X		
TOTAL METALS[3]			
Antimony	X		
Arsenic	X	X	
Barium	X		
Beryllium	X		X
Cadmium	X		X
Chromium	X	X	
Copper			X
Lead	X		X
Mercury	X		X
Nickel	X		
Selenium	X		
Silver	X		
Vanadium	X		
Zinc	X		
ANIONS			
Fluoride	X		
Nitrate (as N)		X	
Nitrite (as N)			X

Table 5-1. Rationale for Parameters to Be Monitored in Treated Effluent.
(sheet 3 of 3)

Parameter	Final Delisting[1]	Discharge Permit[2]	
		Enforcement Limit	Early Warning Value
Sulfate			X
OTHER ANALYSES			
Ammonia[4] (as N)	X		X
Total Kjeldahl nitrogen (as N)			X
Cyanide	X		
Tritium			M
Strontium-90			M
Gross alpha			M
Gross beta			M
Total dissolved solids			X
Total organic carbon			X
Total suspended solids			X
Specific conductivity		M	

1 Parameters required by the current conditions of the Final Delisting, 40 CFR 261, Appendix IX, Table 2 (EPA 1995).
2 Parameters required by the current conditions of the State Waste Discharge Permit, No. ST 4500 (Ecology 1995a).
3 Metals reported as total concentrations.
4 Although the Final Delisting lists "ammonium" (NH_4^+), the standard analytical methods measure ammonia (NH_3). Ammonia is assumed to be the contaminant of concern.
X Rationale for measuring this parameter in treated effluent.
M Monitor only; no limit defined.

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6.0 EFFLUENT TREATMENT FACILITY GENERATED WASTE SAMPLING AND ANALYSIS

The wastes discussed in this section are managed in the container storage areas of the ETF and include the wastes generated at the ETF. This section describes the characterization of the following secondary waste streams generated within the ETF:

- Secondary waste generated from the treatment process, including the following waste forms:
  - dry powder waste
  - concentrate tanks slurry
  - sludge removed from process tanks
- Waste generated by operations and maintenance activities
- Miscellaneous waste generated within the ETF.

For each waste stream, the waste is described, a characterization methodology and rationale are provided, and sampling requirements are addressed.

6.1 SECONDARY WASTE GENERATED FROM TREATMENT PROCESSES

A dry powder waste is generated from the secondary treatment train, from the treatment of an aqueous waste. Waste is received in the secondary treatment train in waste receiving tanks where it is fed into an evaporator. Concentrate waste from the evaporator is then fed to a concentrate tank. From these tanks, the waste is fed to a thin film dryer and dried into a powder, and collected into containers. The containers are filled via a remotely controlled system. The condensed overheads from the evaporator and thin film dryer are returned to the surge tank to be fed to the primary treatment train.

Occasionally, salts from the treatment process (e.g., calcium sulfate and magnesium hydroxide) accumulate in process tanks as sludge. Because processing these salts could cause fouling in the thin film dryer, and to allow uninterrupted operation of the treatment process, the sludge is removed and placed in containers. The sludge is dewatered and the supernate is pumped back to the ETF for treatment.

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train:

- Concentrate from the first RO stage
- Backwash from the rough and fine filters
- Regeneration waste from the ion exchange system
- Spillage or overflow collected in the process sumps.

In an alternate operating scenario, some aqueous wastes may be fed to the secondary treatment train before the primary treatment train. A more complete description of these processes can be found in Chapter 4.0 of the dangerous waste permit application for LERF and ETF (DOE/RL-97-03).

6.1.1 Rationale for Selection of Parameters for Analysis

The ETF secondary waste is anticipated to consist primarily of sulfate salts, minor amounts of metals, and radionuclides. The designation of the ETF secondary waste is based on influent characterization data. These data are used to assign applicable listed waste numbers to the secondary waste and to determine if the secondary waste would designate as a characteristic waste because of toxic metals.

Concentrations of metals in the secondary waste are projected by comparing the influent metals data to the removal efficiencies of the ETF treatment process. When the influent data indicate that the secondary waste will not designate as a characteristic waste, the secondary waste, as slurry, sludge, or dry powder, is not sampled and analyzed for metals.

The influent data, in conjunction with knowledge of the ETF treatment processes, also are used to determine the LDR status of the ETF secondary waste. Knowledge of the treatment process indicates that VOCs and SVOCs (i.e., listed waste constituents) are not expected in the secondary waste because of the organic destruction capability of the UV/OX and the temperatures of the thin film dryer. Accordingly, when the influent data indicate that the secondary waste meets the LDR treatment standards, the secondary waste, as slurry, sludge, or dry powder, is not sampled and analyzed for VOCs or SVOCs.

The parameters for analysis of the ETF secondary waste are provided in Table 6-1. The specific analytical methods for these analyses are provided in Appendix B. Additionally, samples of slurry or sludge undergo a total solids analysis to convert the analytical data on other parameters to dry weight concentrations.

6.1.2 Sampling Methods

The dry powder waste and containerized sludge are sampled from containers using the principles presented in SW-846 (EPA 1986) and ASTM Methods (American Society for Testing Materials), as referenced in WAC 173-303-110(2). The sample container requirements, sample preservation requirements, and maximum holding times for each of the parameters analyzed in either matrix are presented in Appendix B.

Concentrate tank waste samples are collected from recirculation lines, which provide mixing in the tank during pH adjustment and prevent caking. The protocol for concentrate tank sampling prescribes opening a sample port in the recirculation line to collect samples directly into sample containers. The sample port line is flushed before collecting a grab sample. The VOC sampling typically is performed first for grab samples. Each VOC sample container will be filled such that cavitation at the sample valve is minimized and the container has no head space. The remainder of the containers for the other parameters will be filled next.

6.1.3 Sampling Frequency

The ETF secondary waste is sampled at a frequency of two containers per batch. A batch is defined as any volume of aqueous waste that is being treated under consistent and constant process conditions. The secondary waste will be resampled under the following changes in process conditions:

- Change in an influent source (e.g., change in well-head)
- Change in process chemistry.

If waste from the concentrate tanks is used for characterization of a batch of influent waste, up to a maximum of three representative samples will be collected from the concentrate tanks. These samples will be analyzed for the appropriate parameters identified in Table 6-1 based on the needs identified from evaluating influent sampling and analysis data. When radiological and/or chemical exposures are of concern, analytical results from concentrate tank samples will be used to represent the powder waste generated from the treatment of that aqueous waste(s). The dry powder or concentrate tanks will be re-sampled in the following situations:

- The LERF and the ETF management has been notified, or has reason to believe that the process generating the waste has changed (for example, a change in the source such as a change in the well-head for groundwater that significantly changes the aqueous waste characterization).

- The LERF and the ETF management notes an increase or decrease in the concentration of a constituent in an aqueous waste stream, beyond the range of concentrations that was described or predicted in the waste characterization.

6.1.4 Special Requirements Pertaining to Land Disposal Restrictions

Containers of the ETF secondary waste are transferred to a storage or final disposal unit, as appropriate (e.g., the Central Waste Complex or to the Environmental Restoration Disposal Facility). The ETF personnel provide the analytical characterization data and necessary process knowledge for the waste to be tracked by the receiving staff, and for the appropriate LDR documentation.

The following information on the secondary waste is included on the LDR documentation provided to the receiving unit:

- Dangerous waste numbers (as applicable)

- Determination on whether the waste is restricted from land disposal according to the requirements of 40 CFR 268/WAC 173-303-140 (i.e., the LDR status of the waste)

- The waste tracking information associated with the transfer of waste

- Waste analysis results.

6.2 OPERATIONS AND MAINTENANCE WASTE GENERATED AT THE 200 AREA EFFLUENT TREATMENT FACILITY

Operation and maintenance of process and ancillary equipment generates additional routine waste. These waste materials are segregated to ensure proper handling and disposition, and to minimize the commingling of potentially dangerous waste with nondangerous waste. The following waste streams are anticipated to be generated during routine operation and maintenance of the ETF. This waste might or might not be dangerous waste, depending on the nature of the material and its exposure to a dangerous waste.

- Spent lubricating oils and paint waste from pumps, the dryer rotor, compressors, blowers, and general maintenance activities

- Spent filter media process filters

- Spent ion exchange resin

- HEPA filters

- UV light tubes

- RO membranes

- Equipment that cannot be returned to service

- Other miscellaneous waste that might contact a dangerous waste (e.g., plastic sheeting, glass, rags, paper, waste solvent or aerosol cans).

These waste streams are stored at the ETF before being transferred for final treatment, storage, or disposal as appropriate. This waste is characterized and designated using process knowledge (from previously determined influent aqueous waste composition information); analytical data; and material safety data sheets (MSDS) of the chemical products present in the waste or used (these data sheets are maintained at the ETF). Sampling of these waste streams is not anticipated; however, if an unidentified or unlabeled waste is discovered, that waste is sampled. This 'unknown' waste is sampled and analyzed for the parameters in Table 6-1 as appropriate, and will be designated according to Washington state regulatory requirements. The specific analytical methods for these analyses are provided in Appendix B.

6.3 OTHER WASTE GENERATED AT THE 200 AREA EFFLUENT TREATMENT FACILITY

There are two other potential sources of waste at the ETF: spills and/or overflows, and discarded chemical products. Spilled material that potentially might be dangerous waste generally is routed to the ETF sumps where the material is transferred to either the surge tank for treatment or to the secondary treatment train. A spilled material also could be containerized and transferred to another TSD unit. In most cases, process knowledge and the use of MSDSs is sufficient to designate the waste material. If the source of the spilled material is unknown and the material cannot be routed to the ETF sumps, a sample of the waste is collected and analyzed according to Table 6-1, as necessary, for appropriate characterization of the waste. Unknown wastes will be designated according to WAC 173-303. The specific analytical methods for these analyses are provided in Appendix B.

A discarded chemical product waste stream could be generated if process chemicals, cleaning agents, or maintenance products become contaminated or are otherwise rendered unusable. In all cases, these materials are appropriately containerized and designated. Sampling is performed, as appropriate, to determine the radioactivity of a waste or if required for waste designation.

Table 6-1. 200 Area Effluent Treatment Facility Generated Waste - Sampling and Analysis.

Parameter[1]	Rationale
Total solids or percent water[2]	• Calculate dry weight concentrations
Volatile organic compounds[3]	• LDR - verify treatment standards
Semivolatile organic compounds[3]	• LDR - verify treatment standards
Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver)	• Waste designation • LDR - verify treatment standards
Nitrate	• Address receiving TSD waste acceptance requirements
pH	• Waste designation

[1] For concentrate tank samples, the total sample (solid plus liquid) is analyzed and the analytical result is expressed on a dry weight basis. The result for toxicity characteristic metal and organic is divided by a factor of 20 and compared to the toxicity characteristic (TC) constituent limits [WAC 173-303-090(8)]. If the TC limit is met or exceeded, the waste is designated accordingly. All measured parameters are compared against the corresponding treatment standards.

[2] Total solids or percent water are not determined for unknown waste and dry powder waste samples and are analyzed in maintenance waste and sludge samples, as appropriate (i.e.., percent water might not be required for such routine maintenance waste as aerosol cans, fluorescent tubes, waste oils, batteries, etc., or sludge that has dried).

[3] VOC and/or SVOC analysis of secondary waste is required unless influent characterization data and process knowledge indicate that the constituent will not be in the final secondary waste at or above the LDR.

LDR = land disposal restrictions.

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7.0 QUALITY ASSURANCE/QUALITY CONTROL

The following quality assurance/quality control (QA/QC) information for the ETF and LERF is provided as required by WAC 173-303-810(6). The sampling and analysis activities at the ETF and LERF conform to the requirements of a ETF/LERF-specific quality assurance project plan and are in accordance with the following EPA guidance documents:

- *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Third Edition, as amended, U.S. Environmental Protection Agency, Washington, DC, July 1992, as referenced in WAC 173-303-110.

- *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-7-020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, March 1993.

7.1 SAMPLING PROGRAM

Typically generators are responsible for the sampling and analysis of an influent aqueous. However, samples of influent aqueous waste can be collected at the LERF or the Load-In Station. Samples of treated effluent are collected at the verification tanks. Secondary waste generated from the treatment process generally is sampled in the dry powder form; however, the secondary waste also could be sampled while in slurry form for characterization. Sampling of influent aqueous waste, treated effluent, and secondary waste is discussed in Sections 4.0, 5.0, and 6.0, respectively, of the WAP.

Specific information on sample holding times, preservatives, and sample containers is provided in Appendix B. The selection of the sample collection device depends on the type of sample, the sample container, the sampling location and the nature and distribution of the waste components. In general, the methodologies used for specific materials correspond to those referenced to WAC 173-303-110(2). The selection and use of the sampling device is supervised or performed by a person thoroughly familiar with the sampling requirements. Samples are collected according to ETF/LERF-specific sampling protocol.

Sampling equipment is constructed of nonreactive materials such as glass, plastic, aluminum, or stainless steel, as indicated by the nature and matrix of the waste. Care is taken in the selection of the sampling device to prevent contamination of the sample and to ensure compatibility of materials. For example, plastic bottles are not used to collect some organic wastes.

7.2 ANALYTICAL PROGRAM

The onsite laboratory employed by the ETF and LERF organization is required to have a program of quality control practices and procedures to ensure that precision and accuracy are maintained. The QA/QC program for sampling complies with the applicable Hanford Site standard requirements and the regulatory requirements. All analytical data are defensible and traceable to specific, related QC samples and calibrations. Offsite laboratories employed by the ETF and LERF must meet the same QA/QC requirements as onsite laboratories and must demonstrate quality control practices that are comparable to the onsite laboratory's program. A review of an offsite laboratory may be conducted to ensure that the quality control of

ETF and LERF data is maintained. The SW-846 analytical methods are followed (as indicated in Appendix B). However, other methods may be substituted for a parameter if the PQL can be met.

The chemical parameters and associated analytical methods identified in Appendix B are used to characterize an influent aqueous waste, effluent waste, and ETF secondary waste. The analytical data on these parameters are also used to establish that key decision limits pertinent to proper waste management are met. These key decision limits are numerical thresholds which include:

- liner compatibility limits for an influent aqueous waste as managed in LERF (may include blending a waste with other wastes to meet these limits)
- the LDR status of the ETF secondary waste
- delisting limits for treated effluent.

Where analytical data are used in key decision making, the PQL of an analytical parameter (or sum of the PQLs, as indicated by the decision) must be at or below the key decision limit.

Good laboratory practices which encompass sampling, sample handling, housekeeping and safety are maintained at all laboratories. The following section describe the specific practices which are implemented at the onsite laboratory to maintain the precision and accuracy goal of ± 20 percent for quality control samples which include method blank, quality control check, matrix spike, and duplicate samples.

The decision to re-analyze if the stated precision and accuracy goals are not met will depend on the use of the analytical results. Generally, only analytical results used in key decisions would require re-analysis if precision and accuracy goals were not met. For example, if the precision and accuracy goals are not met in a liner compatibility analysis, the sample would generally be re-analyzed if the results were close to a compatibility limit. However, if the analytical results suggested that concentrations were an order of magnitude below a liner compatibility limit, generally re-analysis would not be required. The decision to re-analyze a waste in a key decision situation will be made on a case-by-case basis.

7.2.1 Contamination Evaluation

Method blank samples are prepared with each batch of samples (at least 1 in batch of 20) and analyzed to ensure sample contamination has not occurred.

7.2.2 Quality Control Check Sample

A quality control check sample is analyzed with each batch (at least 1 in batch of 20) for each analytical parameter determined. The results show that analytical procedures are properly performed and that calibration and standardization of instrumentation are within acceptable limits per the method.

7.2.3 Matrix Spike Analyses

Matrix spike samples are employed to monitor recoveries and demonstrate accuracy. Matrix spike samples are periodically analyzed to provide information about the effect of the sample matrix on the analyte in question. Typically a ratio of one spike for each analytical batch of samples, or 1 in 20, is maintained.

7.2.4 Duplicate Analyses

A laboratory sample duplicate or a matrix spike duplicate is analyzed to assess analytical precision in the laboratory. Typically, a ratio of one duplicate sample for each analytical batch of samples, or 1 in 20, is maintained.

7.3 CONCLUSION

The aforementioned sampling and analytical quality practices help ensure that the data obtained are precise and accurate for the waste stream being sampled. The analytical results are used by ETF and LERF management to decide whether or not to accept a particular waste stream and, upon acceptance, to determine the appropriate method of treatment, storage, and disposal. Results are also important to ensure that wastes are managed properly by the ETF and LERF and that incompatible wastes are not inadvertently combined. Just as these results are important, so is the quality of these results. Thus, the quality of the analytical data, the thoroughness and care with which the sampling and analyses are performed and reported, provides an important basis for day-to-day operational decisions.

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8.0 REFERENCES

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Ecology, 1996b, "The Washington State Department of Ecology (Ecology) Regulatory Interpretation of the Liquid Effluent Retention Facility (LERF) Land Disposal Restriction Exemption", letter from Washington State Department of Ecology to T. Teynor, U.S. Department of Energy and A. DiLiberto, Westinghouse Hanford Company, September 9, 1996.

EPA, 1986, *Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846* (Third Edition, November 1986, as amended), U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA, 1994, "Liquid Effluent Retention Facility (LERF) Land Disposal Restrictions Treatment Exemption - Regulatory Interpretation EPA/Ecology ID No: WA7890008967", letter from U.S. Environmental Protection Agency, Region 10 to J. Hennig, U.S. Department of Energy, December 6, 1994.

EPA, 1995, Final Delisting [Exclusion], issued to U.S. Department of Energy, 40 CFR 261, Appendix IX, Table 2 (60 FR 31115, June 13, 1995), U.S. Environmental Protection Agency, Washington, D.C.

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APPENDICES

A TYPICAL AQUEOUS WASTE PROFILE SHEET

B ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATIVE METHODS, AND HOLDING TIMES

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APPENDIX A

TYPICAL AQUEOUS WASTE PROFILE SHEET

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200 AREA LIQUID WASTE PROCESSING AQUEOUS PROFILE SHEET

(Please carefully read the instructions before completing this form)

I. GENERATOR INFORMATION

Generating Facility/Location: ______________________________

Facility Manager: ______________________________

Technical Contact/Phone: ______________________________

Environmental Compliance Officer/Phone: ______________________________

DOE Point of Contact: ______________________________

II. GENERAL WASTE INFORMATION

1. Description of Process Generating Aqueous Waste: ______________________________

____

____

2. Is the aqueous from a CERCLA or state mandated cleanup? Yes ___ No ___

Describe Cleanup Activity: ______________________________

3. A. Is this a dangerous or hazardous waste (40 CFR Part 261 or WAC 173-303-070)? Yes ___ No ___.

B. If yes, identify ALL hazardous/dangerous listed and characteristic waste code numbers (D,F,K,P,U): ______________________________

____

C. State Waste Codes ______________ Explain designation for State waste codes: ______________

____

III. SHIPPING/TRANSPORTATION INFORMATION

A. CONTAINMENT/PACKAGING: Bulk Liquid ___ Total Volume: ______ Drum ___ Number: ____ Total Volume: ______

Other ______________________________

B. SHIPPING FREQUENCY: Units _____ Per: ___ Month ___ Qtr. ___ Year ___

One Time ___ Other ______________________________

C. TRANSPORTATION:

1. Is this a DOT Hazardous Material? Yes ___ No ___

2. Proper Shipping Name: ______________________________

3. Hazard Class: ______________________________

4. CERCLA Reportable Quantity (RQ) and unit (as applicable): ______________________________

5. Transportation Method (e.g., direct pipeline, tanker): ______________________________

GENERATOR'S CERTIFICATION

I hereby certify that all information submitted in this and all attached documents contains true and accurate descriptions of this waste. Any sample submitted is representative as defined in 40 CFR 261-Appendix 1 or by using an equivalent method. All relevant information regarding known or suspected hazards in the possession of the generator has been disclosed.

______________________________	______________________________	__________
Signature	Printed (or typed) name and title	Date

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APPENDIX B

ANALYTICAL METHODS, SAMPLE CONTAINERS, PRESERVATIVE METHODS, AND HOLDING TIMES

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Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 1 of 6)

Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
VOLATILE ORGANIC COMPOUNDS				
Acetone	8260A	40	50-100	Sample container: 2 x 40-mL amber glass with septum[i]; Preservative: 1:1 HCl to pH<2; 4°C[i]; Holding time: 14 days
Benzene		5	40-150	
1-Butyl alcohol (1-Butanol)		500	40-150	
Carbon tetrachloride		5	65-130	
Chlorobenzene		5	40-150	
Chloroform		5	50-130	
1,2-Dichloroethane		5	50-150	
1,2-Dichloroethene		5	50-150	
1,1-Dichloroethylene		5	60-130	
2-Hexanone		50	60-130	
Methylene chloride[f]		5	50-150	
Methyl ethyl ketone (2-Butanone)		100	65-130	
Methyl isobutyl ketone (Hexone, 4-Methyl-2-pentanone)		50	50-160	
2-Pentanone		10	50-160	
Tetrachloroethylene		5	65-140	
Tetrahydrofuran		100	47-150	
Toluene		5	50-160	
1,1,1-Trichloroethane		5	50-150	
1,1,2-Trichloroethane		5	50-150	
Trichloroethylene		5	70-155	
Xylene		5	50-150	
Vinyl chloride		10	40-130	

Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 2 of 6)

Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
SEMIVOLATILE ORGANIC COMPOUNDS				
Acetophenone	8270B	10	70-110	Sample container 4 x 1-liter amber glass Preservative 4°C Holding time 7 days for extraction; 40 days for analysis after extraction
Benzyl alcohol		20	70-120	
2-Butoxyethanol		1000	65-105	
Cresol (o, p, m)		10	55-115	
1,4-Dichlorobenzene		10	45-95	
Dimethylnitrosamine		10	50-120	
2,4-Dinitrotoluene		10	65-100	
Di-n-octyl phthalate		10	70-130	
Hexachloroethane		10	50-110	
Naphthalene		10	60-120	
Tributyl phosphate		100	75-125	

Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 3 of 6)

Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
TOTAL METALS				
Aluminum	6010A/EPA-600 200.7	450	75 - 125	**Sample container** 1 x 0.5-liter plastic/glass **Preservative** 1:1 HNO_3 to pH<2 **Holding time** 180 days; mercury 28 days
Antimony	EPA-600 200.8	30	75 - 125	
Arsenic	EPA-600 200.8	15	75 - 125	
Barium	6010A/EPA-600 200.7	20	75 - 125	
Beryllium	6010A/EPA-600 200.7	40	75 - 125	
Cadmium	EPA-600 200.8	5	75 - 125	
Calcium	6010A/EPA-600 200.7	100	75 - 125	
Chromium	7191/EPA-600 200.8	20	75 - 125	
Copper	6010A/EPA-600 200.7	70	75 - 125	
Iron	6010A/EPA-600 200.7	100	75 - 125	
Lead	EPA-600 200.8	10	75 - 125	
Magnesium	6010A/EPA-600 200.7	300	75 - 125	
Manganese	6010A/EPA-600 200.7	50	75 - 125	
Mercury	EPA 245.1/EPA-600 200.8	2	75 - 125	
Nickel	6010A/EPA-600 200.7	75	75 - 125	
Potassium	6010A/EPA-600 200.7	10,000	75 - 125	
Selenium	EPA-600 200.8	20	75 - 125	
Silicon	6010A/EPA-600 200.7	580	75 - 125	
Silver	6010A/EPA-600 200.7	70	75 - 125	
Sodium	6010A/EPA-600 200.7	290	75 - 125	
Uranium	EPA-600 200.8	5	75 - 125	
Vanadium	6010A/EPA-600 200.7	80	75 - 125	
Zinc	6010A/EPA-600 200.7	20	75 - 125	

Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 4 of 6)

	Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
1	GENERAL CHEMISTRY				
2	Bromide	EPA-600 300.0	2000	75 - 125	Sample container 1 x 1-liter glass Preservative 4°C Holding time 28 days
3	Chloride		1000	75 - 125	
4	Fluoride		500	75 - 125	
5	Formate[i]		1250	75 - 125	
6	Nitrate		100	75 - 125	
7	Nitrite		100	75 - 125	
8	Sulfate		10,000	75 - 125	
9	Phosphate		1500	75 - 125	
10	Ammonia[e]	EPA-600 350.3/350.1	40	75 - 125	Sample container 250 mL glass Preservative H_2SO_4 to pH<2; 4°C Holding time 28 days
11	Total Kjeldahl nitrogen	EPA-600 351.2	600	75 - 125	
12	Cyanide	9010A/ EPA-600 335.3	100	75 - 125	Sample container 500 mL polyethylene Preservative 6M NaOH to pH>12; 4°C Holding time 14 days
13	Total dissolved solids	EPA-600 160.1	RL 10,000	75 - 125	Sample container 1 L glass Preservative None Holding time 7 days for pH - as soon as practical
14	Total suspended solids	EPA-600 160.2	RL 4,000	75 - 125	
15	Specific conductivity	EPA-600 120.1 (in lab)	RL 10[g]	75 - 125	
16	pH[h]	EPA-600 150.1/9040	RL +/- 0.1	75 - 125	
17	Total organic carbon	9060A	RL 1,000	75 - 125	Sample container 250 mL glass Preservative HCl or H_2SO_4 to pH<2; 4°C Holding time 28 days

Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 5 of 6)

Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
RADIONUCLIDES[j]				
Gross alpha	Laboratory specific	3 pCi/L	NA	Sample container 4 x 1-L glass Preservative HNO3 to pH < 2 Holding time 180 days
Gross beta	Laboratory specific	4 pCi/L	NA	
Gamma	Laboratory specific	NA	NA	
Americium-241	Laboratory specific	NA	NA	
Antimony-125	Laboratory specific	NA	NA	
Cerium-144	Laboratory specific	NA	NA	
Cesium-134	Laboratory specific	NA	NA	
Cesium-137	Laboratory specific	NA	NA	
Cobalt-60	Laboratory specific	NA	NA	
Curium-244	Laboratory specific	NA	NA	
Europium-154	Laboratory specific	NA	NA	
Europium-155	Laboratory specific	NA	NA	
Neptunium-237	Laboratory specific	NA	NA	
Niobium-94	Laboratory specific	NA	NA	
Plutonium-238	Laboratory specific	NA	NA	
Plutonium-239/240	Laboratory specific	NA	NA	
Radium-226	Laboratory specific	NA	NA	
Ruthenium-103	Laboratory specific	NA	NA	
Ruthenium-106	Laboratory specific	NA	NA	
Strontium-90	Laboratory specific	5 pCi/L	NA	
Tin-113	Laboratory specific	NA	NA	
Zinc-65	Laboratory specific	NA	NA	

Table B-1. Sample and Analysis Criteria for Influent Aqueous Waste and Treated Effluent.
(sheet 6 of 6)

Parameter	Analytical method[a]	Method PQL[b]	Accuracy/Precision for Method[k] (percent)	Sample container[c]/ Preservative[c]/ Holding time[d]
Carbon-14	Laboratory specific	NA	NA	Sample container 1 x 1-L glass Preservative No preservative added Holding time 180 days
Iodine-129	Laboratory specific	NA	NA	
Technicium-99	Laboratory specific	NA	NA	
Tritium	Laboratory specific	460 pCi/L	NA	

[a] SW-846 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.
[b] PQL is determined from method detection level (MDL), where PQL = 10 x MDL (for reagent-grade water); however, PQL is affected by sample matrix. PQL units are parts per billion unless otherwise noted.
[c] Sample bottle and preservatives could be adjusted, as applicable, to minimize sample volume.
[d] Holding time = time between sampling and analysis.
[e] Although the Final Delisting lists "ammonium" (NH_4^+), the standard analytical methods measure ammonia (NH_3). Ammonia is assumed to be the contaminant of concern.
[f] Methylene chloride is not analyzed for treated effluent sampling.
[g] Conductivity reported in micromhos per centimeter
[h] pH monitored in influent aqueous waste only.
[i] Analysis for formate only required if detected in the influent aqueous waste.
[j] PQLs provided for those radionuclides which are monitored as part of the Discharge Permit.
[k] Accuracy/precision used to confirm or re-establish MDL.
[l] VOC refrigerated composite sampler with syringe requires no chemical preservative.

mL = milliliter.
RL = reporting limit.
pCi/L = picocuries per liter.
PQL = practical quantitation limit
NA = not applicable.
ND = not determined.
MDL = method detection level.

Table B-2. Sample Containers, Preservative Methods, and Holding Times for ETF Generated Waste.

Parameter	Analytical Method[a]	PQL[b]	Accuracy/Precision for Method[c] (percent)	Container[d]	Preservative[e]	Holding time[f]
Total Solids	EPA-600 160.3	10,000	75 - 125	1-liter glass	None	180 days
pH	WAC 173-303-110 (3)(a)(ii)[g]/ EPA-600 150.1/9040	±0.1				as soon as practical
Nitrate	EPA-600 300.0/9056	see Table B-1				28 days
Volatile organic compounds (combined method target compound lists)	8240 or 8260A	see Table B-1	See Table B-1	2-40 ml amber glass w/septum	None	7 days
Semivolatile organic compounds (method target compound list)	8270B	see Table B-1	See Table B-1	4-1,000 ml amber glass	None	Extract within 7 days; analyze extract within 40 days
Mercury	EPA-600 200.8, 245.1/6020	see Table B-1	75 - 125	500 ml plastic/glass	None	Mercury 28 days; 6 months all others
Selenium	EPA-600 200.8/6020	see Table B-1				
Arsenic	EPA-600 200.8/6020	see Table B-1				
Cadmium	EPA-600 200.8/6020	see Table B-1				
Total metals (method target list)	EPA-600 200.8 6020/6010A/7000 Series	see Table B-1				
Toxicity Characteristic Leaching Procedure[h]	1311	NA	NA	NA	NA	NA

[a] SW-846 methods are presented unless otherwise noted. Other methods might be substituted if the applicable PQL can be met.
[b] PQL is determined from method detection level (MDL), where PQL = 10 x MDL (may vary depending on matrix). PQL units are parts per billion unless otherwise noted.
[c] Container size and type could be changed as directed by the laboratory, or as required by the analytical method.
[d] No preservatives are added to containers because of the anticipated high concentrations of salts.
[e] Holding time equals time between sampling and analysis.
[f] For solid waste.
[g] Extraction procedure, as applicable; extract analyzed by referenced methods [WAC 173-303-110(3)(c)].

PQL = practical quantitation limit
MDL = method detection level
mL = milliliter.

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APPENDIX 7A

BUILDING EMERGENCY PLAN FOR THE LIQUID EFFLUENT RETENTION FACILITY AND 200 AREA EFFLUENT TREATMENT FACILITY

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This plan covers the following buildings and structures:

200 Area Effluent Treatment Facility (ETF),
Liquid Effluent Retention Facility (LERF),
200 Area Treated Effluent Disposal Facility (TEDF), and
200 Area Effluent Treatment Facility Groundwater Transfer System (GTS).

Approved:

Building Emergency Director Date 5-14-98

Emergency Preparedness Date 5-14-98

Hanford Fire Department Date 5-13-98

This document will be reviewed annually and updated if necessary by the Building Emergency Director unless Hanford Facility RCRA Permit coordination requirements provides otherwise. The document will be approved by the primary Building Emergency Director, and approved by the Manager of Emergency Preparedness (or delegate) and the Hanford Fire Department.

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1.0 GENERAL INFORMATION

The 200 Area Effluent Treatment Facility (ETF) and the Liquid Effluent Retention Facility (LERF) are located in the northeast portion of the 200 East Area. The 200 Area Treated Effluent Disposal Facility (TEDF) and 200 Area ETF Groundwater Transfer System (GTS) are operated from the 2025E Building. Transfer piping systems for both TEDF and GTS are located in the 200 East and 200 West Areas. 200 East and 200 West Areas are located near the center of the Hanford Site, a 560-square-mile U.S. Department of Energy (DOE) site in southeastern Washington State. The Hanford Site Emergency Preparedness Program is based upon the incident command system which allows a graded approach for response to emergency events. This plan contains a description of facility specific emergency planning and response. It is used in conjunction with DOE/RL-94-02, *Hanford Emergency Response Plan*. Response to events is performed using facility specific and/or site-level emergency procedures.

1.1 Facility Names:
U.S. Department of Energy Hanford Site
200 Area Effluent Treatment Facility (ETF)
Liquid Effluent Retention Facility (LERF)
200 Area Treated Effluent Disposal Facility (TEDF)
200 Area ETF Groundwater Transfer System

1.2 Facility Locations: Benton County, Washington; within the 200 East and 200 West Areas.

ETF Buildings/facilities covered by this plan are:

- 2025E Building, Effluent Treatment Facility
- 2025EA Building, ETF Administration Building
- MO-269, Materials Control Trailer
- Load-in Station, Tanker truck load-in station

LERF Buildings/facilities covered by this plan are:

- Basins 42, 43, and 44, Liquid Effluent Retention Facility
- Change Trailer, Located directly between Basins 42 and 43
- 242AL71 Instrument Building, Located north between Basins 42 and 43
- Electrical Power Substation, North side of LERF

TEDF and GTS Buildings/facilities covered by this plan are:

- Transfer piping, 200 East and West areas
- 225W Building, Pump House 1 - 200 West Area
- 225E Building, Pump House 2 - 200 East Area
- 6653A Building, Pump House 3 - 200 East Area
- 6653 Building, Disposal Sampling Building

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

FACILITY MANAGER: Waste Management Federal Services of Hanford, Inc.
P.O. Box 700
Richland, Washington 99352

ORGANIZATION: 200 Area Liquid Waste Processing Facilities (LWPF)

1.4 Description of the Facility and Operations

1.4.1 Effluent Treatment Facility

The ETF treats various aqueous wastes generated at the Hanford site prior to discharging the effluent to a State Approved Land Disposal Site (SALDS), located adjacent to the 200 West Area.

The ETF operations structure is comprised of the following:

- Process area in 2025E Building
- Administration areas in 2025E and 2025EA Buildings
- Load-in Station
- External tank storage area.

The 2025E Building is a two story structure, with a control room on the second level overlooking the process area. The process area is a high bay, single story area of the 2025E Building. The process area is a Radiological Buffer Area (RBA). The RBA is a posted area and contains various Radiological Controlled Areas (RCA). The entire 200 East Area is classified as an RCA.

The external tank storage area is inside the fenced area immediately outside of the 2025E Building. The 200 East Area security fence encloses the ETF except for the discharge line from the verification tanks to the SALDS. This fence is used to control personnel access and exclude deer and other large animals from the facility.

Figure 1 shows the evacuation routes from the 2025E Building.

Figure 2 shows the ETF/LERF site staging areas.

1.4.2 Liquid Effluent Retention Facility

The LERF consists of three identical surface impoundments constructed with primary and secondary composite liners, a leachate detection, collection, and removal system between liners, and a floating cover. The LERF basins act as an interim storage location for aqueous waste from the 242-A Evaporator, groundwater, and other site remediation projects prior to treatment at ETF.

The LERF is a basin operations structure comprised of the following:

- Excavation and dikes (basins)
- Primary and secondary composite liners
- Leachate detection, collection, and removal system
- Cover
- Piping and pumps
- MO-727 - Change trailer
- 242AL71 Instrument Building

1.4.3 200 Area Treated Effluent Disposal Facility and Groundwater Transfer System

The 200 Area TEDF transports the 200 East and West Area facility effluents to a common disposal system. TEDF consists of approximately 62,000 feet of collection and transfer system piping, three pump stations, a sample building, and two 5-acre disposal ponds located southeast of ETF. The TEDF accepts liquid effluents from numerous sources in the 200 East and 200 West Areas that meet environmental permit requirements for disposal in the disposal ponds.

The GTS transfers groundwater extracted from the 200-UP-1 Operable Unit for interim storage at LERF and subsequent treatment at ETF. The system boundary begins at the first flowmeter from the 200-UP-1 pumps in the 200 West Area and ends at the connection to the LERF basins sample riser.

Figure 3 shows the major facility structures and liquid effluent sources for the SALDS, TEDF, and GTS.

1.5 Building Evacuation Routing

Figures 1 and 2 show building evacuation routes and staging areas.

1.5.1 Effluent Treatment Facility

The 2025E Building evacuation routes are shown in Figure 1. Primary and Alternate staging areas are shown in Figure 2.

1.5.2 Liquid Effluent Retention Facility

Primary and alternate staging areas are shown in Figure 2.

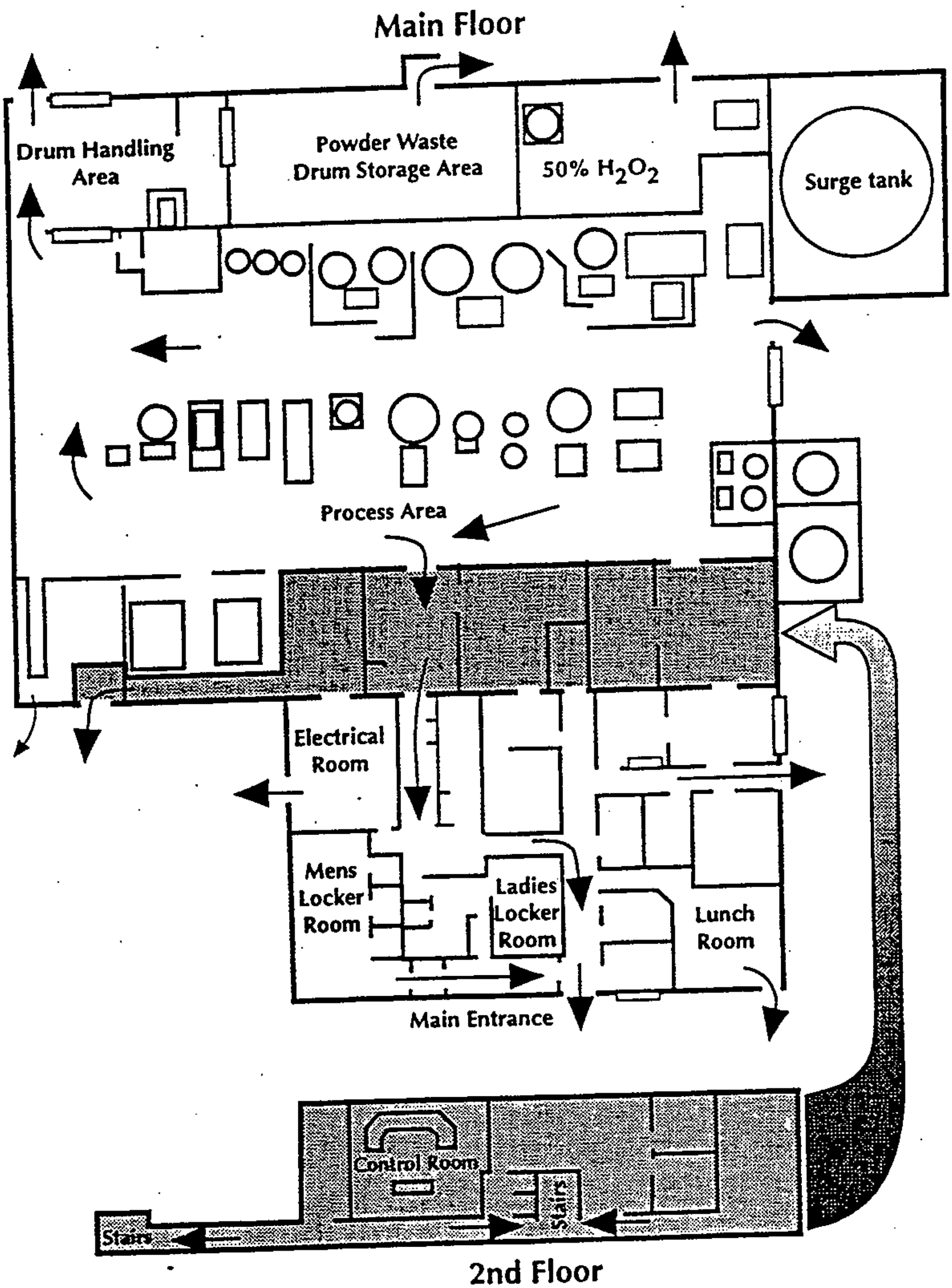
1.5.3 Treated Effluent Disposal Facility

Figure 3 shows the TEDF location.

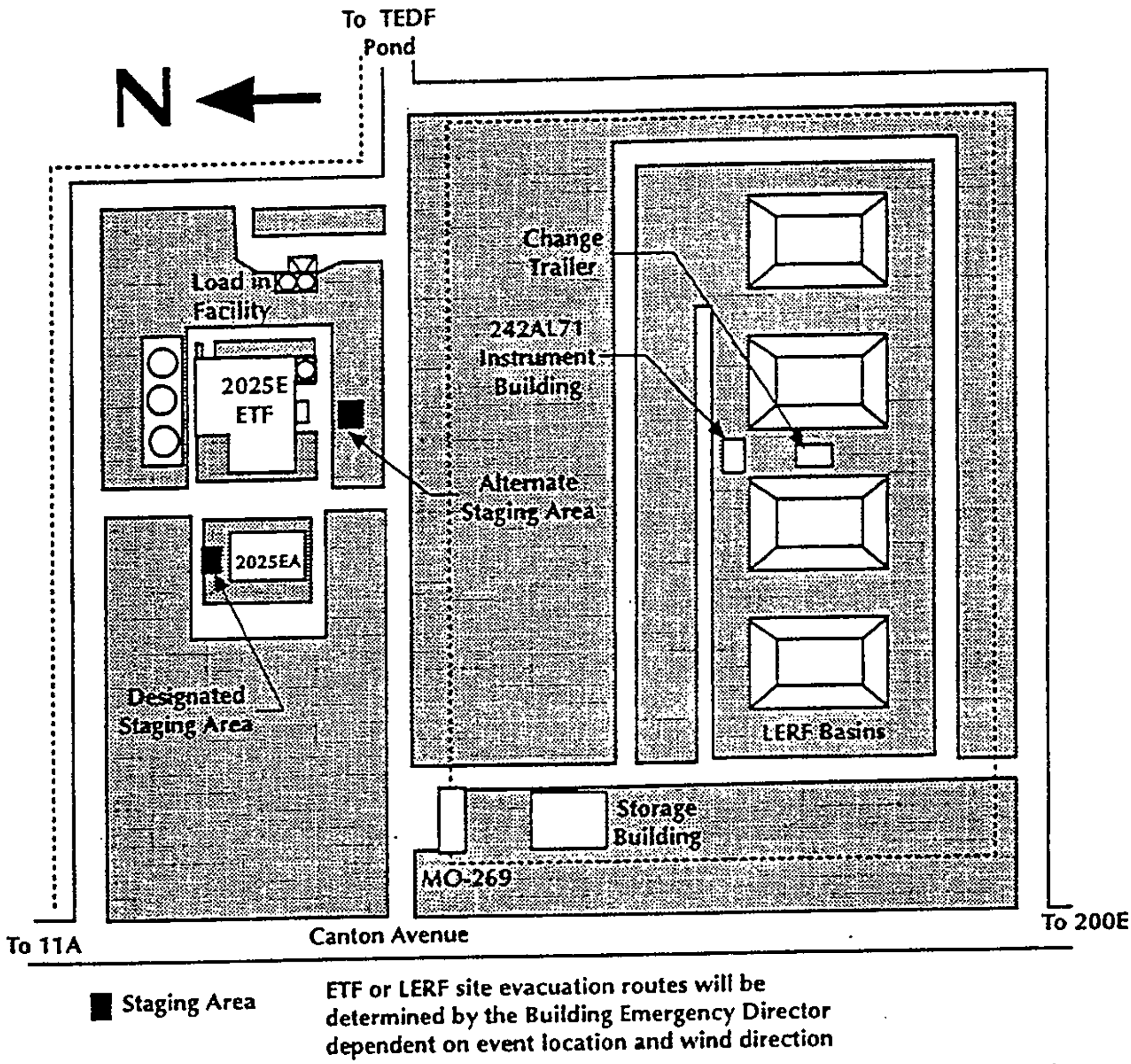
1.5.4 Groundwater Transfer System

Figure 3 shows the GTS location.

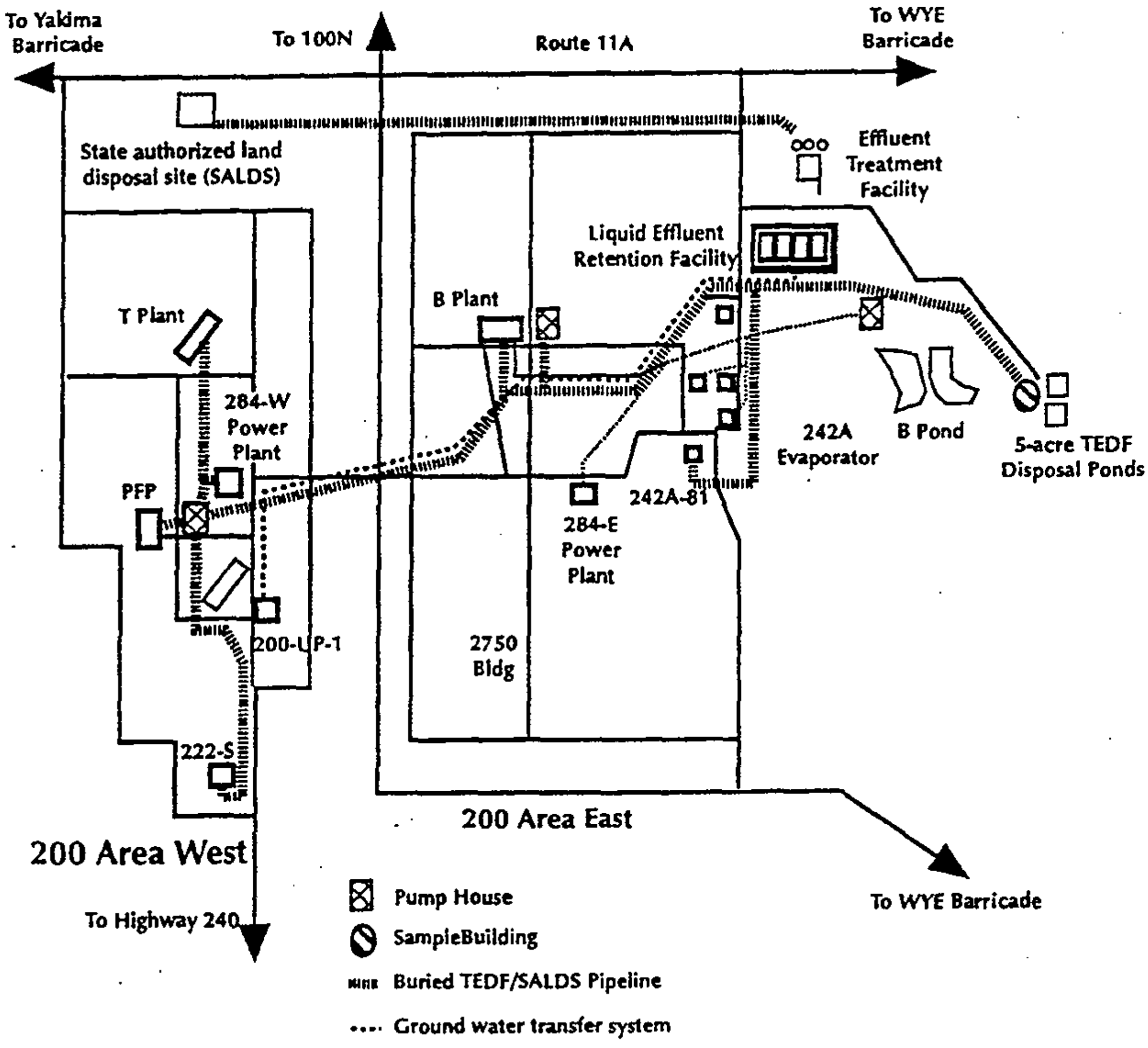
Figure 1, Evacuation Routes from 2025E



Figure, 2 ETF/LERF Site Plan



Figure, 3 200 Area LWPF SALDS, TEDF, Ground Water Transfer System



2.0 PURPOSE

This plan describes both the facility hazards and the impacts of upset and/or emergency conditions. "Emergency" as used in this document includes events meeting the Washington Administrative Code (WAC) 173-303 definition of Emergency as well as DOE-0232.1, "Occurrence Reporting and Processing of Operations Information," categories of Unusual Occurrence and Emergency. These events include spills or releases, fires and explosions, transportation activities, movement of materials, packaging, storage of hazardous materials, and natural and security contingencies. When used in conjunction with DOE/RL-94-02, *Hanford Site Emergency Response Plan*, this plan meets the requirements for contingency planning as required by WAC 173-303.

3.0 BUILDING EMERGENCY ORGANIZATION

The LWPF is staffed 24 hours each day, and is prepared to respond to emergencies through designated personnel with specific primary, on-call and alternate responsibilities. The ETF/LERF Building Emergency Director (BED) directs the emergency response until the Incident Commander arrives at the event scene. The BED is on duty 24 hours each day. The on-duty Shift Operations Manager is the designated primary BED. There is a designated alternate BED on day shift available for directing emergency response if required. Other personnel required as part of the building emergency organization are also on duty with either primary or alternate responsibilities. The following paragraphs describe this organization and the duties of designated personnel.

3.1 Building Emergency Director

Emergency response is directed by the Building Emergency Director (BED) until the Incident Commander arrives. The incident command structure and staff with supporting on-call personnel fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303.

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

A listing of the primary and alternate BEDs by title, work location, and work telephone numbers is contained in Section 13 of this plan. The BED is on the premises or is available through an "on-call" list 24 hours a day. Emergency Preparedness maintains a listing of BED names and work and home telephone numbers at the Patrol Operations Center (POC) in accordance with *Hanford Facility RCRA Permit*, Dangerous Waste Portion, General Condition II.A.4.

3.2 Other Members

As a minimum, the BED or designee appoints and trains individuals to perform as Personnel Accountability Aides and Staging Area Managers. The accountability aides facilitate the implementation of protective actions (evacuation or take cover) and the accountability of personnel after the protective actions have been implemented. Staging Area Managers coordinate/conduct activities at the staging area. In addition, the BED may identify additional support personnel (Radiological Control, Maintenance, Engineering, Hazardous Material Coordinators, etc.) to be part of the building emergency organization. Section 13.0, BUILDING EMERGENCY ORGANIZATION, of this plan discusses the location of information regarding positions, names, and telephone numbers. Copies are distributed to appropriate facility locations and to the Hanford Site Emergency Preparedness organization.

4.0 IMPLEMENTATION OF THE PLAN

To meet the requirements of WAC 173-303, this plan will be implemented when the BED has determined that a release, fire, or explosion involving dangerous waste or dangerous waste constituents that could threaten human health or the environment (WAC 173-303-360, Emergencies) has occurred at the facility. An incident requiring evacuation of personnel or the summoning of emergency response units will not necessarily indicate that the plan will be implemented. The incident classification process is described in DOE/RL-94-02, Section 4.2.

Under DOE guidance, this plan will be implemented whenever the BED determines that one of the incidents listed in Section 6.0 of this plan has or will occur and that the severity is or will be such that there is a potential to endanger human health or the environment (DOE Unusual Occurrence or Emergency).

DOE Declared Emergencies are assigned one of three classifications which, in the order of increasing severity, are: 1) Alert Emergency, 2) Site Area Emergency, and 3) General Emergency. The ETF/LERF implements responses to these DOE emergencies through this plan and criteria identified in DOE-0223, RLEP 1.1, Appendix 1-2.K, and other documents listed in Attachment A of this plan.

The BED assesses each incident to determine the response necessary to protect personnel, the facility, and the environment. If emergency assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911) is used to contact the POC and request the desired assistance. To request other resources or assistance from outside the facility, the POC business number is used (373-3800).

5.0 FACILITY HAZARDS

Facility hazards and potential targets are identified and evaluated in the hazards assessment required by DOE Orders for the ETF/LERF. The hazards assessment is not used in the Hanford Facility contingency planning program. The objective of this section of the emergency plan is to document all known hazards that pose significant risks to human health or to the environment and identify quantitative values for those significant risks.

Certain information in this plan pertains only to DOE Order considerations (e.g., discussions pertaining to hazards from hazardous materials and radioactive-only materials). Terms such as Emergency Response Protective Guidelines (ERPG), Alert Emergencies, Site Area Emergencies, and General Emergencies pertain only to DOE Order planning considerations. These hazards and terms are not part of the Hanford Facility contingency planning program. The only portion of this section that is part of the Hanford Facility contingency planning program are the chemical constituent hazards discussed in Section 5.3.

5.1 ETF Hazards

5.1.1 Hazardous Materials

Material Safety Data Sheets (MSDSs) are located in building 2025EA, rooms 101 and 104, and in the ETF Control Room.

Materials at the ETF defined in DOE Order guidance as potentially hazardous include chemicals added as part of the treatment process, chemicals added to prevent corrosion, and anti-foaming agents added to the evaporator. There are no explosives in the system, although some chemicals can react or decompose violently. Hazardous chemicals in the process liquid are discussed in Section 5.1.3.

Hazardous process chemicals identified in the hazards assessment are given in Table 1, including the associated DOE Order ERPG values. DOE Order emergency planning ensures that appropriate protective actions are taken for the full range of events from a release of hazardous material that has the potential to exceed limits.

Table 1. ETF HAZARDOUS PROCESS CHEMICALS

Hazardous Chemical	ERPG Values		
	1	2	3
50% hydrogen peroxide	NA	25 ppm	50 ppm
92% sulfuric acid	2 mg/m^3	10 mg/m^3	30 mg/m^3
50% sodium hydroxide	2 mg/m^3	40 mg/m^3	100 mg/m^3

ppm-parts per million; mg-milligram; m^3-cubic meter

5.1.2 Industrial Hazards

The industrial hazards associated with the facility include electrical equipment, rotating equipment, confined spaces, compressed gas cylinders, and propane tanks. The industrial hazards associated with the facility do not pose a threat to the human health or the environment. Industrial hazards are addressed in the building health and safety plan and maintenance programs.

5.1.3 Radioactive/Dangerous/Mixed Waste

5.1.3.1 Solid Form

There are three types of solid mixed wastes at ETF:

- Secondary waste powder - A dry powder with a low radioactivity level that may contain ammonium, sodium, sulfates, silicon, nitrates, calcium, magnesium, and trace metals. The ETF Process Run Plan will document the characterization of the waste streams. The process drum capacity is 55 gallons. Locations include the thin film dryer room, drum handling area, and the process drum storage area. Maximum radiological source terms and hazardous materials for the secondary waste powder are below the levels requiring evaluation for emergency preparedness concerns.

- Indirect Waste - Materials that are used in the treatment process. These materials include spent resin beads, spent reverse osmosis membranes, spent high efficiency particulate air (HEPA) cartridges, carbon filter medium, and spent filter elements. Storage locations could include all staged maintenance areas or satellite accumulation areas.

- Dry active waste - Small quantities of waste from routine operations and maintenance activities (i.e., rags, sampling media, etc.). Locations include the process area, external tank area, staged maintenance areas, and satellite accumulation areas.

5.1.3.2 Liquid Form

The aqueous waste treated at ETF may contain trace amounts of radioactive materials and/or dangerous chemical constituents. The radioactive/dangerous/ mixed waste is evaluated in the hazards assessment as required by DOE Orders. Maximum radiological source term and dangerous waste materials are evaluated in the ETF Process Run Plan. The amount present must be below the levels requiring reevaluation for emergency preparedness concerns prior to treatment.

The influent aqueous waste to the ETF is treated in the primary treatment train to remove contaminants to allow discharge to the ground in accordance with the Washington State Waste Discharge Permit. These contaminants are concentrated in the secondary treatment train and are addressed in Section 5.1.3.1.

Emergency planning activities include implementing instructions that evaluate conditions and consequences associated with abnormal radiation levels, as well as release of waste water. For the purposes of field measurements, the site boundary is defined as 100 meters from the facility buildings.

5.1.3.3 Gaseous Form

Airborne effluent streams are produced through the following:

- Radiological control area Heating Ventilation Air Conditioning (HVAC) system - exhaust from radiologically controlled areas.
- Vessel offgas system - Vapors and gases from the various tanks and treatment systems.

The vessel offgas HEPA filters remove particulate and condensate from the air stream before discharge to the radiologically controlled area HVAC system. The combined air stream passes through another HEPA filter and is monitored for radiation. Analysis shows that potential radioactive release levels are less than the values requiring event classification.

5.1.4 Criticality

A criticality is not a credible hazard at ETF. Emergency planning is not required.

5.2 LERF Hazards

5.2.1 Hazardous Materials

No hazardous material is stored at LERF. Small quantities of hazardous material could be used in maintenance and sampling activities. Any release of these materials would not be classed as a WAC 173-303 or DOE emergency. No emergency planning response is required.

5.2.2 Industrial Hazards

The industrial hazards associated with LERF include electrical equipment, rotating equipment, confined spaces, compressed gas cylinders, and propane tanks. The industrial hazards associated with the facility do not pose a threat to the health and safety of the general public or environment. Industrial hazards are addressed in the building health and safety plan and maintenance programs.

5.2.3 Radioactive/Dangerous/Mixed waste

5.2.3.1 Solid Form

Small quantities of low radioactivity mixed waste from routine operations and maintenance activities (i.e., rags, sampling media, etc.). Locations include sampling areas, staged maintenance areas, and satellite accumulation areas. Any release of these materials would not be classed as a WAC 173-303 or DOE emergency. No emergency planning response is required.

5.2.3.2 Liquid Form

The aqueous waste stored in the LERF basins may contain trace amounts of radioactivity with dangerous chemical constituents and is evaluated in the hazards assessment as required by DOE Orders. Maximum radiological source terms for LERF are below the levels requiring evaluation for emergency preparedness concerns. The chemical constituent of concern, based on worst case scenarios for process condensate from the 242-A Evaporator, is ammonia. DOE Order ERPG values are shown in Table 2.

Table 2 LERF WASTE CHEMICAL CONSTITUENTS OF CONCERN

Constituent	ERPG Values		
	1	2	3
Process liquid - Ammonia	25 ppm	200 ppm	1000 ppm

5.2.3.3 Gaseous Form

Airborne effluent streams produced from the wastewater in the basins is vented through the basin vent system. Analysis shows that potential for gaseous release levels are less than the values requiring event classification. However, release modes for the basin liquid are discussed in Section 5.2.3.2.

5.2.4 Criticality

A criticality is not a credible hazard at LERF. Emergency planning is not required.

5.3 TEDF and Ground Water Transfer System Hazards

The hazards associated with the TEDF and the GTS are industrial hazards only. Industrial hazards to facility personnel are addressed in the building health and safety plan and maintenance programs.

5.3.1 Hazardous Materials

Only small amounts of sample preservative chemicals are stored at the TEDF. There are no hazardous materials associated with the TEDF or GTS that would pose a threat to human health or the environment. However, maintenance and sampling activities might require the use of small quantities of hazardous materials. Hazards associated with maintenance and sampling activities are addressed in the health and safety plan and maintenance programs.

5.3.2 Industrial Hazards

The industrial hazards associated with the TEDF include electrical equipment, rotating equipment, confined spaces, compressed gas cylinders, and propane tanks. A propane storage tank for the pump house #1 Standby Power Generator is the only hazard above common industrial hazards. Response to an event involving the propane tank would be as a result of fire or explosion. The industrial hazards associated with the TEDF or GTS do not pose a threat to human health or the environment.

5.3.3 Radioactive/Dangerous/Mixed Waste

The level of radioactive/dangerous materials in the influent to TEDF allows for disposal as a nondangerous waste. The total inventory of the GTS is based on the volume of the transfer line and the concentration of contaminants in the 200-UP-1 groundwater. The radioactive/dangerous material inventories associated with the aqueous waste in the TEDF or GTS are sufficiently low that there is no threat to human health or the environment.

5.3.4 Criticality

A criticality accident is not credible at the TEDF or GTS.

6.0 POTENTIAL EMERGENCY CONDITIONS

The objective of this section is to identify WAC 173-303 and DOE Order potential emergency conditions and to identify the appropriate DOE Order emergency classification level. Protective action responses based on these classifications are discussed in Section 7.0. Technical justification for the values and limits identified in this section are provided in the hazards assessment required by DOE Orders for the ETF/LERF. The hazards assessment is not used in the Hanford Facility contingency planning program.

Potential emergency conditions fall into three basic categories: operational (process upsets, fires and explosions, loss of utilities, spills, and releases), natural phenomena (earthquakes and storms), and security contingencies (bomb threats, hostage situations). For operational emergencies, event frequency coupled with accident severity provide the criteria for emergency plan response.

Potential radioactive/dangerous/mixed waste release modes include fires, explosions, spills, or environmental releases. These events are evaluated based on the potential impact to operations and subsequent release of waste or hazardous materials. Potential consequences to human health or the environment are the ultimate criteria for event classification and protective response actions. Additionally, prolonged small releases are evaluated for their potential to impact human health or the environment.

6.1 Operational Emergencies

Operational emergencies for each facility are discussed in the following section.

6.1.1 ETF Operational Emergencies

6.1.1.1 Loss of Utilities

Loss of utilities would interrupt the treatment processes but would not be classed as a WAC 173-303 or DOE Order defined emergency.

6.1.1.2 Major Process Disruption/Loss of Plant Control

Process disruption/loss of plant control would interrupt the treatment processes but would not be classed as a WAC 173-303 or DOE Order defined emergency.

6.1.1.3 Pressure Release

The ETF has low pressure compressed air and steam systems. Loss of the compressed air or steam system(s) could result in loss of plant control or a process disruption. Process disruption/loss of plant control would interrupt the treatment processes but would not be classed as a WAC 173-303 or DOE Order defined emergency.

Compressed gas cylinders are used at the ETF. Failure of compressed gas bottles could cause flying debris hazards and are addressed as part of fire and/or explosion, Section 6.1.1.4

A process system pressure release is categorized as a condensate spray release. This is addressed as a radioactive/dangerous/mixed waste spill, Section 6.1.1.6.

6.1.1.4 Fire and/or Explosion

A fire/explosion could generate highly toxic and/or corrosive fumes. Flying debris might result from explosions and compressed gas cylinder failure. Process system disruption, loss of plant control, and breach of process system boundaries could result from the flying debris. Fire involving sulfuric acid might be classified as a Site Area Emergency.

6.1.1.5 Hazardous Material Spill

Hazards associated with process chemical spills include potential exposure to corrosive, oxidizing, or toxic materials, as well as potential environmental damage by the release of these materials to the air, water, or soil column. The hazards assessment required by DOE Orders identifies sulfuric acid and hydrogen peroxide spills as events that could pose significant risk or consequences to warrant emergency planning. Emergency classification criteria are provided in Table 3.

Table 3. HAZARDOUS MATERIAL EMERGENCY CLASSIFICATION

Event	Emergency Action Level	Emergency Classification
Sulfuric acid spill	Entire contents of tank or tanker truck spill is released **AND** fire involving the contents of the tank or tanker truck **AND** field measurements at facility boundary (100 meters) indicate sulfuric acid concentrations of 2 milligrams per cubic meter or greater.	Site Area Emergency
Hydrogen peroxide spill	A spill of greater than or equal to 6800 liters (1800 gallons) **AND** field measurements at facility boundary indicate hydrogen peroxide concentrations of 25 parts per million or greater.	Site Area Emergency

6.1.1.6 Dangerous/Mixed Waste Spill

The ETF inventories include large quantities of process liquid, secondary powder waste, indirect waste, and dry active waste. The hazards assessment has evaluated that there are no events that could pose significant risk or consequences to warrant emergency planning. ETF has the potential for minor exposures to radioactive material, corrosive, oxidizing or toxic materials, as well as localized environmental damage by their release to air, water, or soil column. Therefore, response for dangerous/mixed waste releases are included in the scope of emergency planning.

6.1.1.7 Transportation and/or Packaging Incidents

A transportation and/or packaging incident involving chemicals, dangerous/mixed waste, or samples could result in exposure to hazardous materials (corrosive, oxidizer, toxic) and/or low levels of radioactivity, as well as potential environmental damage by their release to the air, water, or soil column.

6.1.1.8 Radiological Material Release/Abnormal Radiation level

The ETF inventories include large quantities of process liquid, secondary powder waste, indirect waste, and dry active waste. Radioactive materials will accumulate in various treatment systems and in secondary waste powder. ETF has the potential for concentrating radioactive materials, therefore, response for abnormal radiation levels and radioactive material release are included in the scope of emergency planning. Criteria used to classify radiological emergencies is identified in Section 5.0.

6.1.1.9 Criticality

A criticality is not a credible accident at the ETF. Emergency planning is not required. The hazards assessment concluded that criticality is not credible at the ETF.

6.1.2 LERF Operational Emergencies

6.1.2.1 Loss of Utilities

Loss of utilities would interrupt the pumping and automatic sampling processes but would not be classed as a WAC 173-303 or DOE Order defined emergency.

6.1.2.2 Major Process Disruption/Loss of Plant Control

Major process disruption/loss of plant control would interrupt the pumping and automatic sampling processes but would not be classed as a WAC 173-303 or DOE Order defined emergency.

6.1.2.3 Pressure Release

The are no high pressure systems at LERF. A piping system breach is addressed as a radioactive/dangerous/mixed waste spill (Section 6.1.2.6).

6.1.2.4 Fire and/or Explosion

A fire/explosion could generate highly toxic and/or corrosive fumes.

6.1.2.5 Hazardous Material Spill

Process liquid releases are addressed in Section 6.1.2.6. Small quantities of hazardous material could be used in maintenance and sampling activities. A spill of these materials would not be classed as a WAC 173-303 or DOE Order emergency. No emergency planning response is required.

6.1.2.6 Dangerous/Mixed Waste Spill

The LERF inventories include large quantities of process liquid. The hazards assessment has determined events listed in Table 4 could pose significant risks or consequences and warrant emergency planning. LERF has the potential for exposures to radioactive material, corrosive, oxidizing or toxic materials, as well as environmental damage by their release to air, water, or soil column. Therefore response for dangerous/mixed waste release are included in the scope of emergency planning.

Table 4 Dangerous/Mixed Waste Emergency Classification

Event	Emergency Action Level	Emergency Classification
Loss of basin cover	Significant portion of basin (>50%) is uncovered AND ammonia concentration in liquid > 7200 ppm AND field measurements at facility boundary (100 meters) indicate ammonia concentrations >25 ppm.	Alert Emergency
Process liquid spray	Breach in LERF piping occurs outside containment barriers, spilling >37.8 liters (10 gallons) AND Ammonia concentration in liquid greater than 6800 ppm AND Field measurements at facility boundary (100 meters) indicate ammonia concentrations >25 ppm.	Alert Emergency
Process liquid spill	Spill of LERF liquid occurs outside containment barriers of >37.8 liters (10 gallons) AND Ammonia concentration in liquid > 2500 ppm AND Field measurements at facility boundary (100 meters) indicate ammonia concentrations >25 ppm.	Alert Emergency
Process liquid spill	Spill of LERF liquid occurs outside containment barriers of >280 liters (74 gallons) AND Ammonia concentration in liquid > 2500 ppm AND Field measurements at facility boundary (100 meters) indicate ammonia concentrations >200 ppm.	Site Emergency

6.1.2.7 Transportation and/or Packaging Incidents

A transportation and/or packaging incident involving hazardous chemicals, radioactive/dangerous/mixed waste, or samples could result in exposure to hazardous materials (corrosive, oxidizer, toxic) and/or low levels of radioactivity, as well as potential environmental damage by their release to the air, water, or soil column.

6.1.2.8 Radiological Material Release/Abnormal Radiation level

Refer to Section 6.1.2.6.

6.1.2.9 Criticality

A criticality is not a credible accident at LERF. Emergency planning is not required.

6.1.3 TEDF and GTS Operational Emergencies

6.1.3.1 Loss of Utilities

Loss of utilities would interrupt the pumping and automatic sampling processes but would not be classed as a WAC 173-303 or DOE Order defined emergency. No emergency planning response is required.

6.1.3.2 Major Process Disruption/Loss of Plant Control

Process disruption/loss of plant control could cause an inadvertent discharge of treated effluent or nontreated groundwater to a nonpermitted area. Discharge to an unauthorized area would not be classed as a WAC 173-303 or DOE Order defined emergency. No emergency planning response is required.

6.1.3.3 Pressure Release

There are no high pressure systems at the TEDF or GTS. A piping system breach is addressed in section 6.1.3.6.

6.1.3.4 Fire and/or Explosion

A fire/explosion could generate highly toxic and/or corrosive fumes.

6.1.3.5 Hazardous Material Spill

No hazardous material is stored in the TEDF pump houses. Small quantities of hazardous material could be used in maintenance and sampling activities. This would not be classed as a WAC 173-303 or DOE Order emergency. No emergency planning response is required.

6.1.3.6 Dangerous/Mixed Waste Spill

Influent to TEDF is a nondangerous waste. TEDF and groundwater releases would not be classed as a WAC 173-303 or DOE Order emergency. No emergency planning response is required for this event. LWPF surveillance serves as leak detection.

6.1.3.7 Transportation and/or Packaging Incidents

There are no transportation and/or packaging activities at TEDF or GTS.

6.1.3.8 Radiological Material Release/Abnormal Radiation level

TEDF process liquid meets discharge limits. A groundwater release would not be classed as a WAC 173-303 or DOE Order emergency. No emergency planning response is required for this event.

6.1.3.9 Criticality

A criticality is not a credible accident at TEDF or the GTS. Emergency planning is not required.

6.2 Natural Phenomena

6.2.1 Seismic Event

Depending on the magnitude of the seismic event, severe structural damage could occur at ETF/LERF, resulting in serious injuries or fatalities and the release of hazardous or radioactive materials to the environment. Damaged electrical circuits and wiring could result in the initiation of fires.

Any seismic event that is felt by personnel, with some minor facility damage, and disturbance of tall objects at ETF/LERF locations that house hazardous chemicals and/or radioactive materials requires classification as an Alert Emergency. An emergency classification upgrade could occur based on facility conditions and/or actual hazardous material or radioactive/dangerous/mixed waste releases determined by personnel assessing quake damage.

6.2.2 Ashfall/Snow Fall Roof Overloading

Ash or snow accumulations can cause actual roof or other structural damage to buildings containing hazardous material or radioactive/dangerous/mixed waste. There should be ample warning of an approaching large ashfall to allow the facilities to be placed in a stable condition.

6.2.3 High Winds/Tornados

An Alert Emergency classification is suggested when sustained wind speeds in excess of 40 meters per second (90 miles per hour) are observed and cause degradation of the facility safety boundary. An emergency classification upgrade could occur based on actual facility damage or release of hazardous materials, radioactive/dangerous/mixed waste.

6.2.4 Flood

A flood is not a credible accident at ETF/LERF because the facility is not within the Columbia River flood plain. Emergency planning is not required.

6.2.5 Range Fire

An Alert Emergency is suggested in the event that a range fire threatens any ETF/LERF building containing hazardous material or radioactive/dangerous/mixed waste.

6.2.6 Aircraft Crash

A Site Area Emergency classification is suggested if an aircraft crash occurs into or near ETF/LERF. An emergency classification upgrade could occur based on actual facility damage or release of hazardous material or radioactive/dangerous/mixed waste.

6.3 Security Contingencies

6.3.1 Bomb Threat/Suspicious Object

An Alert Emergency classification is required if there is a credible bomb threat or a confirmed explosive device located in ETF/LERF housing hazardous chemicals and/or radioactive material. If the device explodes, classification of the event will be performed as stated in Section 6.1.1.4, 6.1.2.4, or 6.1.3.4.

6.3.2 Hostage Situation/Armed Intruder

A hostage situation or armed intruder(s) at ETF/LERF requires an Alert Emergency classification. An emergency classification upgrade could occur based on actual facility damage or release of hazardous material or radioactive/dangerous/mixed waste.

6.3.3 Suspicious Object

The major effect on the facility due to recognizing a suspicious object is that the facility should be placed in a safe configuration, if time permits, and the facility evacuated.

7.0 INCIDENT RESPONSE

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

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in Section 6.0. DOE/RL-94-02, Section 1.3, provides concept of operations for emergency response on the Hanford Site

Incident responses are coordinated from the ETF control room or a designated alternate location.

7.1 Protective Actions Responses

7.1.1 Evacuation

The objective of a facility evacuation order is to limit personnel exposure to hazardous materials or radioactive/dangerous/mixed waste by increasing the distance between personnel and the hazard. The scope of the evacuation includes evacuation of the facility because of an event at the facility as well as evacuation of the facility in response to a site evacuation order. Evacuation will be directed by the BED when conditions warrant and will apply to all personnel not actively involved in the event response or emergency plan-related activities.

The BED will initiate the evacuation by directing an announcement be made to evacuate along with the evacuation location over a public address system, facility radios, and, as conditions warrant, by activating the 200 Area site evacuation/take cover alarms by calling the POC using 911 (preferred) or 373-3800. Personnel proceed to a predetermined staging area (shown in Figure 2), or other safe upwind location, as determined by the BED. The BED will determine the operating configuration of the facility and identify any additional protective actions to limit personnel exposure to the hazard.

Emergency organization personnel or assigned operations personnel will conduct a sweep of occupied buildings to ensure that all non-essential personnel and visitors have evacuated. For an immediate evacuation, accountability will be performed at the staging area. The BED will assign personnel as accountability aides and staging managers with the responsibility to ensure that evacuation actions are taken at all occupied buildings at the ETF or LERF complexes. All implementing actions executed by the aides/managers are directed by the emergency response procedures identified in Attachment A. When evacuation actions are complete, the aides/managers will provide a status report to the BED. The BED will provide status to the Incident Commander.

7.1.2 Take Cover

The objective of the take cover order is to limit personnel exposure to hazardous materials, or radioactive/dangerous/mixed waste when evacuation is inappropriate or not practical. Evacuation might not be practical or appropriate because of extreme weather conditions or the material release might limit the ability to safely evacuate personnel.

The BED will initiate the take cover by directing an announcement be made over the public address system, facility radios, and, as conditions warrant, by activating the 200 Area site take cover alarms by calling the POC using 911 (preferred) or 373-3800. Actions to complete a facility take-cover will be directed by the emergency response procedure in Attachment A. Protective actions associated with operations include configuring, or shutting down, the ventilation systems. Determination of additional take cover response is based on plant operating configuration, weather conditions, amount and duration of release, and other conditions, as applicable to the event and associated hazard. As a minimum, personnel exposure to the hazard will be minimized. The BED will assign personnel as accountability aides with responsibility to ensure that take-cover actions are taken at all occupied buildings at the ETF complex. All implementing actions executed by the aides/managers are directed by the emergency response procedure in attachment A. When take cover actions are complete the aides/manager will provide the BED with a status report.

7.2 Response to Operational Emergencies

Operations activities to isolate, contain, and mitigate an event can be performed in parallel with classification and protective action implementation. The response procedures are structured to allow parallel activity with clearly established priorities. The division of actions and workload between various personnel is such that coordinated team response will result in the successful implementation of both emergency operating actions and emergency planning requirements. Specific event mitigation strategy for each type of accident is provided in the following sections.

7.2.1 Loss of Utilities

The hazards assessment has determined that this occurrence does not pose significant risk to human health or the environment. This event is not classified as a WAC 173-303 or DOE Order defined emergency. No emergency planning is required.

7.2.2 Major Process Disruption/Loss of Plant Control

The hazards assessment has determined that this occurrence does not pose significant risk to human health or the environment. This event is not classified as a WAC 173-303 or DOE Order defined emergency. No emergency planning is required.

7.2.3 Pressure Release

The hazards assessment has determined that a pressure release does not pose significant risk to human health or the environment. This event is not classified as a WAC 173-303 or DOE Order defined emergency. No emergency planning is required. Hazardous material release and radioactive/dangerous/mixed waste releases are addressed in Section 7.2.5.

7.2.4 Fire and/or Explosion

On becoming aware of a fire and/or explosion, the discoverer notifies personnel (if any) in the immediate area and directs them to a safe location. The discoverer then activates the nearest fire alarm pull station, contacts 911 to request fire fighting assistance, and contacts the ETF control room to report the fire. As soon as non-essential personnel are notified of a fire (verbally or by fire alarm activation), they immediately exit the facility to a safe upwind location, account for their personnel, and follow the instructions of responding personnel. If personnel are reported as missing, and might be within the facility, the Hanford Fire Department conducts a search.

The BED is notified and initiates activation of the event command post and resources.

Operations personnel initiate a plant shutdown with the method (controlled or emergency) depending on the location and severity of the fire and the location and type of hazards in the affected area. A controlled shutdown is performed unless it is unsafe to remain in the control room. An emergency shutdown is performed if the control room must be evacuated. The Shift Operations Manager interfaces with the Hanford Fire Department and provides the following:

a. Location and health of personnel, including missing personnel and possible locations for fire fighters to search.

b. Location and severity of fire.

c. Known hazardous (radiological and nonradiological) conditions.

d. Facility operating status.

e. Utility systems status.

f. Support by radiological control personnel (i.e., monitoring, surveys, sampling, decontamination).

g. Facility layout, and facility known hazardous conditions, (i.e., electrical, thermal, flammable materials, pressurized cylinders, toxic gas, pressure systems, batteries, radiation areas, etc.).

h. Support for fire fighter activities as required.

Once the fire is extinguished, the Shift Operations Manager/BED ensures administrative restrictions are implemented to protect the facility, the workers, and the environment. The Shift Operations Manager/BED makes notifications as required and assists with recovery actions.

An incident requiring evacuation of personnel or the summoning of emergency response units does not necessarily indicate that the contingency plan has been implemented.

A fire or explosion involving 92% sulfuric acid will be classified as a Site Emergency. Actions described in Section 7.2.5.2 will be performed for this event.

7.2.5 Hazardous Material, Radioactive/Dangerous/Mixed Waste Spills or Releases

The ETF and LERF have engineering controls to contain or minimize spills. These controls include, containment berms, dedicated spill control sumps, remote gauges and level indicators as well as spray shields on chemical pipe flanges. LWPF procedures provide alarm response and maintenance actions for leak detection equipment, surveillance of possible leak locations, and response actions for detected spills.

Spills can result from many sources including process leaks, container spills or leaks, damaged packages or shipments, or personnel error. Spills of mixed waste are complicated by the need to deal with the extra hazard induced by the presence of radioactive materials.

If a spill or release is discovered, the discoverer performs the following actions:

1. Notifies the ETF control room and evacuates to a safe area

2. Remains available for consultation with the BED, Hanford Fire Department, or other emergency response personnel.

The control room operator performs the following actions:

1. Uses the public address system to notify the facility occupants of the event
2. Notifies the BED/HFD and relays information received from the event scene
3. Places the facility in a safe condition
4. Remains available to support further notification and response activities

The BED performs or arranges for personnel to perform the following actions:

1. Coordinates response activity and establishes a command post at a safe location
2. Obtains all available information pertaining to the incident and determines if the spill or release warrants implementation of the contingency plan in accordance with Sections 4.0, 6.1.5, and 6.1.9
3. Determines need for assistance from outside agencies and arranges for their mobilization and response
4. Initiates the appropriate announcements, if building or area evacuations are necessary
5. Arranges for care of any injured persons
6. Requests activation of the affected area emergency sirens/crash alarm system if a threat to surrounding facilities
7. Provides for event notification
8. Maintains access control at the incident site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control if control of the boundary is difficult. In determining controlled access areas, considers environmental factors such as wind speed and direction
9. Arranges for proper remediation of the incident after evaluation
10. Remains available for HFD, Hanford Patrol, and other authorities on the scene and provide all required information
11. Enlists the assistance of alternate BED(s), if around-the-clock work is anticipated
12. Refers media inquiries to the Media Relations/Communications offices of the contractors or DOE-RL.
13. Ensures the use of proper protective equipment, remedial techniques (including ignition source control for flammable spills), and decontamination procedures by all involved personnel, if remediation is performed by ETF personnel

14. Remains at the command post to oversee activities and to provide information, if remediation is performed by the HFD Hazardous Materials Response Team or other response teams

15. Ensures proper containerization, packaging, and labeling of recovered spill materials and overpack containers

16. Ensures decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations

17. Provides required reports after the incident.

7.2.5.1 Damaged, Unacceptable Hazardous Material, Dangerous and/or Mixed Waste Shipments

When a damaged shipment of hazardous material or dangerous waste arrives at the ETF and the shipment is unacceptable for receipt, actions will be taken to rectify the problem. If required, actions described in Section 7.2.5 are taken.

7.2.6 Radiological Material Release

At a minimum, actions described in Section 7.2.5 are taken. Abnormal radiation actions also may be implemented if conditions are warranted.

7.2.7 Criticality

The hazards assessment has determined that a criticality is not credible for ETF or LERF. No emergency planning is required.

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

The BED, in coordination with emergency response organizations, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The area of the initial incident is isolated by shutting off power, closing off ventilation systems, etc. The affected area containment is inspected for leaks, cracks, or other damage and for toxic vapor generation. Released material and waste remaining inside of containment structures are removed as soon as possible, and residual waste material is contained and isolated using dikes and adsorbents. Areas where residual released materials remain are covered or otherwise stabilized to prevent migration or spread from wind or precipitation run-off.

New structures, systems, or equipment are installed as required to enable better management of hazardous materials or dangerous waste. Adjacent operations in affected areas are reactivated only after cleanup of residual waste materials is achieved.

7.4 Response to Natural Phenomena

If other emergency conditions arise as a result of a natural phenomena event, response is appropriate for the condition created. For example: A fire due to lightning initiates the fire response actions and a spill of hazardous material due to an earthquake initiates spill response actions.

7.4.1 Seismic Event

The Hanford Site emergency response organization's primary role in a seismic event is coordinating the initial response to injuries, fires, and fire hazards, and acting to contain or control radioactive and/or hazardous material releases.

Individuals should remain calm and stay away from windows, steam lines, and hazardous material storage locations. Once the shaking has subsided, individuals evacuate carefully and assist personnel needing help. The locations of any trapped individuals are reported to the BED or are reported to 911 or 373-3800.

The BED takes whatever actions are necessary to minimize damage and personnel injuries, including:

- Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.),
- Conducting accountability,
- Securing utilities and facility operations,
- Arranging for rescue efforts, and notifying 911 or 373-3800 for assistance,
- Determining if hazardous materials were released,
- Determining current local meteorological conditions,
- Warning other facilities and implementing protective actions if release of hazardous materials poses a danger,
- Providing personnel and resource assistance to other facilities.

7.4.2 Volcanic Eruption/Ashfall

When notified of an impending ashfall, the BED implements measures to minimize the impact of the ashfall, including the following:

- Installing filter media over building ventilation intakes,
- Installing filter media or protective coverings on outdoor equipment that could be adversely affected by the ash (diesel generators, equipment rooms etc.),
- Shutting down some or all operations and processes,
- Sealing secondary use exterior doors,

7.4.3 High Winds/Tornados

On notification of impending high winds, the BED takes steps necessary to secure all outside doors and windows, and secure all outdoor waste and hazardous material handling activities. All doors and windows are shut, and personnel are warned to use extreme caution when entering or exiting the building. After the event, facility inspections are performed in accordance with the post-natural phenomena hazards inspection plan and procedure.

7.4.4 Flood

The hazard assessment determined that flooding at the LERF/ETF is not credible. No emergency planning response is required.

7.4.5 Range Fire

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the facility boundary, the response is as described for a fire.

7.4.6 Aircraft Crash

Response to an aircraft crash would be appropriate for the condition created. For example: A fire due to explosion or electrical shorts would initiate the fire response actions specified in Section 7.2.4.

7.5 Security Contingencies

7.5.1 Bomb Threat/Suspicious Object

7.5.1.1 Telephone Threat

Personnel receiving telephoned threats attempt to get as much information as possible from the caller. A form is available for personnel to keep by their telephone to use as a guide for getting useful information from the caller. On conclusion of the call, personnel notify the BED and Security.

The BED evacuates the facility and questions personnel at the staging area regarding any suspicious objects in the facility. When Security personnel arrive, their instructions are followed.

7.5.1.2 Written Threat

Receivers of written threats handle the letter as little as possible and notify the BED and Security. Depending on the content of the letter, the facility may or may not be evacuated. The letter is turned over to Security personnel and their instructions are followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation/armed intruder reports the situation to the BED and to the POC via 911 or 373-3800, if possible. The BED, after conferring with Security personnel, may covertly evacuate areas of the facility not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Security will determine the remaining response actions and will activate the Hostage Negotiating Team, if necessary.

7.5.3 Suspicious Object

The discoverer of an suspicious object reports it to the BED and to the POC via 911 or 373-3080, and, if possible, ensures that the object is not disturbed.

The BED orders evacuation of the facility and (based on the description provided by the discoverer) attempts to determine the identity or owner of the object. This may be done by questioning facility personnel at the staging area.

If the identity/ownership of the object cannot be determined, then Security assumes command of the incident. The canine unit is used to determine if the package contains explosives. If there is a positive indication of explosives or it cannot be assured that there are no explosives, then the Richland Police Department's Emergency Ordinance Disposal Team is dispatched to the facility to properly dispose of the device.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

The DOE/RL-94-02, *Hanford Emergency Response Plan*, Section 8.0, describes these considerations. The extent by which these actions are employed is based upon the incident classification of each event. In addition, DOE/RL-94-02 contains considerations for the management of incompatible wastes, which may apply.

8.1 Termination of Event

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

8.2 Incident Recovery and Restart of Operations

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

If this plan is to be implemented for a WAC emergency (see Section 4.0), the Washington State Department of Ecology is notified before operations can resume. The DOE/RL-94-02, *Hanford Emergency Response Plan*, Section 6.1 discusses different reports to outside agencies. This notification is in addition to other required reports and includes information documenting the following conditions:

1. There are no incompatibility issues with the waste and released materials from the incident.

2. All the equipment has been clean, fit for its intended use, and placed back into service. The notification may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in WAC 173-303-360(2)(k).

For emergencies not involving activation of the RL-EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of DOE-RL to restore conditions to normal. This process is detailed in DOE-RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization is appointed by the appropriate contractor's management.

8.3 Incompatible Waste

After an event, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by facility personnel or other assigned personnel. DOE/RL-94-02, Section 8.3, describes actions to be taken.

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

If incompatibility of wastes was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected.

8.4 Post Emergency Equipment Maintenance and Decontamination

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

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

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in DOE/RL-94-02, Appendix A.

9.1 Fixed Emergency Equipment

FIXED EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Safety shower/eye wash stations (ETF only)	1 - 2025E Rm 122 Decon Station 1 - 2025E South Wall of Process Area 1 - 2025E Rm 134 1 - Outside south 2025E near acid/caustic tanks 1 - Outside at Load-in station	Assist in flushing chemicals/materials from the body and/or eyes and face of personnel.
Wet pipe sprinkler (ETF only)	Throughout the ETF except those areas protected by pre-active sprinklers.	Assist in the control of a fire.
Preactive sprinkler (ETF only)	Control room, communications room, electrical equipment room	Assist in the control of a fire. Maintained dry to prevent accidental damage to equipment.
Fire alarm pull boxes (ETF only)	All high traffic areas in operations administration and support areas, truck bay, and process area	Activate the local fire alarm

9.2 Portable Emergency Equipment

PORTABLE EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Fire extinguisher ABC type	Throughout ETF (Administrative/Support areas), LERF, and TEDF	Fire suppression for Class A, B, and C fires
Fire extinguisher BC type	Throughout ETF (process area and electrical room)	Fire suppression for Class B and C fires
Portable safety showers and Eye Wash Stations	As needed for special evolutions and maintenance	Assist in flushing chemicals/ materials from the body and/or eyes and face of personnel.

9.3 Communications Equipment/warning Systems

COMMUNICATIONS EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Fire alarms (ETF only)	Corridors, locker rooms, process area, drum storage, and truck bay	Audible throughout ETF
Take cover/evacuation	Site Emergency Alarm System	Audible outside buildings and inside administrative buildings
Public address system (ETF Only)	Throughout the ETF	Audible throughout ETF
Portable radios	Operations and maintenance personnel	Communication to control room
Telephone	ETF - control room, 2025E, 2025EA offices, MO-269. LERF - MO-727 and 242AL71 instrument building TEDF - 225E(pump house 1), 225W (pump house 2), 6653 (sample building), 6653A (pump house 3)	Internal and external communications. Allows notification off outside resources (POC, HFD, Hanford Patrol, etc,.)
Crash alarms (ETF only)	Control room, 2025EA Rm 101	Audible in ETF control room
Process alarm (ETF only)	ETF - beacon near IX columns	Visible from ETF control room

9.4 Personal Protective Equipment

PERSONAL PROTECTIVE EQUIPMENT		
Self contained breathing apparatus (SCBA)	5 - 2025E Rm 122 2 - 2025E Control room area 2 - Outside southeast 2025E.	Breathable air for initial response to emergency, and recovery activities when required
Acid suits	3 each included in the spill response cabinets in 2025E.	Chemical protection for personnel during containment and isolation.
Respirators	2025E Rm 203	Filtered air for recovery of known hazards.

9.5 Spill Control and Containment Supplies

SPILL KITS AND SPILL CONTROL EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Spill bag	1 - TEDF 6653 Disposal Sampling Building. 1 - 90-day storage CONEX East of 2025E building	Support containment and cleanup of 6 gallons of acids or bases.
Drum spill kit	2 - 2025E building in process area. 1 - MO-727 Change Trailer	Support containment and cleanup of 51 gallons of acids or bases.
Spill cart	2 - 2025E building in process area	Support containment and cleanup of 77 gallons of acids or bases.
Spill response cabinet	1 - 2025E Rm 122 1 - outside southeast side of 2025E.	Support equipment for spill response.
Spill bag	1 - 2025E Rm 112 1 - 2025E upper level process area.	Support containment and cleanup of 10 gallons of acids or bases.

9.6 Emergency Response Center

For emergencies not requiring evacuation, the BED and support personnel will assemble in the ETF control room, ETF control room, or other location as identified by the BED.

10.0 COORDINATION AGREEMENTS

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

11.0 REQUIRED REPORTS

Post incident, written reports are required for certain incidents on the Hanford Site. The reports are described in DOE/RL-94-02, Section 6.1.

12.0 PLAN LOCATION

Copies of this plan are maintained at the following locations:

- ETF control room
- 242-A Evaporator control room
- Operations Managers office (Building 2025EA, room 101)
- 200 LWPF regulatory file

13.0 BUILDING EMERGENCY ORGANIZATION

BED	TITLE	WORK LOCATION	WORK PHONE
PRIMARY	Shift Operation Manager (SOM)	2025E Building - ETF control room or 242-A Evaporator control room	373-9000 373-2737
ALTERNATE	Operations Manager	2025EA Building, room 101	373-4565

The complete building emergency organization listing of positions, names, work locations and telephone numbers for essential LWPF personnel is maintained in the organization administrative procedures. Copies are distributed to appropriate facility locations and to Emergency Preparedness. In addition, work and home telephone numbers of the BEDs and alternates are available from the POC (373-3800) in accordance with Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4.

14.0 REFERENCES

DOE-0223, *Emergency Plan Implementing Procedures*:

DOE-0232.1, "Occurrence Reporting and Processing of Operations Information", U.S. Department of Energy, Washington D.C.

DOE/RL-94-02, Hanford Site Emergency Response Plan

DOE Order 5500.1B, *Emergency Management Systems*

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Washington State Department of Ecology, Olympia, Washington.

29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*

NIOSH, *Pocket Guide to Chemical Hazards*, National Institute of Occupational Safety and Health, U.S. Department of Health and Human Resources, Public Health Service, Centers for Disease Control, Washington, D.C.

ATTACHMENT A

Listing of Procedures and Guides

Site-Wide Procedures

DOE-0223, *Emergency Plan Implementing Procedures*:

- RLEP-1.1, "Hanford Incident Command System and Event Recognition and Classification," Appendix 1-2.K;
- RLEP-3.4, "Emergency Termination, Reentry, and Recovery."

Facility-Specific Emergency Response Procedures and Guides

EP-85B-001	Safety Shutdown
EP-85B-002	Minor Spill
EP-85B-003	Major Chemical Spill
EP-85B-004	Abnormal Radiation Levels
EP-85B-005	Fire/Explosion
EP-85B-006	Loss of AC Electrical Power
EP-85B-007	Take Cover
EP-85B-008	Evacuation

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APPENDIX 8A

TRAINING PLAN

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1.0 PURPOSE

This document outlines the Dangerous Waste Training Program (DWTP) for the 200 Area Liquid Waste Processing Facilities (LWPF) organization. The 200 Area Effluent Treatment Facility (ETF), Liquid Effluent Retention Facility (LERF), and 242-A Evaporator are under the control of LWPF and each is permitted as a Treatment, Storage, or Disposal (TSD) unit on the Hanford Facility.

The program is designed for compliance with the requirements of Washington Administrative Code (WAC) 173-303-330 and Title 40 Code of Federal Regulations (CFR) 264.16 for the development of a written dangerous waste training program. These training requirements were determined after assessment of employee duties and responsibilities.

2.0 SCOPE

This Dangerous Waste Training Plan applies to personnel who perform work at, or in support of, the 200 Area Effluent Treatment Facility (ETF), Liquid Effluent Retention Facility (LERF) and the 242-A Evaporator. This Dangerous Waste Training Plan defines the minimum required training for employees to perform tasks associated with dangerous waste(s).

The LWPF training program is designed to ensure that employees who operate and maintain LWPF systems/equipment receive the training they require to safely operate and maintain LWPF systems/equipment in a effective and environmentally sound manner. In addition to preparing employees to operate and maintain LWPF equipment/systems under normal conditions, this training program ensures that employees are prepared to respond in a prompt and effective manner should off-normal or emergency conditions occur.

3.0 DEFINITION

NONE

4.0 RESPONSIBILITIES

4.1 Training Manager

The LWPF Facility Manager has overall responsibility for all training required by Washington Administrative Code (WAC) 173-303-330 and Condition II.C of the Hanford RCRA Permit (DW portion) at LWPF. To meet the training requirements in WAC 173-303-330(1)(a), the training director position is described in Chapter 8.0 of DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General Information Portion.*

4.2 Facility Management (including Team Leaders)

Develop and administer a comprehensive training program for employees.

Ensure annual training on dangerous waste(s) is provided to affected employees.

Ensure all applicable training requirements are met.

4.3 Operations Management

Ensure Operations personnel are trained.

Ensure required certifications are maintained.

4.4 Training Personnel

Maintain knowledge in the area of waste management, including updates.

Re-evaluate training courses at least every year to ensure waste training requirements continue to be met.

4.5 Employees

Handle dangerous waste(s) in accordance with applicable regulations.

Minimize personal exposure to all dangerous wastes.

Inform management of problems concerning dangerous waste handling / storage / disposal.

5.0 PROCEDURE

The LWPF Dangerous Waste Training Program is implemented based on training requirements related to job responsibilities. Personnel affected by the Dangerous Waste Training Program complete those portions of the training curriculum delineated in the company level environmental compliance manuals, and tracked by the (computerized) Training Matrix (TMX), prior to performing unsupervised work in a facility.

Personnel new to LWPF, or changing positions within LWPF, complete the required dangerous waste training within six months of the assignment. Personnel who have not completed required training are permitted to perform work requiring handling dangerous wastes at LWPF only under the supervision of a trained employee. LWPF operations management is responsible for ensuring that all operations personnel are trained and required certifications are maintained.

5.1 Identification of Training

The required training is specified by the employee's specific job duties as determined by a job analysis or management assessment. Training requirements for individual operations personnel can be found in TMX. Required training is based on worker positions/job titles described in this plan and listed on Attachment 3, Required LWPF Training.

5.2 Dangerous Waste Worker Positions

Employee duties have been categorized within six worker positions. In the event personnel duties and responsibilities overlap and fall into more than one position, the employee will complete the training requirements for each position. The six worker positions are: 1) All Employee, 2) General Worker, 3) Advanced General Worker, 4) General Manager, 5) General Shipper, and 6) Waste Designator.

The level of training is determined by the duties associated with each worker position. The description of job duties for each position can be matched to individual job titles held by employees at the Hanford Site. The determining factor for placing a specific worker within any of the worker positions are the duties of the worker's job.

5.3 Job Title and Descriptions

Each employee is assigned a job title and job description. The job descriptions include requisite skills, work experience, education, and other qualifications, and a brief list of duties and/or responsibilities for each position. Work experience, education, and other qualifications required for each position are maintained by the company's human resources department.

In the following sections, brief job titles and job descriptions of employees associated with dangerous waste management at LWPF are listed within the appropriate position.

1) **All Employees**

Employees included in this position are those personnel who do not fall into one of the other five positions and have no duties or responsibilities directly associated with dangerous waste. The types of personnel in this position typically include Secretaries, Clerks, and Oversight (example: Quality Assurance) Personnel.

Most non-Hanford Facility Personnel will be categorized as All Employees since they generally tour, provide oversight, or are brought on site for interviews. Other non-Hanford Facility Personnel who gain access to the LWPF facilities to complete work in controlled areas but do not become involved in the management of dangerous or mixed waste will be categorized as All Employees.

2) **General Worker**

Facility or support personnel with limited dangerous waste management duties, which include general activities associated with the generation of waste, facility maintenance or modification, are categorized as General Workers. Job duties and responsibilities for general workers are not unit specific.

Hanford Facility personnel categorized as General Workers may be assigned duties and responsibilities for:

Placing waste generated into pre-approved containers and filling out log sheets where applicable.

Completing radiological surveys of dangerous or mixed wastes.

The loading of packaged containers onto trucks or movement of containers.

Responding to a spill or release of known contents where the duties and responsibilities are limited to containing the spill/release, returning the drum to an upright position, and placing the known spilled material or waste into a pre-approved container.

Applying advanced container markings or labels based on direction from an Advanced General Worker, General Manager, or General Shipper.

Support organizations management and technical support personnel assist management in the safe, effective, efficient, and environmentally acceptable operation and maintenance of the facilities. Personnel who function as general workers may include, but are not limited to: maintenance personnel, radiological control technicians (RCTs), craftspeople, supervisors of general workers, truck drivers, and laboratory personnel.

3) **Advanced General Worker**

Nuclear Process Operators (NPOs) and designated environmental engineering personnel are categorized as advanced general workers, based on job duties. Their activities either generate and manage dangerous waste or they operate the facility systems and processes.

Examples of the duties and responsibilities of an Advanced General Worker for management of dangerous waste in containers include: container inspection, determining advanced container markings and preparing container log sheets, completing waste inventories, sampling of waste, responding to spills and releases of waste in accordance with approved procedures, etc.

LWPF NPOs responsibilities and duties include:

- Operate the ETF, LERF and 242-A Evaporator facilities.
- Package and transport waste samples.
- Perform sampling.
- Conduct routine inspections.
- Provide surveillance.
- Respond to facility alarms.
- Respond to abnormal and/or emergency conditions.

4) **General Manager**

Personnel identified as General Managers coordinate, direct and oversee the work of general or advanced general workers in the management of dangerous waste or in the operation and control of the facility. Other duties may include command responsibilities during emergency events requiring implementation of the contingency plan. The personnel at LWPF who may be categorized as General Managers include: the Operations Manager (OM), Shift Operations Managers (SOMs), Environmental Compliance Officer (ECO), Cognizant Engineers (Cogs), Persons In Charge (PICs), and Hazardous Material Coordinator (HMC). The TMX identifies employees currently filling these positions.

a) **Operations Manager (OM) responsibilities include:**

- Supervise, coordinate, and direct the activities of the SOMs.
- Maintain control over the LWPF unit operations in accordance with established operating procedures and policies, DOE Orders, and Federal and State regulations.
- Direct, control, and coordinate the storage and transfer of dangerous waste.
- Comply with LWPF discharge permits, delisting, and operating limits.
- Provide guidance to SOMs during abnormal or emergency conditions.

b) **Shift Operations Managers (SOMs) responsibilities include:**

- Supervise and coordinate LWPF operation and maintenance activities.
- Maintain control of LWPF unit operations in accordance with established policies and operating procedures, DOE Orders, and Federal and State regulations.
- Conduct pre-job safety meetings with personnel.
- Maintain operational records.
- Review and revise LWPF operations procedures.
- Recognize and respond to abnormal and/or emergency conditions.
- Supervise the storage, handling, and transfer of dangerous waste.
- Comply with LWPF discharge permit/Delisting requirements and operating limits.

c) **Environmental Compliance Officer (ECO) responsibilities include:**

- Maintain Operations Management awareness of environmental compliance requirements and issues.
- Provide support to ensure compliance with applicable environmental rules and regulations.
- Serve as LWPF's liaison on environmental issues and permits.
- Advise LWPF management of emerging environmental. requirements and policies, and recommend implementation strategies to ensure compliance.
- Ensure compliance with LWPF discharge permit/Delisting requirements.

d) **Cognizant Engineers (Cog Engs) responsibilities include:**

- Ensure emergency and monitoring equipment, process equipment, procedures, designs, etc., comply with DOE Orders, Federal and State regulations, national standards, and applicable engineering procedures and management standards.
- Issue and maintain operating documentation, operating procedures, flowsheets, sample schedules, specifications, process test plans and procedures, operational safety requirements, etc.
- Perform evaluations of LWPF unit process to ensure compliance with process control requirements and discharge permits/Delisting.
- Prepare and approve engineering design documents and drawings in compliance with applicable policies, procedures, and instructions per national standards and codes.
- Provide technical assistance for hazardous material and dangerous waste spill response.

e) **Person In Charge (PIC) responsibilities include:**

- Provide in-field direction of tasks in progress.

f) **Hazardous Material Coordinator (HMC) responsibilities include:**

- Create and maintain Satellite Accumulation Areas (SAAs), as needed, for maintenance of waste generated at LWPF in accordance with applicable requirements.
- Supervise and coordinate dangerous waste storage and transfer.
- Provide approved storage containers and applicable markings.
- Interface with other organizations to ensure proper and timely disposal of waste.
- Prepare and maintain applicable waste handling documentation in accordance with DOE Orders and Federal and State regulations.
- Ensure non-regulated alternatives are used whenever possible.
- Provide review and waste disposition instructions as required.

5) **General Shipper**

General Shippers prepare and sign waste movement documentation for on-site and off-site shipments of dangerous waste. Additionally, at LWPF they are involved in the development and approval of hazardous waste procedures. Designated environmental engineering personnel are categorized as General Shippers as noted on the TMX. The Environmental Compliance Officer should also meet all training requirements for a General Shipper.

6) **Waste Designator**

Personnel who perform and/or complete waste designations at unit/buildings are categorized as waste designators under the RCRA training program.

5.4 Type and Amount of Training

This section provides an overview of dangerous waste management and job-specific training provided to employees in job titles and positions discussed in the previous sections. In addition to normal operating conditions, all employees are trained on emergency equipment, systems, and procedures to include the following, as applicable to meet the requirements in WAC 173-303-330(1)(d):

- Procedures for using, inspecting, and maintaining emergency response equipment.
- Automatic and manual waste feed cut-off systems.
- Communication and alarm systems.
- Response to fires and explosions.
- Response to dangerous waste contamination incidents and spills.
- Shutdown of operation.

LWPF uses existing courses to the maximum extent practical, ranging from introductory to task specific waste training. Attachment 1 gives listing of the classes, with brief descriptions, required for the stated job classifications and Attachment 2 provides a matrix of job positions and required training.

Support organization employees are also required to complete identified facility specific training applicable to their involvement with dangerous waste management. LWPF Managers and Team Leaders are responsible for identifying individual employee training requirements, in accordance with this plan, and for ensuring training requirements are met.

1) Training for Emergency Response

Federal and state regulations require all employees be able to respond effectively to emergencies and employees be familiar with emergency procedures, emergency equipment, and emergency systems. Specific topics required by federal and state dangerous waste regulations are addressed throughout the Dangerous Waste Training Program and are included in the following training, as applicable:

- Waste Management Awareness.
- Facility Specific Orientation, including Building Emergency Plan.
- Facility Emergency and Hazard Information Checklist.
- Nuclear Process Operator certification.
- Building Emergency Director training.

2) **Non-Hanford Facility Personnel Training**

Non-Hanford Facility personnel who will be performing unsupervised work at LWPF must complete training required by WAC 173-303 and 40 CFR 264.16.

Non-Hanford Facility personnel who not will be performing un-supervised work in a facility, such as touring a facility, must be escorted by facility personnel with the training required for the tasks.

The TSD Unit Manager is responsible for ensuring non-Hanford Facility personnel meet applicable access requirements before granting access to the facilities.

5.5 Relevance of Training to Positions

The dangerous waste training program for LWPF employees was developed after reviewing state and federal regulations and the completion of a job analysis for selected positions. Tasks performed by employees were identified and evaluated to determine training requirements. In addition, training needs are evaluated continually in relation to current state and federal regulations.

The LWPF Dangerous Waste Training Program ensures personnel responsible for waste handling are trained properly to perform the job duties pertinent to the handling, storage, treatment, and/or disposal of dangerous wastes.

5.6 Conduct of Training

Training is provided using classroom instruction, On-the-Job Training, and/or computer based training methods. Training is developed and provided by personnel knowledgeable in dangerous waste management policies/procedures.

Hanford Facility personnel shall maintain appropriate knowledge and skills by reviewing training material, required reading, self-paced instruction manuals, lessons learned, group discussions, continued training, etc.. Employees requiring certification are required to recertify annually or biennially, as applicable.

5.7 Documentation of Training

Classroom training is documented on course completion rosters, which are signed by students attending the course. Written examinations are signed by the student at the time of taking the exam and when reviewed with the instructor who grades the examination.

Training record files for LWPF employees are stored in the TMX computer database, which is accessed by the Facility Records Specialist. A report is generated from the database to inform facility management when an employee's training is within 90 days of expiration. An example of a TMX report is included in Attachment 3. Copies of completed TSD unit-specific training certifications/qualifications are available from the LWPF Training Department. Additional information regarding training records can be accessed through the Human Resources Information System (HRIS). The HRIS system is managed by the Hanford Training Records organization.

Training record summaries for support organization employees are also stored in the HRIS system. Training records for former employees are kept on the HRIS system for three years from the date the employee last worked at LWPF. Original signed and dated training records are maintained by the Hanford Training Records organization. These records are transferred quarterly to the Records Holding Facility in Richland, Washington. After approximately one year at the Records Holding Center, the original training records are archived.

1) **Access of Training Records**

When a training record is requested during an inspection, an electronic data storage record will be provided. If an electronic data storage record does not satisfy the inspection concern, a hard copy training record will be provided. Training records of former employees may not be readily available to facility personnel and may require a representative from the Training Records organization to access this information.

2) **Determining Current Training Status**

The electronic data storage training record, coupled with this training plan, will give the ability to quickly determine the training status of personnel in the field.

3) **Personnel List**

A list of personnel for Advanced General Workers, General Managers, General Shippers and Waste Designators is maintained on TMX, including the direct link between these positions and the individuals filling the positions. The TMX is updated quarterly.

6.0 ATTACHMENTS

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS
ATTACHMENT 2. REQUIRED LWPF TRAINING
ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS

The following list of courses constitutes the RCRA training program courses as determined by
(1) the Dangerous Waste Regulations WAC 173-303,
(2) the Hanford Facility RCRA Permit, and
(3) correspondence between RL and Ecology on dangerous waste training.

HANFORD TRAINING COURSES

Title / course number	**000001 Hanford General Employee Training**
Description	Course covers DOE orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazard communications, dangerous waste, fire prevention, personal protective equipment, safety requirements, certain unit/building orientation refresher training, emergency preparedness, accident reporting, and avenues for addressing safety concerns. The RCRA training program identifies this course as a program element as an annual refresher to the Hanford Facility RCRA permit condition concerning training.
Mandating Document(s)	Hanford Facility RCRA Permit, General Condition II.C.2 and 4
Target Audience	All Hanford Facility personnel working on the Hanford Site.
Frequency	Initially and annually thereafter

Title	02006G Waste Management Awareness
Description	Course introduces workers to federal laws governing chemical safety in the work place. The course provides the hazardous material/waste worker with the basic fundamentals for safe use of hazardous materials and initial accumulation or storage of dangerous or mixed waste in containers. The concepts covered in this course instruct personnel on specific waste generation procedures and requirements which includes: (1) Applicable waste management practices (i.e., waste stream identification, waste segregation practices, completing container logsheets, and housekeeping requirements), (2) proper responses to incidents pertaining to the waste in the initial accumulation containers, (3) proper responses to dealing with waste of unknown origins, and (4) proper responses to questions posed in the field concerning the above elements.
Mandating Document(s)	Satellite accumulation areas: Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4 90-day accumulation areas: WAC 173-303-330(1) Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4 TSD unit storage containers: WAC 173-303-330(1) Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Conditions II.C.1 and II.C.4
Target Audience	Hanford Facility personnel categorized as a General Worker, Advanced General Worker, and General Manager. Subcontractors categorized as General Workers. Other courses may provide equivalent training so that credit for this course is provided when the electronic data storage training record is generated.
Frequency	One-time-only Justification: The initial accumulation of waste can be conducted under satellite accumulation area provisions in WAC 173-303-200(2), during a project where the 90-day accumulation period starts when the waste is first placed into a container, inside an Area of Contamination during CERCLA or RCRA past practice activities, or in a TSD unit storage container. Annual refresher training is not required because unit/building specifics are adequately covered through the annual BEP and container waste management courses.

Title	**020159 Advanced Course 2 - Hazardous Waste Shipper Certification**
Description	Course introduces General Shippers to identify shippers' responsibilities and liabilities with regard to compliance to manifesting requirements and DOT regulations, including placarding, identifying proper shipping names, and loading requirements.
Mandating Document(s)	WAC 173-303-330(1), -180, -190, and -370. Hanford Facility RCRA Permit, General Condition II.Q as applicable.
Target Audience	General Shippers of dangerous or mixed waste on roadways anywhere on the Hanford Facility.
Frequency	Every three years.

Title	**02028B Building Emergency Director Training**
Description	Course provides an overview of the responsibilities of the Building Emergency Director, identifies the building emergency organizations, actions required during an event, implementing the contingency plan, and discusses drill and exercise requirements.
Mandating Document(s)	WAC 173-303-330(1), -340, -350, and -360
Target Audience	Hanford Facility personnel categorized as a General Managers because they perform the responsibilities of a RCRA Emergency Coordinator through the title of Building Emergency Director or alternate. The BED can function over TSD units or generator activities.
Frequency	Initial (Retrained annually by Building Emergency Director Requalification)

Title	**035010 Waste Designation**
Description	Course teaches dangerous waste designation according to WAC 173-303. Class content includes section-by-section lecture on the regulations, with examples following each section. Students complete examples using a waste designation flow chart. Examples addressed include: listed waste, characteristic waste, and Washington State criteria: toxicity and persistence.
Mandating Document(s)	WAC 173-303-330(1), -070, and -080 through -100
Target Audience	General Shippers and Waste Designators
Frequency	One-time only Justification: Another course, the Waste Designation Qualification course, annually qualifies those personnel who designate waste. General Shippers do not need to be annually retrained in this course because they

Title	**035012 Waste Designation Qualification**
Description	Course provides qualification to become a qualified waste designator.
Mandating Document(s)	WAC 173-303-330(1), -070, and -080 through -100
Target Audience	Waste Designators
Frequency	Annual

Title	**035020 Facility Waste Sampling and Analysis**
Description	Course presents waste sampling methodologies according to EPA Protocols SW-846, "Test Methods for Evaluating Solid Waste Physical/Chemical Methods." This course also covers documentation requirements in a sampling plan, waste analysis plan, field and laboratory quality control/assurance, data quality objectives process, and use of actual sampling equipment as specified by WAC 173-303-110. Finally topics on listed waste management pertaining to sample management and available on-site sampling services are covered.
Mandating Document(s)	WAC 173-303-330(1), -070, -110, and -300
Target Audience	General Shippers
Frequency	One time only Justification: In most cases on the Hanford Facility, the General Shipper will utilize resources from outside organizations to physically acquire samples. In addition, the General Shipper will also rely on the review and approval process for the development and issuance of Sampling and Analysis Plans regarding a sampling effort. This training provides an overview of information to ensure that sampling efforts are properly arranged for and planned.

Title	**035100 Container Waste Management - Initial**
Description	Course covers general training requirements pertaining to waste management in container at 90-day accumulation areas and TSD units. The course incorporates WAC 173-303-200(1), -630, DOE orders, and FDH policy for container management. Includes practical exercises for hands-on experience with the packaging of dangerous or mixed waste, and preparation of packages for final destination. This course does not cover waste management aspects pertaining to other RCRA waste management units such as tank systems, surface impoundments, containment buildings, landfills, etc.
Mandating Document(s)	WAC 173-303-330(1), -630, -200(1) and Waste Minimization
Target Audience	Advanced General Workers and General Managers categorized because they are immediate managers of Advanced General Workers who manage containers of dangerous or mixed waste.
Frequency	Initial only (refresher - Container Waste Management Training)

Title	**035110 Container Waste Management - Refresher**
Description	Refresher Course - Container Waste Management - Initial
Mandating Document	WAC 173-303-330(1), -630, -200(1), and waste minimization
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers.
Frequency	Annual

Title	**035120 Waste Management Administration - Initial**
Description	Course is designed for personnel preparing to become shippers of dangerous and/or mixed waste. This course covers regulatory and company policies, forms, reports, forecasts, and plans. Topics also covered include: waste characterization, waste storage disposal request, low level waste storage/disposal record, transuranic waste storage/disposal record, and radioactive mixed waste attachment sheet. In addition, students will learn how these forms are used to complete shipping papers.
Mandating Document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target Audience	General Shippers
Frequency	Initial only (Refresher - Waste Management Administration)

Title	**035130 Waste Management Administration - Refresher**
Description	Refreshes course - Waste Management Administration - Initial
Mandating Document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target Audience	General Shippers
Frequency	Annual

Title	**037510 Building Emergency Director Requalification**
Description	Refresher for Building Emergency Director Training
Mandating Document(s)	WAC 173-303-330, -340, -350, and -360
Target Audience	General Manager categorized because they can act as RCRA Emergency Coordinator in WAC 173-303-360.
Frequency	Annual

Title	**03E096 Unit/building-Specific Contingency Plan/Hazard Communication/Emergency Preparedness Training for 242-A Evaporator/LERF** (Uses "Facility Emergency and Hazard Information Checklist", A-6000-784R)
Description	Course consists of a review of specific chemical hazards associated with each RCRA waste management unit and job assignment, as covered by a RCRA contingency plan. The training is completed by the supervisor, manager, or a designated individual using a checklist available on the Hanford Local Area Network under Jet Forms. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The training is completed by the immediate manager, or a designated individual using a checklist. The checklist acts as a guide to ensure consistent coverage of necessary topics.
Mandating Document(s)	WAC-173-303-330, -340, and -350 Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4
Target Audience	All Hanford Facility personnel assigned to, or performing work at 242-A Evaporator/LERF. Non-Hanford personnel who will perform work unsupervised.
Frequency	Annual
Title	**03E074 Unit/Building-Specific Contingency Plan/Hazard Communication/Emergency Preparedness Training for ETF/LERF** (Uses "Facility Emergency and Hazard Information Checklist", A-6000-784R)
Description	Course consists of a review of specific chemical hazards associated with each RCRA waste management unit and job assignment, as covered by a RCRA contingency plan. The training is completed by the supervisor, manager, or a designated individual using a checklist available on the Hanford Local Area Network under Jet Forms. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The training is completed by the immediate manager, or a designated individual using a checklist. The checklist acts as a guide to ensure consistent coverage of necessary topics.

Mandating Document(s)	WAC-173-303-330, -340, and -350 Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4
Target Audience	All Hanford Facility personnel assigned to, or performing work at ETF/LERF. Non-Hanford Facility personnel who will perform work unsupervised.
Frequency	Annual

Title	**350400 242-A Evaporator Operator Certification**
Description	Qualifies NPOs to control 242-A Evaporator systems.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**350540 242-A Evaporator Orientation**
Description	Introduction to the 242-A Evaporator, including facility mission, hazards and emergency response procedures. (Includes BEP)
Mandating Document(s)	WAC-173-303-330 Hanford Facility RCRA Permit, General Condition II.C.2
Target Audience	All Hanford Facility personnel assigned to, or doing work at, the 242-A Evaporator. Non-Hanford Facility Personnel who will perform work unsupervised.
Frequency	Annual

Title	**705020 LWPF Hazardous Material/Waste Handling**
Description	Presents Waste Handlers with state, federal and Hanford specific regulations on waste handling, including: segregation, packaging, and disposal.
Mandating Document(s)	WAC-173-303-330, -630
Target Audience	All General Workers, and Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers.
Frequency	Annual

Title	**705120 LWPF Outside Operator Certification**
Description	Qualifies NPOs to operate those systems under the control of the LWPF Outside Operator, including: TEDF, Load-In Station, and LERF.
Mandating Document(s)	WAC-173-303-330, -640, -650
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in tank systems and/or surface impoundments.
Frequency	Biennial

Title	**705125 LWPF Primary Systems Operator Certification**
Description	Qualifies NPOs to operate the ETF's Primary Treatment Train systems, including the UV/OX and the RO systems.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**705130 LWPF Secondary Systems Operator Certification**
Description	Qualifies NPOs to operate the ETF's Secondary Treatment Train systems, including the Secondary Waste Receiving Tanks and the ETF Evaporator and Thin Film Dryer.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**705135 ETF Control Room Operator Certification**
Description	Qualifies NPOs to control ETF and TEDF systems from a centralized computer system, including emergency response procedures.
Mandating Document(s)	WAC-173-303-330, -340, -350, 360, -630, and -640.
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers and/or tank systems. General Managers who are Building Emergency Directors.
Frequency	Biennial

Title	**705700 200 Area LEF Facility Orientation**
Description	Introduction to the ETF, LERF and TEDF facilities including: facility missions, hazards, and emergency response procedures.
Mandating Document(s)	WAC-173-303-330 Hanford Facility RCRA Permit, General Condition II.C.2
Target Audience	All Hanford Facility personnel assigned to, or doing work at ETF, LERF, or TEDF. Non-Hanford Facility Personnel who will perform work unsupervised.
Frequency	Annual

ATTACHMENT 2. REQUIRED LWPF TRAINING

Position	Job Title	Required Training
All Employee	All other Job Titles not specifically listed below.	000001, 350540[1], 705700[2], 03E096[1], 03E074[2]
General Worker	Radiological Control Technician, Maintenance Personnel, including: Electrician, Instrument Technician, Insulator, Millwright, Painter, Pipefitter, Power Operator, Process Crane Operator, Rigger, Sign Painter, Truck Driver, Welder Maintenance Manager, Radiological Control Manager	000001 02006G 350540[1] 705700[2] 03E096[1] 03E074[2]
Advanced General Worker	Nuclear Process Operator	000001, 02006G, 035100, 035110, 705120[2], 705125[2], 705130[2], 705135[2], 350400[1], 03E096[1], 03E074[2]
General Manager	Operations Manager, Shift Operations Managers, Environmental Compliance Officer, Person-in-Charge, Hazardous Material Coordinator	000001, 02006G, 02028B, 037510, 035100, 035110, 350540[1], 705700[2]. 03E096[1], 03E074[2]
General Shipper	Shipper	000001, 02006G, 020159, 035010, 035020, 035100, 035110, 035120, 035130, 350540[1], 705700[2], 03E096[1], 03E074[2]
Waste Designator	Waste Designator	000001, 035010, 035012, 350540[1], 705700[2], 03E096[1], 03E074[2]

Notes:

1. These classes are specific to the 242-A Evaporator and are not required for personnel who work exclusively at LERF/ETF. TMX provides information on personnel who work exlusively at 242-A Evaporator or LERF/ETF.

2. These classes are specific to the LERF/ETF and are not required for personnel who work exclusively at the 242-A Evaporator. TMX provides information on personnel who work exlusively at 242-A Evaporator or LERF/ETF.

ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

******* BUSINESS SENSITIVE ******* **POSITION TRAINING REPORT** *******BUSINESS SENSITIVE *******

Tracking Code:
Manager:
Organization : 200A EFFLUENT TREATMENT FAC OPS
Position: Shift Ops Mgr - ETF (GM)

Matrix Last Modified on 07/19/97
30 Days Delinquent Forecast

07/21/97 Position 1
16:16:46 Sheet 1 of 2

	Course No.	Title	Retrain Course	Individual #1	Individual #2	Individual #3	Individual #4
M	000001	HGET	000001	09/30/97	10/10/97	01/10/98	08/26/97
M	003034	LOCK & TAG - AUTH WRKR INITIAL	003037	11/15/97	10/29/97	11/18/97	03/10/98
M	020001	RAD WORKER TRNG II - INIT	020003	08/06/98	11/09/97	07/11/98	09/24/98
M	020030	SCBA ANNUAL	020030	05/09/98	10/04/97	05/22/98	06/04/98
M	020032	SCOTT SKA-PAK AIRLINE SYSTEM	020032	05/09/98	10/04/97	05/22/98	06/04/98
M	020041	BASIC RESP PROTECT TRNG	020041	01/10/98	10/30/97	09/05/97	11/19/97
M	020044	QUANTITATIVE MASK FIT	020044	01/10/98	10/30/97	09/05/97	11/19/97
M	02006G	WASTE MANAGEMENT AWARENESS	---------	OK	OK	OK	OK
M	020130	CONFND SPC ENTRY (CSE)	---------	OK	OK	OK	OK
M	02028B	BLDG EMER DIR TRNG	037510	02/18/98	02/04/98	01/28/98	01/11/98
M	020702	RAD WORKER I/II REFRESH	020702	09/30/98	10/10/98	01/09/99	08/26/98
M	031110	24 HR RCRA TSD HAZ WASTE	032020	05/09/98	10/09/97	05/22/98	06/04/98
M	350540	242-A EVAPORATOR ORIENT	---------	OK	OK	OK	OK
M	703036	LWPF LOCK & TAG	703036	12/31/98	12/31/98	01/09/99	12/31/98
M	705020	200 AREA WSTE HNDLING OPS	---------	OK	OK	OK	OK
M	705700	200A LEF FAC ORIENT	705700	09/30/97	10/10/97	01/10/98	08/26/97
D	000390	OJT TRAINING WORKSHOP	---------	OK	OK	OK	OK
D	020107	BHVR BASED SAFETY TRNG	---------	OK	OK	OK	OK
D	020704	RAD CON MANUAL TRNG - MGRS ---------	OK	OK	OK	OK	
D	03E074	BLDG EMERG PLAN - 0263 - ETF	03E074	09/30/97	10/10/97	01/09/98	08/26/97
D	03E096	242A EVAP/LERF FAC EMERG ID CH	03E096	03/19/98	12/19/97	03/12/98	03/12/98
D	042720	AERIAL LIFT OPER TRNG 043920	05/17/98	/ /	06/15/98	04/07/00	
D	044470	FORKLIFT OPERATNL SAFETY	041890	03/18/00	/ /	11/29/98	11/22/99
D	044480	MEDIUM RISK ELECT SAFETY	044480	12/12/97	04/30/00	<<08/16/97>>	09/13/97

LEGEND

Upper case (M/D/C/P) = Course needed by all
Lower case (m/d/c/p) = Course needed by some
* = Retrain not to be maintained
<< >> = Course delinquent
/ / = Course needed (upper case) but not taken

Date = Course retrain date
OK = Course taken; no retrain required
**** = Course taken; retrain requirement not maintained
Blank = Course not needed (lower case) and not taken

To delete specific employee retrain dates for lower case (m, d, c, p): See TMX Main Menu 5., TMX Course Alternates.

******* BUSINESS SENSITIVE ******* **POSITION TRAINING REPORT** *******BUSINESS SENSITIVE *******

Tracking Code: Matrix Last Modified on 07/19/97 07/21/97 Position 1
Manager: 30 Days Delinquent Forecast 16:16:46 Sheet 2 of 2
Organization : 200A EFFLUENT TREATMENT FAC OPS
Position: Shift Ops Mgr - ETF (GM)

	Course No.	Title	Retrain Course	Individual #1	Individual #2	Individual #3	Individual #4
D	170500	BASIC MEDIC FIRST AID	170535	01/23/98	03/05/99	08/05/98	09/13/97
D	170640	QTRC - INTRO TO OCC RPTG	---------	OK	OK	OK	OK
D	170642	OCCURRENCE REPORT WRITING	---------	OK	OK	OK	OK
D	170656	HANDS-ON FIRE EXTINGSHR	170656	05/14/98	03/06/98	<<06/12/97>>	08/28/97
D	705035	200 AREA LEF EP/APC	705035	09/30/97	09/30/97	10/28/97	10/21/97
D	705120	200 LEF OUTSDE OPER CERT	705120	03/07/99	12/26/98	03/10/99	03/13/99
D	705125	200 AR PRMRY SYS OPR CER	705125	09/20/97	03/24/99	09/20/97	10/04/97
D	705130	200 LEF SCNDRY WSTE OPER	705130	09/20/97	03/24/99	09/20/97	10/04/97
D	705135	200 LEF CNTRL RM OP CERT	705135	09/20/97	03/24/99	09/20/97	10/04/97
m	020140	FALL PROTECTION TRAINING	---------				
d	001000	CONDUCT OF OPS - INTRO	---------	OK	OK	OK	OK
d	001005	OVERVIEW CONDUCT OPERTNS	---------	OK	OK	OK	OK
d	010108	WORK MGT & JCS OVERVIEW	010108	****		****	****
d	02006L	ASBESTOS CONTROL	02006L		05/27/98		
d	040784	BASIC CRANE & RIGGING SAFETY	040788		****		
d	060760	COND IND WTR HAMMER SFTY	060765		****	****	05/06/98
d	080969	NEW MANAGER ORIENTATION	---------			OK	
d	705115	200A LEF PIC TRAINING	---------	OK	OK	OK	OK
d	705140	200 ETF SHTDN SHFT OPS MGR QUL	705140		01/06/99		
p	080553	SELF ASSESS FOR MGT SKLS	---------				
p	080810	COM SKILLS WORKSHOP	---------		OK		OK
p	080925	SEXUAL HARASSMENT WRKPL	---------			OK	
p	170002	RISK EVALUATION	---------	OK		OK	
p	170654	SELF ASSES 1ST LIN SPVSR	---------				
p	170780	INTRO TO OSHA STDS	---------			OK	

Modifications to Part III, Chapter 5

242-A Evaporator

Chapter 2	(Class 1 modification from 3/31/98)
Chapter 6	(Modification D dated 5/98)
Chapter 7	(Modification D dated 5/98)
Chapter 11	(Class 1 modification from 6/30/98)
Chapter 14	(Modification D dated 5/98)
Appendix 3A	(Class 1 modification from 3/31/98)
Appendix 7A	(Modification D dated 5/98)
Appendix 8A	(Class 1 modification from 6/30/98)

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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

The 242-A Evaporator is an existing waste management unit located in the 200 East Area (Chapter 1.0).

The 242-A Evaporator treats mixed waste from the Double-Shell Tank System (DST System) (DOE/RL-90-39) by removing water and most volatile organics. The mixed waste is separated into a slurry stream and a process condensate stream.

A more detailed discussion of waste types and manifesting, and the identification of the processes and equipment, are provided in Chapters 3.0 and 4.0 respectively. Although the treatment, storage, and/or disposal of radioactive waste (i.e., source, special nuclear, and by-product materials as defined by the *Atomic Energy Act of 1954*) are not within the scope of *Resource Conservation and Recovery Act* (RCRA) *of 1976* or WAC 173-303, information is provided for general knowledge.

2.1 242-A EVAPORATOR DESCRIPTION [B-1]

The following sections provide general descriptions of the 242-A Evaporator process components (Figure 2-1). Detailed process information for each component is provided in Chapter 4.0.

2.1.1 Process Buildings

The principle process components of the 242-A Evaporator system are located in the 242-A and 242-AB Buildings (Figure 2-2), along with supporting service and operating areas. These buildings enclose the following areas that handle mixed waste:

- Evaporator room
- Condenser room
- Pump room
- Loadout and hot equipment storage room
- Loading room
- Ion exchange column room.

In addition, 242-A and 242-AB Buildings enclose the following areas that do not contain or handle mixed waste.

- Control room (242-AB Building)
- Aqueous makeup (AMU) room
- Heating, ventilation, and air conditioning (HVAC) room
- Miscellaneous offices, lunch room, lavatories, and change rooms.

Figures 2-3 and 2-4 provide floor plans for the first and second floors of the 242-A and 242-AB Buildings and Figure 2-5 provides building elevations.

2.1.1.1 Control Room. The new control room, located in the 242-AB Building, contains the centralized monitoring and control system (MCS). The MCS computer monitors process parameters and controls the parameters where required. Once the configuration parameters and other process control functions are set, the MCS functions independently of the operator, maintaining process parameters within specified ranges by sending output signals that operate specific pieces of equipment (e.g., control valves).

The control room also has instrumentation that monitors alarms at 241-AW, 241-AN, 241-AP, 241-A, and 242-AX Tank Farms, as well as computer terminals for the computer automated surveillance system (CASS) and the laboratory computer system (for access to sample results).

2.1.1.2 Aqueous Makeup Room. The AMU room, located on the south end of the 242-A Building, is used for receiving and mixing chemicals and transferring these into the process. The room contains the antifoam tank (E-102), a 378-liter (100-gallon) tank used to hold antifoam added to the process, the eluant tank (E-101), a 15,900-liter tank that is no longer used, and the decontamination tank (E-104), a 2,350-liter tank used to hold decontamination solutions, such as water or citric acid.

2.1.1.3 Evaporator Room. The evaporator room contains the vapor-liquid separator where evaporative separation and concentration take place, and the reboiler, which heats process solution to the required temperature. The room is set 3.0 meters belowgrade and extends approximately five stories abovegrade with work platforms located at each level.

Personnel entries to the evaporator room are made only for nonroutine maintenance and inspections. Such entries require that the evaporator vessel be drained and flushed with water or decontamination solution to reduce radiation exposure to personnel.

2.1.1.4 Condenser Room. The condenser room, like the adjacent evaporator room, is approximately five stories abovegrade, with the floor set 3.0 meters belowgrade. Condensed vapors from three condensers drain by gravity to the condensate collection tank located on the bottom floor. The condenser room also houses the vacuum condenser system, process condensate pump, condensate recycle pump, process instrumentation, and other equipment.

Also located in the condenser room is the vessel ventilation system. The vessel ventilation system is used to filter and exhaust noncondensable vapors from the 242-A Evaporator process vessels. The system consists of a deentrainment unit, prefilter, heater, high-efficiency particulate air (HEPA) filters, and an exhauster.

2.1.1.5 Pump Room. The pump room is located directly south of the evaporator room and houses the recirculation pump and slurry pump. Equipment in the pump room is designed to be maintained remotely using a bridge-type service crane. Concrete cover blocks (that can be moved by the crane) cover the pump room to provide confinement of contaminants.

A portion of the pump room floor is set 3.0 meters belowgrade to contain potential spills. Located in this section of the floor is a 1.5-meter by 1.5-meter by 1.8-meter deep sump lined with stainless steel to collect spills from various floor drains.

2.1.1.6 Loadout and Hot Equipment Storage Room. The loadout and hot equipment storage room is located adjacent to the pump room and is open to the overhead crane gallery. Failed pump room equipment (pumps, jumpers, etc.) are placed here by crane, decontaminated, and either repaired or packaged for disposal.

A shielded sampling enclosure is located within the room along a portion of the wall that is common with the pump room. Sampling lines run from the pump room to this enclosure. Valve handles outside the enclosure and a shielded viewing window allow the remote collection of feed and slurry samples.

2.1.1.7 Loading Room. The loading room is located in the southwest corner of the 242-A Building. The ceiling of the loading room is formed by a rollup, nylon-vinyl curtain-type door enclosure that can be rolled open to allow transfer of equipment between the loading room and the loadout and hot equipment storage room using the overhead crane.

2.1.1.8 Heating, Ventilation, and Air Conditioning Room. The HVAC room is located on the second floor, directly above the AMU room. The HVAC room contains the supply ventilation equipment for the 242-A Building.

2.1.1.9 Ion Exchange Column Room. The ion exchange enclosure is a small area that holds the ion exchange column for process condensate treatment. The enclosure is located on the north wall of the condenser room

2.1.1.10 Miscellaneous Offices, Lunch Room, Lavatories, and Change Rooms. The offices, lunch room, lavatories, and change rooms are located on the first floor away from contaminated areas.

2.1.2 External Equipment and Structures

In addition to the equipment and structures housed within the 242-A and 242-AB Buildings, some external equipment and structures are required for 242-A Evaporator operation. These external units include the following:

- The 207-A retention basins
- Steam service supply
- Ventilation exhaust fans and HEPA filter housing
- Raw water service building.

2.1.2.1 The 207-A Retention Basins. The 207-A retention basins consist of six basins constructed of reinforced concrete, each having about 265,000 liters capacity. The north three basins are used to temporarily store non-contact steam condensate from the 242-A Evaporator for sampling before discharge to the 200 Area Treated Effluent Disposal Facility (TEDF). The three north basins are included in the 242-A Evaporator waste management unit. The three south basins previously held process condensate mixed waste for sampling and discharge. These basins have been removed from service, emptied, and will be closed under a separate closure plan.

2.1.2.2 Steam Service Supply. Steam needed for the 242-A Evaporator process is supplied by the 242A-BA package boiler annex. The boiler annex supplies medium pressure steam (620 kilopascals gauge pressure) and low pressure steam (69 kilopascals gauge pressure) to the 242-A Evaporator Building. The 242-BA boiler annex is not part of the 242-A Evaporator.

2.1.2.3 Ventilation Exhaust Fans and Filter Housing. The exhaust fans and the HEPA filter system are located north of the 242-A Evaporator. There is no dangerous or mixed waste associated with this exhaust system, which ventilates the various rooms within the building for contamination control.

2.1.2.4 Raw Water Service Building. The raw water service building (242-A-81) houses the valves and strainers for routing raw process water to the 242-A Evaporator. Columbia River water is supplied to the water service building from the 284-E Water Supply Reservoir. Water used to backflush strainers in the water service building is routed to TEDF. No dangerous or mixed waste is present in the raw water service building. The 284-E Water Supply Reservoir is not considered part of the 242-A Evaporator.

2.1.3 Other Environmental Permits

All environmental permits that are required to support operation of the 242-A Evaporator are identified in the *Annual Hanford Site Environmental Permitting Status Report* (e.g., DOE/RL-96-63).

2.1.4 Construction Schedule

Any proposed new construction for mixed waste operations will be managed as described in the Hanford Facility RCRA Permit.

2.2 TOPOGRAPHIC MAP [B-2]

A topographic map (Drawing H-13-000039) is located in Appendix 2A.

2.3 ROADWAY TRAFFIC TO THE 242-A EVAPORATOR [B-4]

General traffic information for the Hanford Facility is presented in the General Information Portion (DOE/RL-91-28). Access to the 242-A Evaporator is provided by 4th Street to the south and Canton Avenue to the east. These roads are constructed of bituminous asphalt that provides satisfactory all-weather access. Paved parking areas are provided for 242-A Evaporator personnel.

2.4 RELEASE FROM SOLID WASTE MANAGEMENT UNITS [E]

Information concerning releases from solid waste management units is discussed in the General Information Portion (DOE/RL-91-28).

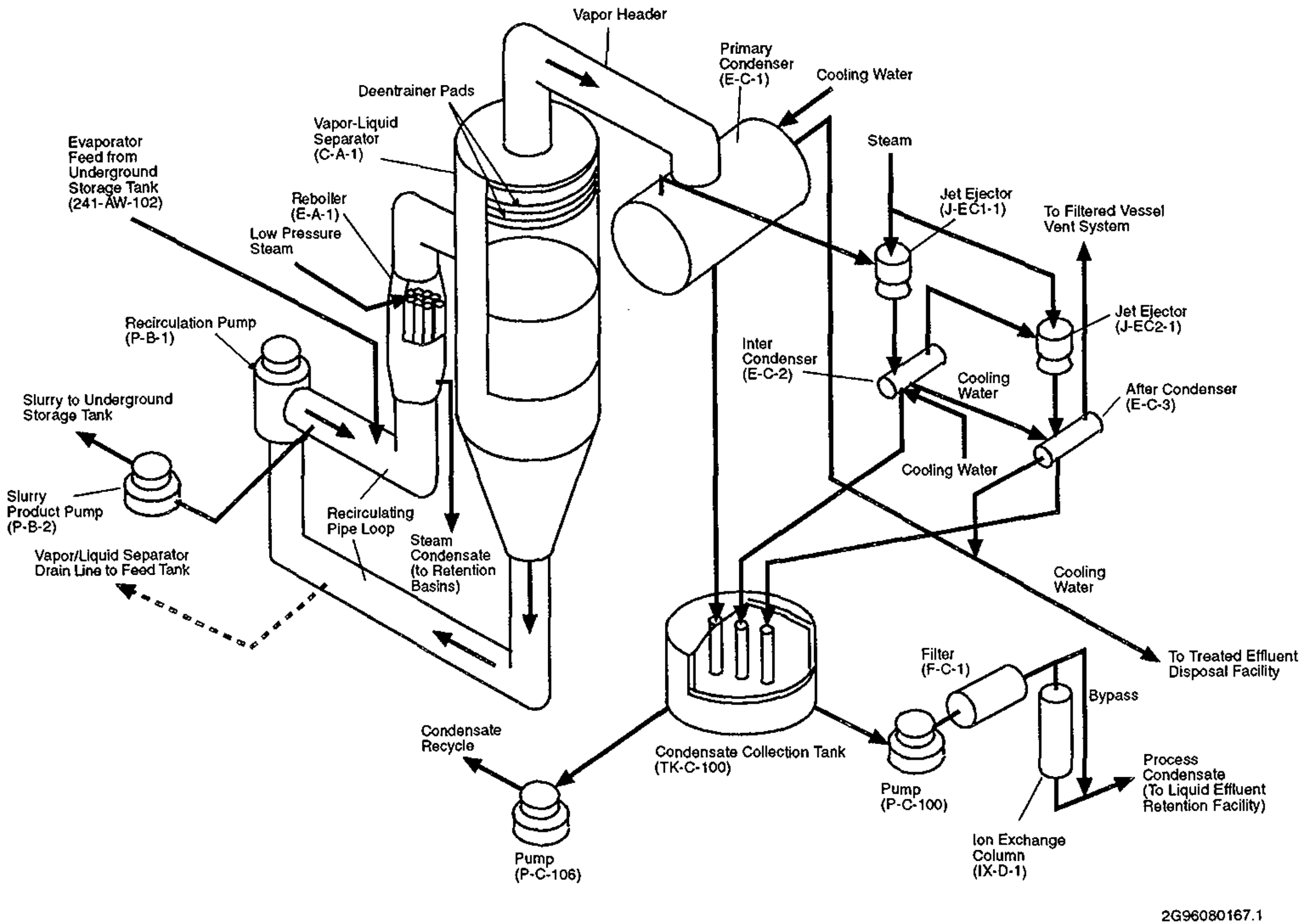

Figure 2-1. 242-A Evaporator Simplified Schematic.

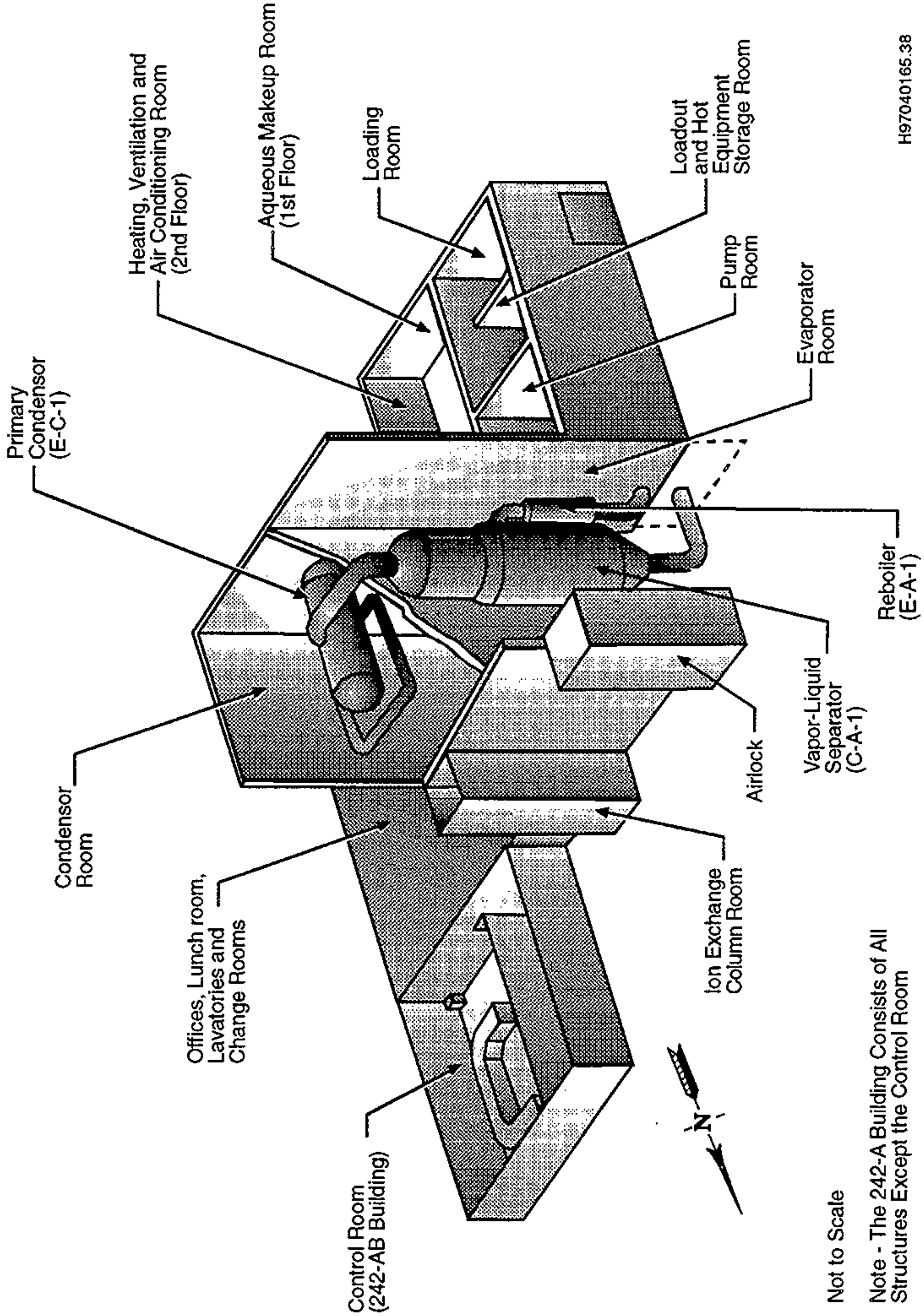

Figure 2-2. 242-A Evaporator Perspective.

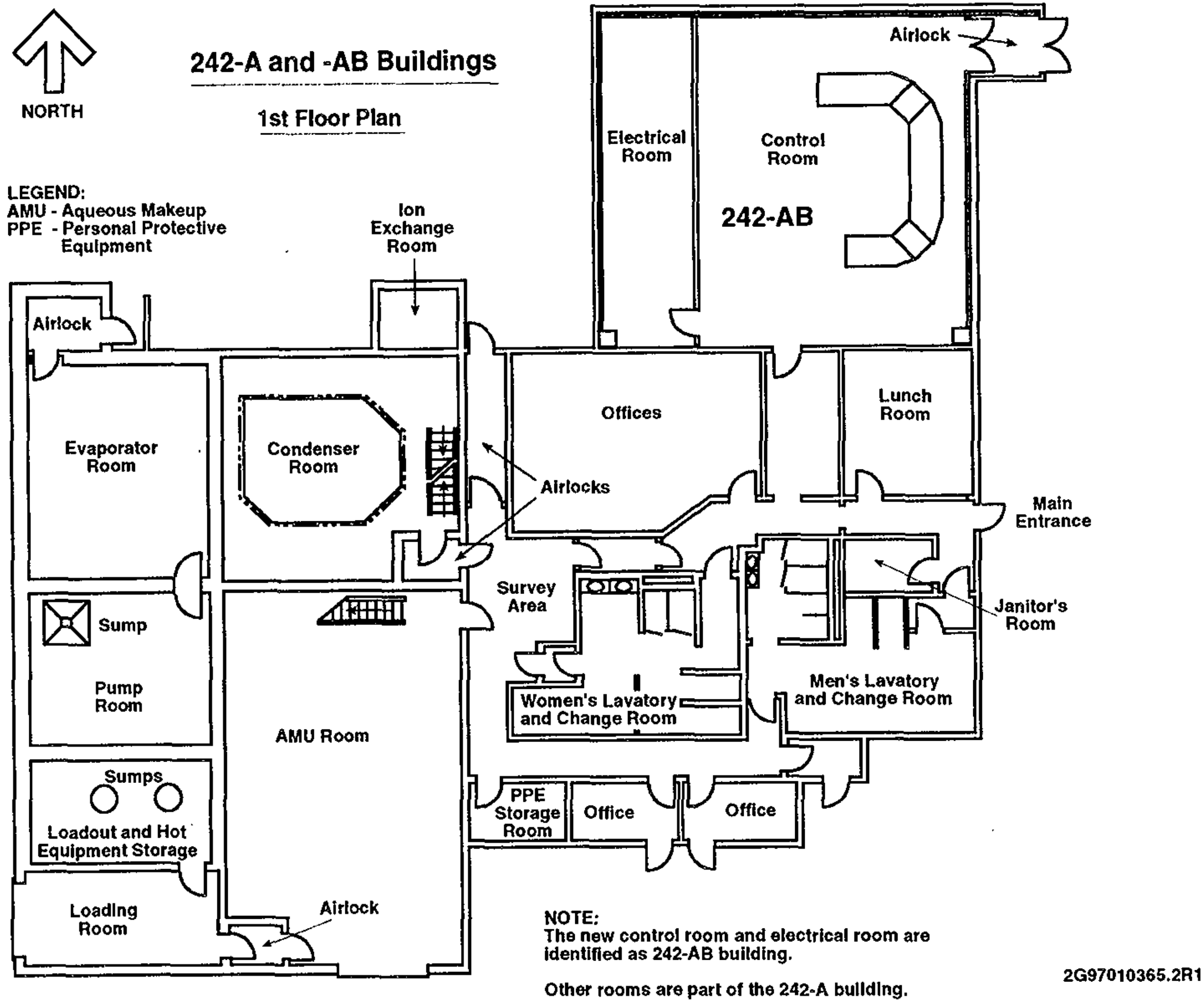

Figure 2-3. 242-A Evaporator First Floor Plan.

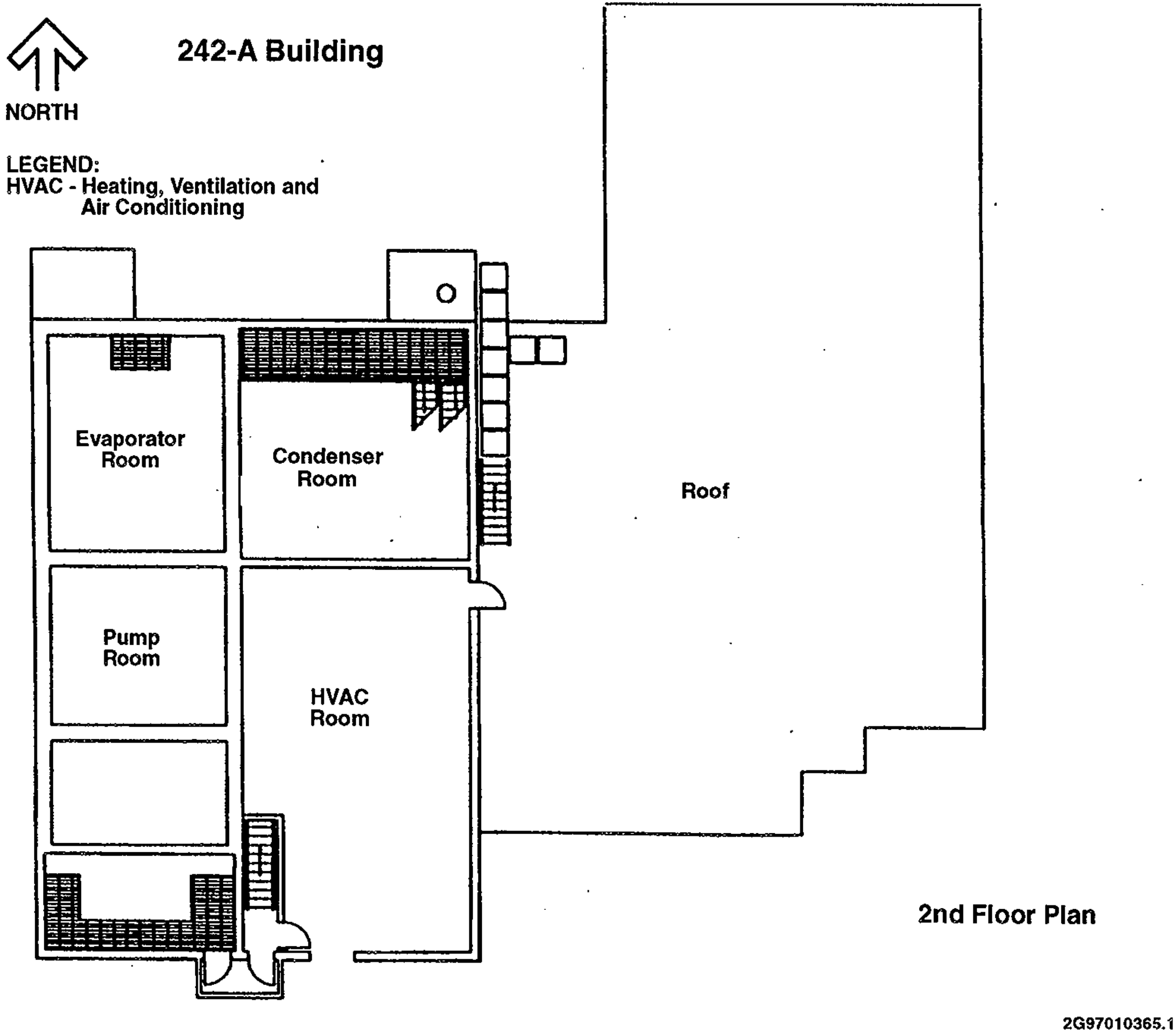

Figure 2-4. 242-A Evaporator Second Floor Plan.

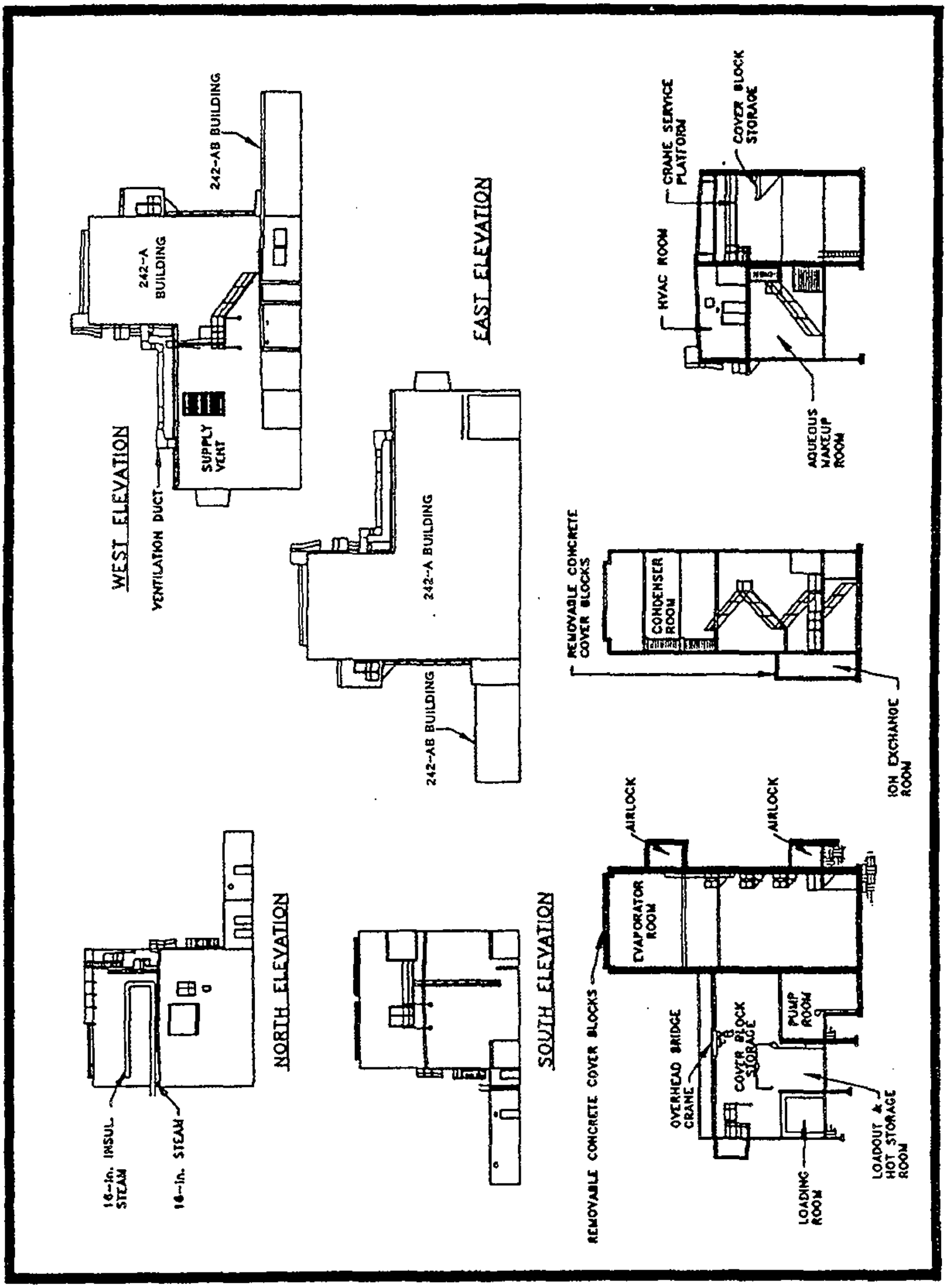

Figure 2-5. Side View of 242-A and 242-AB Buildings.

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

This chapter discusses security, inspection schedules, preparedness and prevention requirements, preventive procedures, structures, and equipment, and prevention of reaction of ignitable, reactive, and incompatible waste for the 242-A Evaporator.

6.1 SECURITY [F-1]

The following sections describe the security measures, equipment, and warning signs used to control entry to the 242-A Evaporator. Hanford Facility security measures are discussed in the General Information Portion (DOE/RL-91-28).

6.1.1 Security Procedures and Equipment [F-1a]

The following sections describe the 24-hour surveillance system, barriers, and warning signs used to provide security and control access to the 242-A Evaporator.

6.1.1.1 24-hour Surveillance System. The entire Hanford Facility Site is a controlled-access area with around-the-clock access control. For surveillance information refer to the General Information Portion (DOE/RL-91-28).

6.1.1.2 Barrier and Means to Control Entry. All 242-A Evaporator mixed waste tanks and equipment are located within the 242-A Building, which is protected by the building structure and secured entrances. The main entrance, on the east side of the building, and the office entrances, on the south side of the building, are open during normal day shift hours. All other external entrances, including external entrances to areas containing mixed waste, are secured. Visitors are required to check in at the control room and must be escorted when entering areas of the 242-A Evaporator where they might be exposed to mixed waste. All entrances are secured when the building is not staffed. Security lighting is provided around the outside of the building.

6.1.1.3 Warning Signs. Signs bearing the legend "DANGER-- HAZARDOUS MATERIAL - UNAUTHORIZED PERSONNEL KEEP OUT," or equivalent legend, legible from a distance of 7.6 meters, are posted on entrances to rooms at the 242-A Evaporator Building that could contain mixed waste. In addition, there are posted signs at the main entrance and other office entrances instructing visitors to report to the control room for access to the 242-A Evaporator.

6.1.2 Waiver [F-1b]

A waiver of security procedures and equipment requirements is not requested for the 242-A Evaporator. Therefore, the waiver requirements outlined in WAC 173-303-310(1)(a) and (b) are not applicable.

6.2 INSPECTION PLAN [F-2]

This section describes the method and schedule for inspections of the 242-A Evaporator. The purpose of inspections is to identify situations that might cause or lead to a release of mixed waste that could pose a threat to human health and the environment. Abnormal conditions identified by an inspection must be corrected on a schedule that prevents hazards to the public and environment.

6.2.1 General Inspection Requirements [F-2a]

This section provides an overview of inspections performed at the 242-A Evaporator. A copy of the inspection plan is kept in the 242-A Evaporator control room. There are three general classes of inspections at the 242-A Evaporator:

- Continuous monitoring of remote instrumentations and alarms are performed by operating personnel in the 242-A Evaporator control room using the MCS computer.

- Visual inspections of tanks and equipment are performed by operating personnel. Some inspections of fire protection equipment, such as sprinkler system inspections, are performed by the Hanford Fire Department.

- Preventive maintenance of equipment and calibration of instruments are performed by maintenance personnel. A computerized tracking system is used to identify and schedule preventive maintenance and calibration activities.

Preventive maintenance and instrument calibrations on certain equipment might not be possible when the 242-A Evaporator is operating. Because of the limited duration of 242-A Evaporator campaigns, these activities are scheduled during outages between campaigns to avoid interference with operating activities.

6.2.1.1 Types of Problems. The 242-A Evaporator inspections include, but are not limited to, the following:

- Condition of tanks and ancillary equipment
- Condition of secondary containment
- Evidence of leaks or overflows from tanks, piping, or transfer lines
- Condition of security equipment
- Condition of safety, communications, and emergency equipment.

A schedule of inspections, including items to be inspected, problems to look for, frequency of inspections, and responsible organization are provided in Tables 6-1 through 6-4.

6.2.1.2 Frequency of Inspections. The frequency of inspections is based on the significance of a failure of the equipment and on regulatory requirements, Hanford Site and industry standards, and past experience of the nature and frequency of equipment failures.

The frequency of inspections for the 242-A Evaporator are given in Tables 6-1 through 6-4. Examples of frequencies include:

- Daily (at least every 24 hours) - visual inspections of tanks, piping and secondary containment.

- Weekly (at least every 7 days) - visual inspections of personal protective equipment, exterior lighting, and posted warning signs.

- Monthly (at least every 31 days) - inspections of emergency sirens, fire extinguishers, safety showers, emergency lighting and the spill control kit.

- Bimonthly (at least every 62 days) - inspection of cathodic protection system rectifiers.

- Annually (at least every 365 days) - instrumentation calibrations, cathodic protection system testing, fire inspections.

Leak detectors are functionally checked within 92 days of the start of a campaign and every 92 days thereafter until the campaign is over. The frequency of some alarm monitoring is continuous. This means an operator must be present in the control room to monitor alarm instruments that continuously check for conditions such as leaks and high sump levels. Continuous monitoring is only required when the system is operating.

6.2.2 Tank System Inspections and Corrective Actions [F-2d(2)].

This section discusses the inspections performed on the two tank systems at the 242-A Evaporator: the vapor-liquid separator, C-A-1, and the condensate collection tank, C-100. Inspections include secondary containment and leak and overfill prevention equipment.

6.2.2.1 Overfill Prevention. The vapor-liquid separator, C-A-1, is equipped with instrumentation that alarms before the tank reaches a level where the tank could overflow or entrain liquid waste into the vacuum condenser system. The alarm annunciates in the control room allowing operating personnel to take immediate action to stop the vapor-liquid separator from overfilling.

The condensate tank, C-100, was designed with an overflow line that routes waste to the feed tank, 241-AW-102. This design prevents tank overflow to the condenser room.

6.2.2.2 Visual Inspections. Visual inspections of tanks and secondary containments are performed to check for leaks, signs of corrosion or damage, and malfunctioning equipment. Inspections also include housekeeping checks to ensure aisle space requirements are met. The following rooms containing dangerous waste are inspected:

- Condenser room
- Pump room
- Loadout and hot equipment storage room
- Loading room
- Ion exchange column room.

In addition, the AMU room is inspected when hazardous materials are present in the room. Inspection of the ion exchange column room is required only when mixed waste is present in the ion exchange column or piping.

The vapor-liquid separator is located in the evaporator room, with a portion of the recirculation loop located in the pump room. Because of the high radiation dose in the evaporator room, visual inspections cannot be performed. Leaks in the evaporator room drain to the pump room sump; monitoring of the pump room sump instrumentation is performed to determine if leaks have occurred.

Visual inspection of the portion of the recirculation loop located in the pump room is performed through the shielding window on the AMU mezzanine.

6.2.2.3 Leak Detectors. Conductivity probe leak detectors are installed to measure leaks to secondary containment of the feed transfer line, slurry line, and drain lines connecting the 242-A Evaporator to AW Tank Farm. The slurry and drain lines are equipped with cleanout boxes that also have leak detectors. The sample enclosures in the loadout and hot equipment storage room have leak detectors for both the feed and slurry samplers. For information on these systems and their secondary containment, refer to Chapter 4.0, Section 4.1.4.

Leaks to secondary containment in the evaporator room, pump room, loadout and hot equipment storage room, and loading room drain to the pump room sump. The sump high level alarm serves as a leak detector for these rooms. For information on the rooms and their drain systems, refer to Chapter 4.0, Section 4.1.4.

6.2.2.4 Cathodic Protection. An active cathodic protection system is installed in the 200 East Area Tank Farms to protect underground piping, including the feed transfer, slurry, and drain lines, from galvanic corrosion. The system consists of rectifiers providing direct current to buried anodes that direct the current to the soil. Test stations are located along the system to determine operability by taking readings on the system. The installation is according to the recommended practices of NACE.

Rectifiers are checked for signs of damage or component degradation at least every 2 months for cathodic protection systems. Operability testing of the cathodic protection system is performed annually.

6.2.2.5 Tank Assessments. The IAR was issued in 1993 (Appendix 4C). The frequency and nature of these assessments are discussed in the IAR.

6.2.3 Storage of Reactive and Ignitable Wastes [F-2d(3)]

The Hanford Fire Department performs annual fire inspections of the 242-A Evaporator using a checklist developed specifically for facilities that handle dangerous and/or mixed waste. The checklist was developed from requirements in the Uniform Fire Code and the National Fire Protection Association code. A copy of the completed checklist is given to operating management to take remedial actions for any problems identified. The completed checklist is included in the operating record and also is available from the Hanford Fire Department.

6.2.4 Air Emissions Control and Detection Inspections [F-2d(4)].

The process vent at the 242-A Evaporator is subject to 40 CFR 264, Subpart AA, which requires organic emissions be limited to 1.4 kilograms per hour, and 2.8 megagrams per year, or controls be installed to reduce organic emissions by 95 percent. Organic concentrations in the waste processed at the 242-A Evaporator are limited to ensure the values of 1.4 kilograms per hour and 2.8 megagrams per year are not exceeded. Therefore, no emission control devices are installed on the 242-A Evaporator vessel ventilation system and no inspections are required (Chapter 4.0, Section 4.2).

6.2.5 Inspection Logs [F-2b]

Visual inspections are performed using inspection log sheets (also called round sheets) that outline frequency, the components to inspect, and types of problems. Log sheets are kept in the 242-A Evaporator control room. Inspectors record the following information:

- Date and time of the visual inspection
- Printed name and signature of the person performing the inspection
- Notations of the observations made, including space for writing comments.

Completed log sheets are reviewed and approved by the shift supervisor, collected, and stored for at least 5 years.

Maintenance inspections are performed as part of the maintenance job control system. After completion, the maintenance documentation is reviewed and signed.

6.2.6 Schedule for Remedial Action for Problems Revealed [F-2c]

If while performing a visual inspection (Table 6-1), a leak or spill is discovered, facility management responds immediately per the building emergency plan (Chapter 7.0). Action is taken to stop the leak and determine the cause. The waste is removed from the secondary containment within 24 hours or in a timely manner that prevents harm to human health and the environment. For spills that drain to the pump room sump, the sump must be emptied and rinsed three times (Chapter 4.0, Section 4.1.5).

If an alarm activates during inspections, an operator responds immediately and implements appropriate actions.

If an inspection identifies equipment that is missing, damaged, or not operating properly, the operator records the problem on a deficiency log in the 242-A Evaporator control room. Repair work is prioritized by facility management to mitigate health risks to workers, maintain integrity of the facility, and prevent hazards to public health and the environment. The Hanford Fire Department repairs fire prevention equipment.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The following sections document the preparedness and prevention measures taken at the 242-A Evaporator.

6.3.1 Equipment Requirements [F-3a]

The following sections describe the internal and external communications and emergency equipment located at the 242-A Evaporator.

6.3.1.1 Internal Communications. The 242-A Evaporator is equipped with internal communication systems to provide immediate emergency instruction to facility personnel. The onsite communication systems at the 242-A Evaporator include telephones, hand-held two-way radios, a public address system, and alarm systems. The telephone and radio systems provide for internal and external communication. Alarm systems allow facility personnel to appropriately respond to various emergencies, including building evacuations, take cover events, fires and/or explosions. The locations of telephones, public address systems, and alarms are given in the Building Emergency Plan (Appendix 7A).

Immediate emergency instruction to personnel is provided by a public address system using speaker horns and speakers located throughout the 242-A and 242-AB Buildings and outside.

6.3.1.2 External Communications. The 242-A Evaporator is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hazardous Materials Response Team, and/or local emergency response teams, as necessary. External communication is made through the normal telephone system. In addition, the following systems are available for external communication with persons assigned to emergency response organizations:

- A crash alarm telephone is available in the 242-A Evaporator control room. The crash alarm telephone system provides communication of centralized emergency response instructions to 242-A Evaporator personnel

- Fire alarm pull boxes and fire sprinkler flow monitoring devices are connected to a system monitored around the clock by the Hanford Fire Department

- Telephone number 911 (811 if using a cellular phone) is the contact point for the Hanford Site; on notification, the Hanford Patrol Operations Center notifies and/or dispatches required emergency responders

- Telephone number 373-3800 is the single point of contact for the Hanford Site emergency duty officer; this number can be dialed from any Hanford telephone

During certain periods, only one operator may be present at the facility. This operator has access to external communication using telephones located throughout the building.

6.3.1.3 Emergency Equipment. Emergency equipment is available throughout the 242-A Building. The locations of telephones, public address systems, and alarms are given in the building emergency plan (Appendix 7A).

Major fire damage is unlikely at the 242-A Evaporator because of the concrete construction and because the amount of combustible material is minimal. A temperature-activated water sprinkler system, emergency lights, fire alarms pull boxes, and fire extinguishers are located throughout the facility. The Hanford Fire Department is capable of providing rapid response to major fires at the 242-A Evaporator and its vicinity, with a fire hydrant located near the east side of the facility.

Safety showers are located in the areas where personnel are most likely to have direct exposure of hazardous materials: in the AMU room and on the first and fourth floors of the condenser room. Water for these devices is supplied from the sanitary water system. Self-contained breathing apparatus units are available in the control room for use throughout the 242-A Building. Respirators are located in the PPE storage room near the entryway to the condenser room. Other PPE, such as hazardous material protective gear and special work procedure clothing, are located in cabinets in the survey area. If required, PPE is donned before entry into the rooms containing mixed waste. The level of personal protective equipment required depends on the level of contamination in the area being entered and the activity being performed.

A spill control kit is located in a cabinet near the door to the PPE storage room. An inventory of the equipment in the spill kit is included inside the cabinet. The spill kit cabinet door seal is checked monthly to ensure the kit has not been used. The kit inventory is inspected annually.

The 242-A Evaporator operating personnel are trained in the use of emergency equipment (Chapter 8.0). Additionally, the Hanford Facility maintains a sufficient inventory of heavy equipment (e.g., bulldozers, cranes, road graders) for emergency response.

6.3.1.4 Water for Fire Control. Water for fire protection is supplied from the 200 East Area raw water system. Columbia River water is supplied to the fire control system from the 282-E Water Supply Reservoir. The water distribution system is sized to provide adequate volume and pressure to supply fire fighting needs under normal and emergency conditions. A fire hydrant is located approximately 10 meters east of the main entrance on the east side of the 242-A Building.

In the event that the sprinkler system at the 242-A Evaporator does not put out a fire, or the sprinkler system is damaged during an accident, each Hanford Fire Department fire station normally has a fire engine, equipped with a hydraulically operated aerial ladder, available to fight the fire. A pumper (fire engine without a boom) is used if the aerial ladder fire engine is inoperable. Fire engines have a pumping capacity of at least 5,600 liters of water per minute.

6.3.2 Aisle Space Requirement [F-3b]

Sufficient aisle space is maintained on the exterior of the 242-A Evaporator to allow access of personnel and equipment responding to fires, spills, or other emergencies. Unobstructed fire lanes run from Fourth Street and Canton Avenue to the 242-A Building main entrance to allow emergency vehicle access to the main entrance and the nearby fire hydrant.

The 242-A Building interior aisle space is designed to allow access by emergency response personnel while maintaining barriers to contain releases of gaseous or liquid waste and hazardous material. Walkways in the rooms containing mixed waste are checked daily to ensure the walkways have not been obstructed by portable equipment, trash, etc.

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

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

6.4.1 Loading and Unloading Operations [F-4a]

The feed transfer and slurry lines between the 242-A Evaporator and AW Tank Farm are constructed of carbon steel piping with secondary containment and leak detection in a pipe-within-a-pipe arrangement. Although the regulations exempt systems that serve as secondary containment from requiring secondary containment, two of the drain lines from the 242-A Evaporator to AW Tank Farm also have outer encasement piping and leak detection (refer to Chapter 4.0, Section 4.1.4, for information on these lines).

Waste transfers within the 242-A Building are contained by the secondary containment walls, floors and drains (refer to Chapter 4.0, Section 4.1.4, for information on secondary containment at the 242-A Evaporator).

There are no mixed waste storage containers loaded or unloaded at the 242-A Evaporator. Unloading operations occur when equipment contaminated with mixed waste exits the facility. Such materials are fully sealed in plastic with absorbent material to absorb any free liquid present. Because of these requirements, the likelihood of a spill outside the 242-A Building during this operation is extremely low.

6.4.2 Run-Off [F-4b]

All liquid waste handling at the 242-A Evaporator occurs within tank systems with secondary containment. All rooms containing mixed waste have drains that route to either the pump room sump or the feed tank, 241-AW-102. The pump room sump overflows to the feed tank as well. Therefore, run-off from a major leak, such as a break in a large water line within the 242-A Building, would be contained within the facility or drained to the feed tank (refer to Chapter 4.0, Section 4.1.4 for information on secondary containment and drain systems).

6.4.3 Water Supplies [F-4c]

Raw and sanitary Columbia River water are supplied to the 242-A Evaporator via separate underground lines from the 282-E Water Supply Reservoir. Raw water is filtered to prevent organisms and other debris from clogging valves, fire hydrants, and other equipment. Sanitary water is filtered and treated before distribution through a piping system separate from the raw water system.

The raw water supply to the 242-A Evaporator enters the 242-A-81 Water Service Building, passing through a strainer and backflow preventer before entering the facility. The backflow preventer ensures contaminated water cannot flow back into the raw water system. A second backflow preventer is installed in the 242-A Building on the raw water supply line connecting with the condensate recycle line. This system allows either raw water or process condensate to be used for the pump seal water and deentrainment pad spray water without risk of contamination of the raw water system.

The sanitary water system provides water to the lunchroom, drinking fountains, men's and women's changerooms, safety showers, and supply ventilation system air washers. There are no connections between sanitary water and any system or piping containing mixed waste.

6.4.4 Equipment and Power Failures [F-4d]

Standby power is provided by a diesel generator located southeast of the 242-A Building. The diesel motor starts automatically on loss of electrical power and has sufficient fuel to operate the generator to safely shut down the evaporator process. An uninterruptible power supply system also is provided to allow continued operation of the MCS computer to ensure uninterrupted monitoring until the emergency generator is fully on line.

The 242-A Evaporator is designed to mitigate the effects of failure of a major piece of equipment. In general, the evaporator process can be shut down and the vapor-liquid separator gravity-drained to the feed tank, 241-AW-102, in the event of equipment failure. The process condensate tank, TK-C-100, is designed to overflow to feed tank 241-AW-102. This mitigates failure of the process condensate pump used to transfer the process condensate to LERF.

Response to equipment and power failures are discussed in more detail in the building emergency plan (Appendix 7A).

6.4.5 Personnel Exposure [F-4e]

Facility design, administrative controls, and personal protective equipment are used at the 242-A Evaporator to prevent undue exposure of personnel to mixed waste and other hazardous materials. The following features were incorporated into the 242-A Evaporator design to minimize personnel exposure.

- The facility is designed for remote operation of equipment containing highly radioactive solutions such as waste feed and slurry. These solutions usually are present only in the pump room and evaporator room, which are heavily shielded and routinely are not entered by operating personnel.

- The 242-A Building ventilation system is designed to provide air flow from uncontaminated zones to progressively more contaminated zones.

- Emergency lighting devices are located strategically throughout the 242-A Building.

- Eyewash stations and safety showers are located in rooms containing mixed waste or other hazardous materials that personnel routinely enter. For location of these, refer to the building emergency plan (Appendix 7A).

- Continuous air monitors with audio and/or visual alarms to notify personnel of airborne radioactive contamination are provided in rooms that contain mixed waste and that routinely are entered.

- Methods for decontaminating vessels and equipment are available to reduce personnel exposure if entry for maintenance activity is required.

- Offices, control room, change rooms, and lunchroom are situated to minimize casual exposure of personnel.

All operations are conducted so employee exposure to mixed waste and other hazardous materials are maintained ALARA. Exposures are minimized by engineering or administrative controls with protective gear used where such controls are not practical. Before the start of any operation that might expose personnel to the risk of injury or contamination, a review of the operation is performed to ensure the nature of hazards that might be encountered are considered and that appropriate protective gear is selected. Administrative procedures dictate the level of protective clothing worn and depend on the location within the 242-A Building and the nature of the activity being performed. Personnel are trained to wear personal protective equipment in accordance with approved work procedures.

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

The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

6.5.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste [F-5a]

Administrative procedures are designed to prevent the ignition or reaction of waste at the 242-A Evaporator. The precautions include the following.

- Analysis is performed on candidate waste in the DST System to check that there are no exothermic reactions when the waste is heated and that there will be no adverse affects due to mixing the contents of different waste tanks in the feed tank and evaporator vessel (refer to Chapter 3.0, Appendix 3A for details on waste analysis).

- Sample analysis of the candidate waste in the DST System includes a surface sample to identify the presence of a separable organic phase that might be ignitable. If a separate organic phase is detected, the waste solution level in the feed tank is maintained above 2.54 meters to prevent transfer of the organic phase to the 242-A Evaporator.

- The condensate tank, C-100, is equipped with instrumentation to detect the presence of a separable organic phase. If a separate organic phase is detected, the tank is allowed to overflow, transferring the organic phase to the feed tank, 241-AW-102.

- No smoking is allowed anywhere in the 242-A Building.

- The vapor-liquid separator and the condensate tank are drained before any welding is performed.

6.5.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Waste [F-5b, F-5b(1), and F-5b(2)]

Waste received at the 242-A Evaporator is protected from materials or conditions that might cause the waste to ignite or react. Much of the waste handling is done remotely to reduce the risk to operating personnel. For precautions taken to prevent the ignition or reaction of waste, refer to Section 6.5.1.

The constituents in the waste received at the 242-A Evaporator that are ignitable or reactive are not very volatile. Therefore, the evaporation process renders the waste that is evaporated (i.e., the process condensate) neither ignitable nor reactive.

Table 6-1. Visual Inspection Schedule for Tanks, Piping, and Rooms. (sheet 1 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
Tank and Piping Inspection				
Condensate tank and piping	Inspect tank and piping for leaks, corrosion, or wear.	Daily	Operations	
Room Inspections				
AMU room	• Inspect tanks and piping for leaks, corrosion, or wear. • Inspect floor for spills or damage. • Inspect for equipment malfunctions. • Inspect for housekeeping/aisle space.	Daily	Operations	
Pump room	• Inspect piping for leaks, corrosion or wear. • Inspect floor for spills or damage. • Inspect for equipment malfunctions. • Inspect for housekeeping. • Inspect pump room sump for overflow.	Daily	Operations	Use viewing window in AMU room to perform inspection.
Loadout and hot equipment storage room	• Inspect piping for leaks, corrosion, or wear. • Inspect sumps and floor for spills or damage. • Inspect for housekeeping/ aisle space.	Daily	Operations	Use viewing window in AMU room to perform inspection.

Table 6-1. Visual Inspection Schedule for Tanks, Piping, and Rooms. (sheet 2 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
Loading room	• Inspect for housekeeping/ aisle space.	Daily	Operations	Use viewing window in AMU room to perform inspection.
Condenser room	• Inspect tanks and piping for leaks, corrosion, or wear. • Inspect floors for spills or damage. • Inspect for equipment malfunctions. • Inspect for housekeeping/ aisle space.	Daily	Operations	
IX column room	• Inspect piping for leaks, corrosion, or wear. • Inspect floor for spills or damage.	Daily	Operations	Surveillance is required only when mixed waste is present in the column or piping.

[1]Frequencies: Continuously: an operator must be present in the control room to respond to alarms.
Daily: at least every 24 hours.
Weekly: at least every 7 days.
Monthly: at least every 31 days.
Bimonthly: at least every 62 days.
Biannually: at least every 184 days.
Annually: at least every 365 days.

Table 6-2. Inspection Schedule of Safety, Security, and Emergency Equipment. (sheet 1 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
		Security		
Building external doors	Verify external doors are closed and locked.	Daily	Operations	Entrances to office areas are allowed to be unlocked.
Posted warning signs	Verify signs are present, legible, and visible at 7.6 meters.	Weekly	Operations	
Outdoor lighting	Verify outdoor lighting is sufficient.	Weekly	Operations	
		Communications		
Crash alarm telephone	Verify crash alarm telephone is operable.	Monthly	Operations	
Emergency sirens	Perform functional check to verify operability.	Monthly	Operations	
Radios	Verify radios are operable and batteries are charged.	Monthly	Operations	
Telephones	Verify telephones are operable.	Quarterly	Operations	
Intercom/public address system	Verify systems are working properly.	Quarterly	Operations	
		Emergency Equipment		
Safety showers/ eyewash station	Verify safety showers and eyewash station are operable.	Monthly	Operations	
Emergency lanterns	Verify emergency lanterns are operable.	Monthly	Maintenance	

Table 6-2. Inspection Schedule of Safety, Security, and Emergency Equipment. (sheet 2 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
Fire extinguishers	Verify fire extinguishers are in their proper location with no signs of tampering.	Monthly	Operations	
Spill response kit	Verify all equipment is present (from checklist in kit) with no signs of tampering.	Monthly	Operations	
Self-contained breathing apparatus (SCBA)	Verify shelf life of SCBA is current, no signs of tampering.	Monthly	Operations	
Personal protective clothing	Verify sufficient stock of clothing is available.	Weekly	Operations	
Full-face respirators	Verify shelf life of respirators are current and sufficient stock is available.	Monthly	Operations	

[1]Frequencies: Continuously: an operator must be present in the control room to respond to alarms.
Daily: at least every 24 hours.
Weekly: at least every 7 days.
Monthly: at least every 31 days.
Bimonthly: at least every 62 days.
Biannually: at least every 184 days.
Annually: at least every 365 days.

Table 6-3. Inspection Schedule for Alarm Monitoring.

Item	Inspection	Frequency[1]	Responsible organization	Comments
Overfill Protection				
Vapor-liquid separator: WFSH-CA11 WFSH-CA12	Monitor for vapor-liquid separator high level.	Continuously	Operations	Surveillance required only when solution is in the vapor-liquid separator.
Leak Detection				
Feed transfer line: LDS-SN269 LDS-SN270	Monitor feed transfer line for leaks.	Continuously	Operations	Surveillance required only during feed line transfers.
Slurry transfer line: LDS-AW-SL	Monitor slurry transfer line for leaks.	Continuously	Operations	Surveillance required only during slurry line transfers.
Cleanout boxes: LDS-COBAW	Monitor cleanout boxes for leaks.	Continuously	Operations	Surveillance required only during slurry or drain line transfers.
Drain lines: LDS-AW-DR	Monitor drain lines for leaks.	Continuously	Operations	Surveillance required only during drain line transfers.
Sampler lines: LDS-SMPL1 LDS-SMPL2	Monitor feed and slurry sampler lines for leaks.	Continuously	Operations	Surveillance required only during feed or slurry sampling.
Pump room sump: WFI-SUMP1	Monitor for leaks in the evaporator room, pump room, loadout and hot equipment storage room and loading room. These rooms drain to the pump room sump.	Continuously	Operations	Surveillance required only when waste solution is present in the rooms listed.

[1]Frequencies: Continuously: an operator must be present in the control room to respond to alarms.
Daily: at least every 24 hours.
Weekly: at least every 7 days.
Monthly: at least every 31 days.
Bimonthly: at least every 62 days.
Biannually: at least every 184 days.
Annually: at least every 365 days.

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Table 6-4. Inspection Schedule for Maintenance and Other Inspections. (sheet 1 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
Instrumentation Functional Checks and Calibrations				
Leak detectors	Perform leak detector functional checks.	Refer to comment	Maintenance/ Operations	Perform functional checks within 92 days of campaign startup and every 92 days thereafter until the campaign is over.
Vapor-liquid separator high level alarms: WFSH-CA11 WFSH-CA12	Perform calibrations of loop instruments.	Annually	Maintenance	
Pump room sump level: WFI-SUMP1	Perform calibrations of loop instruments.	Annually	Maintenance	
Emergency Electrical Equipment				
Diesel generator	Verify operability.	Monthly	Maintenance	
Uninterruptible power supply	Verify output voltage and inspect battery for signs of damage or tampering.	Annually	Maintenance	
Cathodic Protection				
Rectifiers	Check rectifiers for leaks, murky oil, signs of damage, or component degradation.	Bimonthly (62 days)	Maintenance	
System operation	Verify operation meets NACE requirements.	Annually	Maintenance	

T6-4.1

Table 6-4. Inspection Schedule for Maintenance and Other Inspections. (sheet 2 of 2)

Item	Inspection	Frequency[1]	Responsible organization	Comments
Fire Systems				
Smoke detectors	Verify operability	Annually	Hanford Fire Department	
Pull stations	Verify operability	Annually	Hanford Fire Department	
Fire extinguishers	Verify that pressure is within proper range and verify unimpaired physical condition.	Annually	Hanford Fire Department	Refer to Table 6-2 for monthly inspection.
Fire hydrant	Check that hydrant is operational.	Biannually (182 days)	Hanford Fire Department	
Fire inspection	Walk down to check for fire extinguishers, access control, labeling, fire lanes, fire hydrants, etc.	Annually	Hanford Fire Department	Hanford Fire Department Checklist is used for the inspection.
Other Inspections				
Integrity assessment	Check integrity of vapor-liquid separator and condensate tank per IAR.	Refer to comment	Operations	The requirements and frequencies for integrity testing are given in the IAR (Appendix 4C).

[1]Frequencies: Continuously: an operator must be present in the control room to respond to alarms.
Daily: at least every 24 hours.
Weekly: at least every 7 days.
Monthly: at least every 31 days.
Bimonthly: at least every 62 days.
Biannually: at least every 184 days.
Annually: at least every 365 days.

IAR = initial integrity assessment.
NACE = National Association of Corrosion Engineers.

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APPENDIX

7A BUILDING EMERGENCY PLAN FOR THE 242-A EVAPORATOR .... APP 7A-i

TABLE

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7.0 CONTINGENCY PLAN [G]

The WAC 173-303 requirements for a contingency plan are satisfied in the following documents: Portions of the *Hanford Emergency Response Plan* [Attachment 4 of the Hanford Facility RCRA Permit (DW Portion)] and portions of the *Building Emergency Plan for the 242-A Evaporator* (Appendix 7A).

The unit-specific building emergency plan also serves to satisfy a broad range of other requirements [e.g., Occupational Safety and Health Administration standards (29 CFR 1910), TSCA (40 CFR 761) and U.S. Department of Energy Orders]. Therefore, revisions made to portions of this contingency plan document that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to WAC 173-303-830 or Hanford Facility RCRA Permit (DW Portion) Condition I.C.3. Table 7-1 identifies which portions of the Building Emergency Plan are written to meet WAC 173-303 contingency plan requirements.

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Table 7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3). (sheet 1 of 2)

Requirement	DOE/RL-94-02*	Building Emergency Plan
-350(3)(a) - A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360.	X[1] Section 1.3.2	X[1] Section 7.1 through 7.3
-350(3)(b) - A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[1] Section 1.3.2	X[1,2] Section 7.2
-350(3)(c) - A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Table 3-1	
-350(3)(d) - A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application.		X[3] Section 13.0
-350(3)(e) - A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	X HFD: Appendix C	X Section 9.0

Table 7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3). (sheet 2 of 2)

Requirement	DOE/RL-94-02*	Building Emergency Plan
-350(3)(f) - An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[4] Figure 5-2	X[5] Section 1.5

* Attachment 4 of the HF RCRA Permit (DW Portion).

[1]The *Hanford Emergency Response Plan* contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions are required if emergency planning activities are addressed. If other credible scenarios exist or if emergency procedures at the unit are different, the language contained in the BEP will be used during an event by a BED.

[2]This requirement only applies to TSD units which receive shipment of dangerous or mixed waste defined as off-site shipments in accordance with WAC 173-303.

[3]Emergency Coordinator names and home telephone numbers are maintained separate from any contingency plan document, on file in accordance with Hanford Facility RCRA Permit, DW Portion, General Condition II.A.4. and is updated, at a minimum, on a monthly basis.

[4]The Hanford Facility (sitewide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[5]An evacuation route for the TSD unit must be provided. Evacuation routes for occupied buildings surrounding the TSD unit are provided through information boards posted within buildings.

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11.0 CLOSURE AND FINANCIAL ASSURANCE [I]

This chapter describes the planned activities and performance standards for closing the 242-A Evaporator. Final closure will begin when the 242-A Evaporator is no longer needed.

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

The 242-A Evaporator will be clean closed with respect to dangerous waste contamination that resulted from operation as a TSD unit. To facilitate closure, the 242-A Evaporator is being viewed as consisting of six components: tanks, ancillary equipment, piping, concrete floors/liners, structures, and underlying soil. Only areas that have treated, stored, or handled dangerous waste will undergo closure activities. Remedial actions with respect to contamination that was not a result of use of these areas for treatment, storage, or handling of dangerous waste are outside the scope of this closure plan.

Contaminated equipment, tanks, and piping removed from the 242-A Evaporator will be considered "debris" and transported to an appropriate permitted treatment, storage, or disposal unit for final disposition. Uncontaminated structures either 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.

The pipes located west and north of the 242-A Evaporator, which connect to A Farm and AW Farm, are in the same bundles with pipes used for transfers between tanks in the DST System. To minimize radiation exposure during closure, these pipes will be closed at the same time the piping for the DST System is closed. Closure of these pipes will be performed per *Double-Shell Tank System Dangerous Waste Permit Application* (DOE/RL-90-39). The pipelines between the 242-A Evaporator and the 207-A pump pit, and in the 207-A pump pit, which were previously used for transfer of process condensate, will be closed per this closure plan.

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. All work will be performed as low as reasonably achievable (ALARA) with respect to worker exposure to dangerous and/or any other workplace hazards. Activities that are planned to achieve clean closure are presented in the following sections.

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.

After closure, the appearance of the land where the 242-A Evaporator is located will be consistent with the appearance and future use of the surrounding land areas. This closure plan proposes to leave clean structures and equipment in place after closure for potential future operations. This need will be evaluated at the time of closure.

11.2.1 Closure Standards for Metal Surfaces, 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, and concrete that will remain after closure. This approach is consistent with Ecology guidance (Ecology 1994) for achievement of clean closure.

Attainment of a clean debris surface can be verified visually in accordance with the standard that states, "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).

Decontamination of concrete, per the 'debris rule' is based on a physical extraction method (40 CFR 268.45, Table 1), 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.

11.2.2 Closure Standards for Tanks

Using the 242-A Evaporator's decontamination system, the tank system could be flushed and decontaminated. The rinsate will be sampled and analyzed. Results of the analysis with less than designation limits for the constituents of concern will be accepted as indicating that the tanks are clean with respects to dangerous waste residues. An alternative to decontaminating the tanks is to remove and dispose of the tanks accordingly.

11.2.3 Closure Standards for Internal and/or External Piping

The internal and/or external piping of 242-A Evaporator will be flushed and drained as part of closure. The rinsate will be sampled, and analyzed. Results less than designation limits for the constituents of concern will be accepted as indicating that the piping is clean with respect to dangerous waste or dangerous waste residues.

11.2.4 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.

11.2.5 Closure Standards for Underlying Soils

Clean closure of soil under the 242-A Evaporator will be accomplished by determining that the coated concrete floor and stainless steel liners, kept contaminants from reaching the soil. The coated concrete and liners provided secondary containment for all the tanks, process piping,and ancillary equipment within the building. 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 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. Regulatory cleanup levels are defined by the Hanford Facility RCRA Permit (Condition II.K.). Sampling and disposal objectives will be determined at the time of closure activities through the data quality objectives process. If verification sampling is required, a sampling analysis plan will be prepared before closure in a manner consistent with Ecology guidance (Ecology 1994) for achievement of clean closure.

11.3 CLOSURE ACTIVITIES [I-1b]

At the time of closure, the closure plan will be modified as necessary to reflect current regulations and information. 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 242-A Evaporator closure is to dispose of accumulated liquid waste by transferring the waste to the LERF. After the waste has been removed, clean closure of the tanks, process equipment, the piping, concrete/liners, and the structures will be accomplished by decontaminating the components, as necessary, and demonstrating that clean closure performance standards are met. Clean closure of the soil will be accomplished by demonstrating that the concrete and liners kept the contaminants from reaching the soil. If it is determined that soil contamination is possible, investigation and cleanup of the soils will be managed appropriately. All work will be performed ALARA with respect to worker exposure to dangerous and/or mixed waste, radioactivity, hazardous chemicals, or any other workplace hazards. 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 242-A Evaporator

Based on process knowledge and the risk to human health and the environment, the constituents of concern for closure will be selected from the list of dangerous waste numbers in Chapter 1.0 through the data quality objective process.

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

All of the waste inventory at the 242-A Evaporator will be processed before closure. Any residue remaining in piping and equipment will be removed to an appropriate TSD unit.

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

Before closure activities begin, all waste inventory will be removed. To facilitate closure, tanks, internal and/or external piping, ancillary equipment, concrete floors/liners, 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 the time of closure. Clean closure of the soil will be accomplished by demonstrating that the concrete/liners kept contaminants from reaching the soil.

11.3.4.1 Tanks

After all pumpable waste has been removed from the tanks, the interior of the tanks, including the internal components such as the agitator, either will be flushed and decontaminated by adding or spraying with steam, a water-soluble cleaner, or other approved method, or removed as debris and disposed appropriately.

If the tanks are decontaminated, the tanks will be inspected visually for compliance with the performance standard. Because of possible radiation exposure, visual inspection of the vapor-liquid separator will be made remotely using a camera or other device that allows verification of meeting the standard. If any areas are found to not meet 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.

If the decontamination option is used, the outside of the tanks also will be inspected for compliance to the performance standard. Any areas found to not 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 11.2.1 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., collection basins) will be used to collect and contain solutions.

Decontamination residues will be collected, designated, and managed. 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.

11.3.4.2 Internal and/or External Piping and Ancillary Equipment

The initial closure activity for the piping that is associated with the areas undergoing closure will be to identify the lines that might have carried dangerous waste. Only piping that might have carried dangerous waste will undergo closure activities.

The piping that will undergo closure will be rinsed and the rinsate will be sampled and analyzed for the constituents of concern. The constituents of concern will be based on knowledge of what constituents were in the dangerous waste carried through the particular piping. The flushing, sampling, and analysis will be repeated until the rinsate no longer designates as dangerous waste. If the rinsate does not designate based on the concentrations of the constituents of concern, the piping will be considered clean with respect to this closure. If necessary, the piping will be rinsed with a decontamination solution before sampling and analyses. If it is not possible to meet the clean closure standard, portions of the piping will be removed, designated, and disposed of accordingly. The ancillary equipment will be removed, designated, and disposed of accordingly.

The 207-A pump pit, located east of the 242-A Evaporator, will be closed using the performance standards for pipes and concrete. A visual inspection will be performed. if the interior surfaces meet the performance standards, the 207-A pump pit will be considered clean closed. If the performance standards are not met, the interior surfaces will be cleaned using an appropriate decontamination method and the method repeated until the surfaces meet the clean closure performance standard.

11.3.4.3 Concrete/Liner

The coated concrete floor and the pump room sump liner provide secondary containment for all the tanks, process piping, and ancillary equipment. All concrete and liners will be inspected visually and surveyed radiologically 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 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 11.2.1. The inspection of the concrete for a clean debris surface will be documented on an inspection record. Those areas already meeting the standard will 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 re-inspected for a clean debris surface. Concrete surfaces indicated by visual examination as potentially still being 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.

11.3.4.4 Structures

If contaminated with either dangerous or mixed waste constituents, structures will be decontaminated and/or disassembled, if necessary, packaged, and disposed 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 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, odor). If contamination is evident, the affected area(s) will be decontaminated.

- Decontaminate walls and floors to minimize the potential for loose contamination and to facilitate any required radiation surveys and/or chemical field screening. Wash down could be by water rinse or high-pressure, low-volume steam cleaning coupled with a detergent wash. After decontamination, the building walls and floor 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 soil closure requirements.

11.3.4.5 Underlying Soils

Clean closure of soil under the 242-A Evaporator will be accomplished by demonstrating that the coated concrete floor and stainless steel liners kept contaminants from reaching the soil. The coated concrete floor provided secondary containment for all the tanks, process piping, and ancillary equipment. 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 to visually inspect directly beneath the tanks, a visual inspection will be performed. Where it is not possible to visually 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 are observed, it will be reasoned that mixed or dangerous waste solutions could not have penetrated to the soil directly below the tank.

External piping between the 242-A Evaporator and the 207-A pump pit is 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 242-A Evaporator is used to treat mixed waste from the DST System by removing water and most volatile organics. Two waste streams leave the 242-A Evaporator following the treatment process. The first waste stream, the concentrated slurry (in which approximately half the water content is removed and a portion of the volatile organics), is pumped back into the DST System. The second waste stream, process condensate (containing a portion of the volatile organics removed form the mixed waste during the evaporation process), is routed through condensate filters before being transferred to LERF. The 242-A Evaporator is used to treat up to 870,642 liters of mixed waste per day.

Tank C-100 receives process condensate and potentially contaminated drainage from the vessel vent system. The maximum design capacity for the C-100 tank is 67,380 liters.

Vapor-liquid separator, C-A-1, is located in the evaporator room and is used to separate vapor from the boiling slurry solution and deentrain liquid from the vapor before it enters the condensers in the condenser room. The maximum design capacity of C-A-1 is 103,217 liters.

11.5 CLOSURE OF TANKS

Clean closure of 242-A Evaporator will consist of the removal and disposal of all dangerous waste and the decontamination and/or removal and disposal of contaminated equipment, including tanks.

11.6 SCHEDULE FOR CLOSURE [I-1f]

Closure of 242-A Evaporator is not anticipated to occur within the next 15 to 20 years. The actual year of closure will depend on the time required for current waste to be processed and what role the 242-A Evaporator 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 unforseen 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. Should a modified schedule be necessary, a revised schedule will be presented and agreed to before closure.

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14.0 PART B CERTIFICATION [K]
Modification D

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.

Owner/Operator John D. Wagoner, Manager U.S. Department of Energy Richland Operations Office	5/22/98 Date
Co-operator* H. J. Hatch, President and Chief Executive Officer Fluor Daniel Hanford, Inc.	May 14, 1998 Date

Note: This certifies the following: Chapter 6.0 (Procedures to Prevent Hazards), Table 6-2, Page 1 of 2, Revision 1A and Table 6-4, Page 1 of 2, Revision 1A; Chapter 7.0 (Contingency Plan), Revision 1A; Appendix 7A (Building Emergency Plan for 242-A Evaporator, HNF-IP-0263-242-A), Revision 4.

* Fluor Daniel Hanford, Inc. is responsible for information presented in Chapters 1.0 through 4.0 and 6.0 through 15.0, including the associated appendices.

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APPENDIX 3A

WASTE ANALYSIS PLAN FOR 242-A EVAPORATOR

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1.0 INTRODUCTION

This waste analysis plan (WAP) addresses analysis necessary to manage the waste at the 242-A Evaporator according to *Resource Conservation and Recovery Act* (RCRA) requirements included in the *Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste* (Ecology and EPA 1994), *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement, Ecology et.al. 1996), Washington Administrative Code (WAC), Chapter 173-303, and Part 264 of the Code of Federal Regulations.

The WAP is included as Appendix 3A of the *242-A Evaporator Dangerous Waste Permit Application* (DOE/RL-90-42). Modifications of the WAP require modifications of the permit. Permit modifications are discussed in Section I.C of the Hanford Facility RCRA Permit and WAC 173-303-830.

1.1 PURPOSE

The purpose of the WAP is to ensure waste at the 242-A Evaporator is managed properly in accordance with WAC 173-303-300. To ensure the waste analysis is comprehensive, a data quality objectives (DQO) analysis was performed on all streams at the 242-A Evaporator. Sampling and analysis identified in the DQO analysis related to meeting RCRA requirements are included in this WAP.

Regulatory and safety issues are addressed in the WAP by establishing boundary conditions for waste to be received and treated at the 242-A Evaporator. The boundary conditions are set by establishing limits for items such as reactivity, waste compatibility, and control of vessel vent organic emissions. Waste that exceeds the boundary conditions would not be acceptable for processing without further actions, such as blending with other waste.

1.2 SCOPE

This WAP discusses RCRA sampling and analysis of the waste in selected DST System tanks to determine the acceptability of the waste for processing at the 242-A Evaporator. Sampling and analysis of DST System waste for other reasons, such as preparation for tank-to-tank transfers, is included in the waste analysis plan for the DST System.

RCRA sampling of the process condensate transferred to the Liquid Effluent Retention Facility (LERF) can be performed at either the 242-A Evaporator or at LERF. A discussion of process condensate sampling at the 242-A Evaporator is included in this WAP, while discussion of process condensate sampling at LERF is included in the *Hanford Facility Dangerous Waste Permit Application, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility* (DOE/RL-97-03, Appendix 3A).

Samples of other 242-A Evaporator waste streams, such as steam condensate, cooling water, and 242-A-81 backflush water, are taken as required for process control but are excluded from this plan because these streams have been previously characterized and determined to be nondangerous waste streams.

2.0 242-A EVAPORATOR PROCESS DESCRIPTION

The 242-A Evaporator, located in the 200 East Area of the Hanford Site, separates the incoming waste from the DST System into two aqueous streams as described in the following paragraph. Also associated with thr 242-A Evaporator are utility waste streams such as cooling water and steam condensate which are not dangerous waste. Description of the waste processed by the 242-A Evaporator are described in Section 3.0.

The 242-A Evaporator process uses a conventional forced-circulation, vacuum evaporation system to concentrate mixed waste solutions from the DST System tanks. The incoming stream is separated by evaporation into two liquid streams: a concentrated slurry stream and a process condensate stream. The slurry contains the majority of the radionuclides and inorganic constituents. After the slurry is concentrated to the desired amount, the slurry stream is pumped back to the DST System and stored for further treatment. Vapor from the evaporation process is condensed, producing process condensate, which is primarily water with trace amounts of organic material and a greatly reduced concentration of radionuclides. The process condensate is transferred to LERF for storage and treatment. Vacuum for the evaporator vessel is provided by two steam jet ejectors, producing a gaseous vessel vent exhaust. The 242-A Evaporator vessel vent stream is filtered and discharged through an exhaust stack. Figure 1 shows a simplified schematic of the 242-A Evaporator process. A more detailed description of the 242-A Evaporator process is provided in Chapter 4.0 of the *Hanford Facility Dangerous Waste Permit Application, 242-A Evaporator* (DOE/RL-90-42).

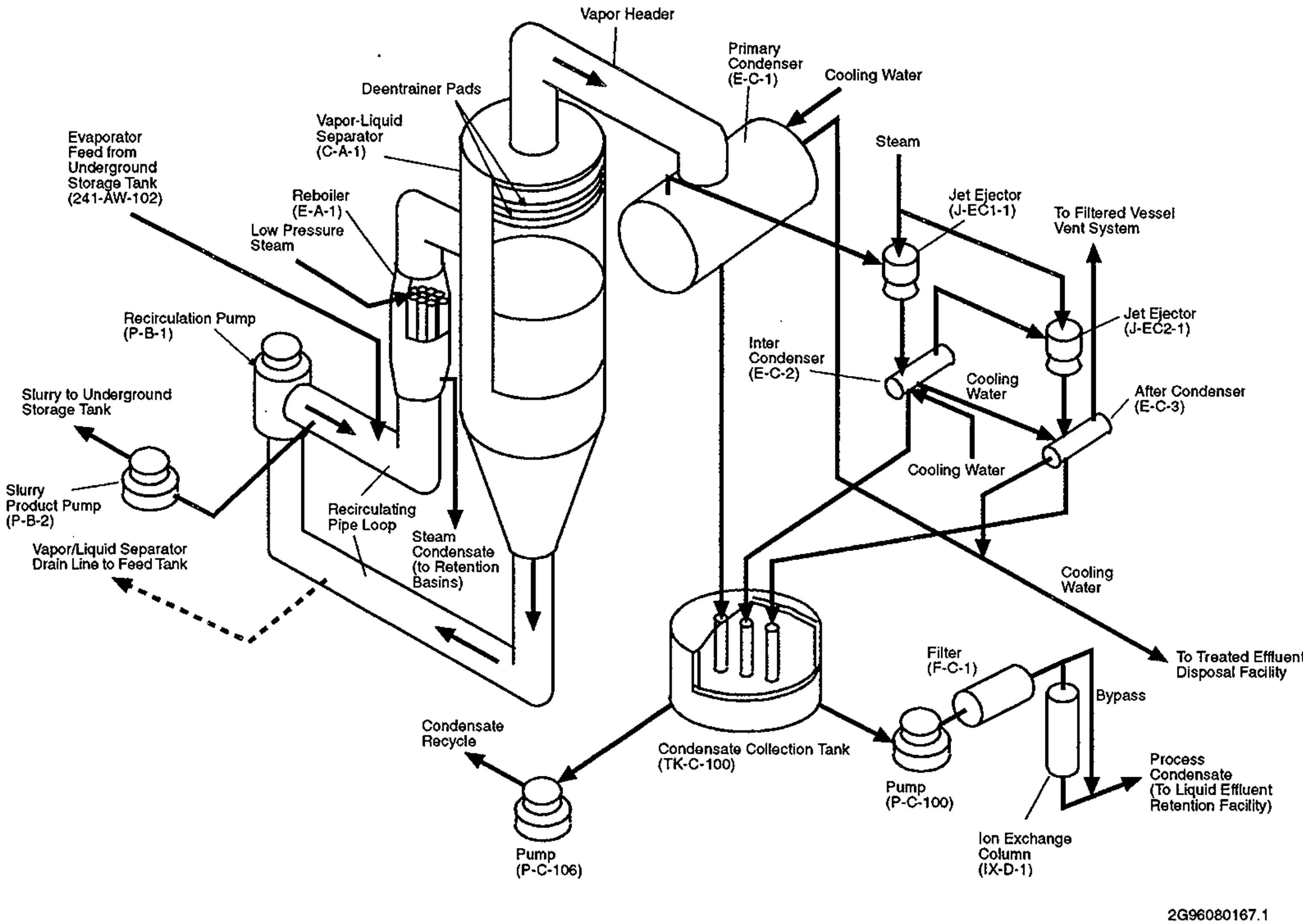

Figure 1. 242-A Evaporator Simplified Schematic.

3.0 WASTE IDENTIFICATION

All of the waste accepted by the 242-A Evaporator comes from DST System. The waste in the DST System tanks is received from onsite generators, which characterize the waste before transfer to the DST System. Waste characterization is based on analytical data and/or process knowledge. Based on this information, the waste in certain DST System tanks are selected as `candidates' for processing in the 242-A Evaporator. The contents of these candidate feed tanks are subjected to closer scrutiny and evaluated against 242-A Evaporator waste acceptance criteria before the final tank selection is made. To meet waste acceptance criteria, the contents of several tanks could be blended together in the feed tank (241-AW-102) prior to processing.

3.1 GENERAL CONSTITUENT DESCRIPTION

The only waste stream processed at the 242-A Evaporator is the DST System waste stream, which consists of mixed waste received from various Hanford Site activities. The mixed waste is a radioactive aqueous solution containing dissolved inorganic salts such as sodium, potassium, aluminum, hydroxides, nitrates, and nitrites. The mixed waste in some tanks has detectable levels of heavy metals such as lead, chromium, and cadmium. The radionuclide content includes fission products such as the Sr-90 and Cs-137, and actinide series elements such as uranium and plutonium. Small quantities of ammonia and organics, such as acetone, butanol, and tri-butyl phosphate, could also be present. Waste received in the DST System has been chemically adjusted to ensure the waste is compatible with materials used for construction of the waste tanks and the 242-A Evaporator. The consistency of the waste in the DST System ranges from liquid supernate to thick sludge. Waste fed to the 242-A Evaporator is supernate taken from the DST System; the sludge is not processed through the 242-A Evaporator.

The slurry is an aqueous solution containing the same components as the feed stream with increased concentrations. Most of the volatile constituents are evaporated and transferred to the process condensate. The process condensate is a dilute aqueous solution with ammonia, volatile organics, and trace quantities of radionuclides and inorganic constituents.

3.2 CLASSIFICATION OF WASTE

The waste processed at the 242-A Evaporator is classified as a mixed waste because it contains radioactive components and is a dangerous waste. The concentrated slurry produced by the evaporation process is also a mixed waste because it contains the same mixed waste constituents as the waste feed. The process condensate is classified as a mixed waste because it contains radioactive components and is a listed waste. The process condensate is a listed waste because it is derived from a listed waste.

Analysis of utility streams which do not contact mixed waste solutions, such as cooling water and steam condensate, are conducted per the requirements of the 200 Area Treated Effluent Disposal Facility, which receives these streams. These analyses are not discussed in this plan because these streams are not dangerous waste under WAC 173-303.

3.3 DANGEROUS WASTE NUMBERS

Waste transferred to the 242-A Evaporator could be assigned any of the dangerous waste numbers found in the Part A, Form 3 given in Chapter 1.0 and in the *Hanford Facility Dangerous Waste Part A Permit Application* (DOE/RL-88-21). These numbers are identical to the ones in the Part A, Form 3 for the DST System. Because of blending that occurs within the DST System, waste transferred to the 242-A Evaporator usually do not display all the characteristics found in the Part A, Form 3s, for these TSD units.

Process knowledge and historical data indicate that the slurry stream returning to the DST System contains the same dangerous waste constituents as the waste feed, so the same dangerous waste numbers are applicable to the feed and slurry.

Table 1 lists the dangerous waste numbers assigned to the process condensate. The process condensate is designated with the dangerous waste numbers F001 to F005 because it is derived from treatment of DST System waste assigned these numbers.

Table 1. Waste Designation For Process Condensate.

Waste number	Characteristic/Source	Basis for designation
F001	Spent halogenated solvents	Derived from F001 waste
F002	Spent halogenated solvents	Derived from F002 waste
F003	Spent nonhalogenated solvents	Derived from F003 waste
F004	Spent nonhalogenated solvents	Derived from F004 waste
F005	Spent nonhalogenated solvents	Derived from F005 waste
F039	Multi-source leachate from waste disposal operations	Future receipt of waste with the F039 number, derived from F001 through F005.

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4.0 WASTE ACCEPTANCE PROCESS

This section describes the actions performed before every campaign to determine if the waste in the DST System tanks is acceptable for treatment at the 242-A Evaporator. This section also describes the actions for sampling the process condensate stream at the 242-A Evaporator, if necessary, to determine if the process condensate is acceptable for treatment at the 200 Area Effluent Treatment Facility (ETF).

4.1 CANDIDATE FEED WASTE ACCEPTANCE PROCESS

Candidate feed tank sampling performed for this WAP is done in the DST System before transfer of the waste to the 242-A Evaporator. Certain DST System tanks are selected as `candidates' for waste to be processed in the 242-A Evaporator. This section describes the method for determining if the waste in a candidate feed tank is acceptable for processing.

4.1.1 Selecting Candidate Feed Tanks

For each 242-A Evaporator campaign, DST System tanks are selected as candidate feed tanks based on process knowledge of chemical properties with respect to waste acceptance criteria (Section 5.0). After a candidate tank is selected, the waste in the tank is sampled and analyzed and the data evaluated to confirm waste acceptability. Every candidate feed tank is sampled and analyzed to confirm waste acceptability.

4.1.2 Determining the Number of Candidate Feed Tank Samples

Once a candidate feed tank is selected, the number of tank samples to be taken is determined by statistical analysis using existing tank data or data from similar waste in other tanks. Figure 2 illustrates the decision logic used to determine the number of samples to be taken. Preliminary concentrations of critical analytes are compared to the waste acceptability limits to statistically determine the number of samples necessary to verify the composition of the waste. The statistical analysis accounts for how close the concentrations of critical analytes are to the limits and the desired confidence level. The closer the concentrations are to the limits, or the greater the desired confidence level, the more samples must be taken. For regulatory compliance, acetone is used as the critical analyte because it is often present at elevated levels. A 95% confidence level is specified for acetone. Critical analytes for process control are also assessed. Acetone analysis is usually not available from preliminary data, so process control analytes (such as nitrate and hydroxide) are often used. The statistical analysis includes the generation of power curve calculations using *Data Quality Objectives Decision Error Feasibility Trials* (EPA 1994b) software developed by the EPA. This software requires input of minimum and maximum expected values, action levels, mean sample results, standard deviations of sample results, and upper and lower confidence levels. The software outputs the minimum number of samples required. In general, three samples are taken as a minimum because taking two samples would require resampling if one sample should be lost or contaminated in the laboratory. A maximum of five samples generally is applied to minimize exposure to sampling personnel.

4.1.3 Assessing Candidate Feed Tank Analysis

When results of the sample analysis are available (and before the waste is processed), a second statistical analysis, similar to the first, is performed with the new analyte data to verify a sufficient number of samples was indeed taken (Figure 3).

Candidate feed tank sampling and analysis, in conjunction with acceptance criteria in Section 5.0, are used to assess whether established limits would be exceeded. Based on the results, three possible options are implemented:

- The waste is acceptable for processing at the 242-A Evaporator without further actions.
- The waste is unacceptable for processing as a single batch, but is acceptable if blended with other waste to be processed.
- The waste is unacceptable for processing.

If the waste is suitable for evaporation, it will be transferred to the feed tank (241-AW-102) for processing.

4.2 PROCESS CONDENSATE WASTE SAMPLING PROCESS

RCRA sampling of process condensate is completed per the LERF/ETF WAP (HNF-SD-ENV-WAP-008) before treatment at the ETF. Depending on programmatic needs, this sampling can be performed at the 242-A Evaporator during a campaign or at LERF after the campaign is completed.

Before the start of a 242-A Evaporator campaign, the decision whether process condensate sampling will be performed at the 242-A Evaporator or at LERF is documented in the operating record. Planning for process condensate sampling at the 242-A Evaporator (i.e., number of samples, when samples are taken, etc.) is completed before starting the campaign.

4.2.1 Determining the Number of Process Condensate Samples

The purpose of sampling the process condensate stream at the 242-A Evaporator is to confirm that the stream is acceptable for treatment at the ETF. Before starting a 242-A Evaporator campaign where sampling will be performed at the 242-A Evaporator instead of LERF, characterization of the process condensate will be developed based on process knowledge. Process knowledge includes previous documented process condensate analysis, estimated concentrations based on documented candidate feed tank analysis, etc. RCRA sampling of the process condensate stream at the 242-A Evaporator is performed during the campaign to confirm the characterization is correct. Sampling frequency is determined using the following equation:

Number of process condensate samples required (per campaign) = N + 1

Where N is the number of candidate feed tanks to be processed during the campaign.

For example, a campaign processing waste from only one candidate feed tank would require two samples, while a campaign processing waste from three candidate feed tanks would require four samples. Sampling is spread approximately evenly through the campaign, allowing for operational events such as unexpected shutdowns and planned maintenance outages. This sample frequency represents a confirmation rate of about one sample every 5 to 8 days of processing. This is reasonable based on the extensive database of previous process condensate analysis. A minimum of two samples are taken to allow averaging of results.

4.2.2 Assessing Process Condensate Analysis

The process condensate sample results are assessed against the requirement in the LERF/ETF WAP (HNF-SD-ENV-WAP-008). The discussion of the waste management decision process for process condensate sampling, including the reevaluation process, is also included in the LERF/ETF WAP.

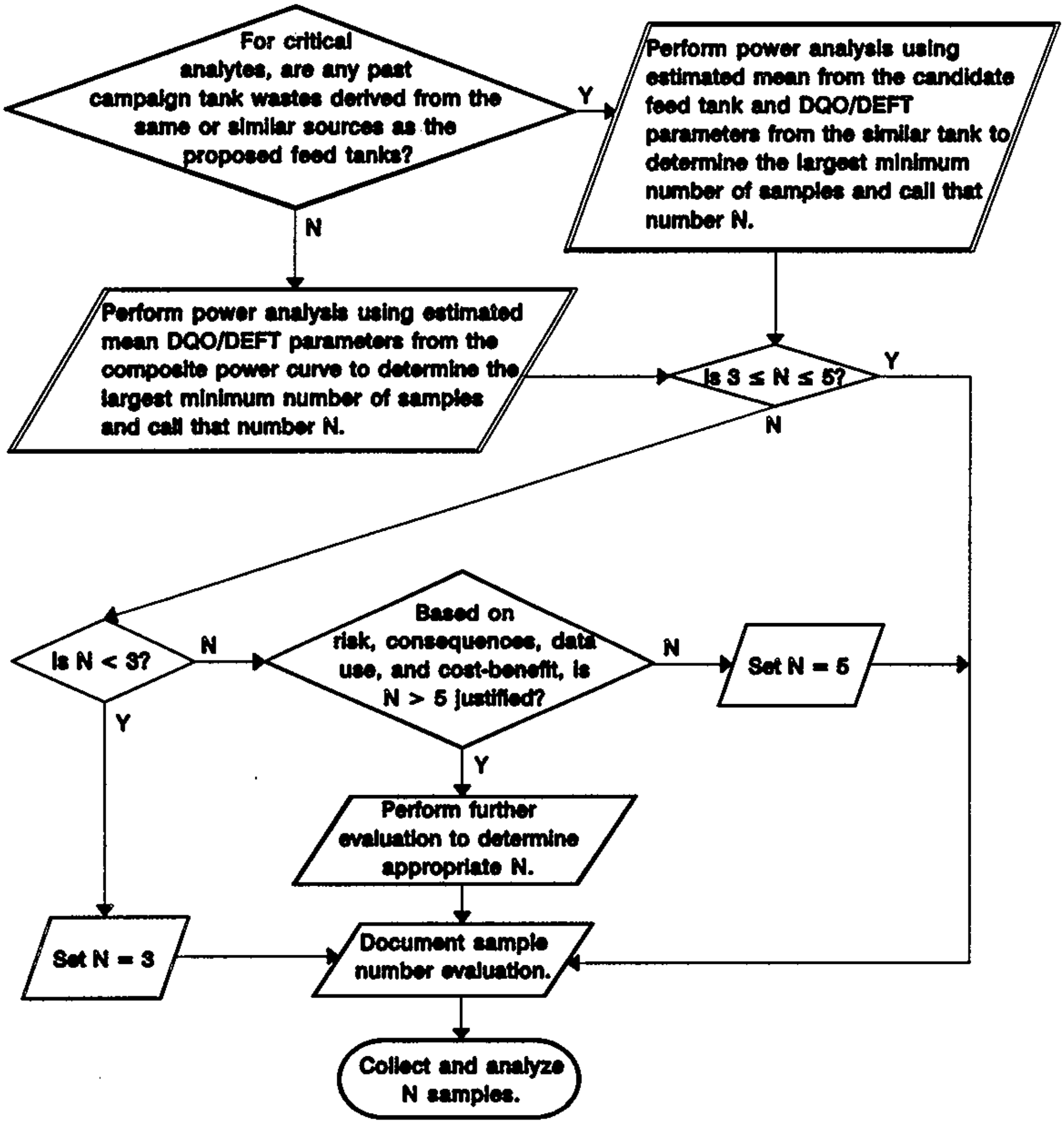

Figure 2. Strategy for Determining the Number of Candidate Feed Tank Samples.

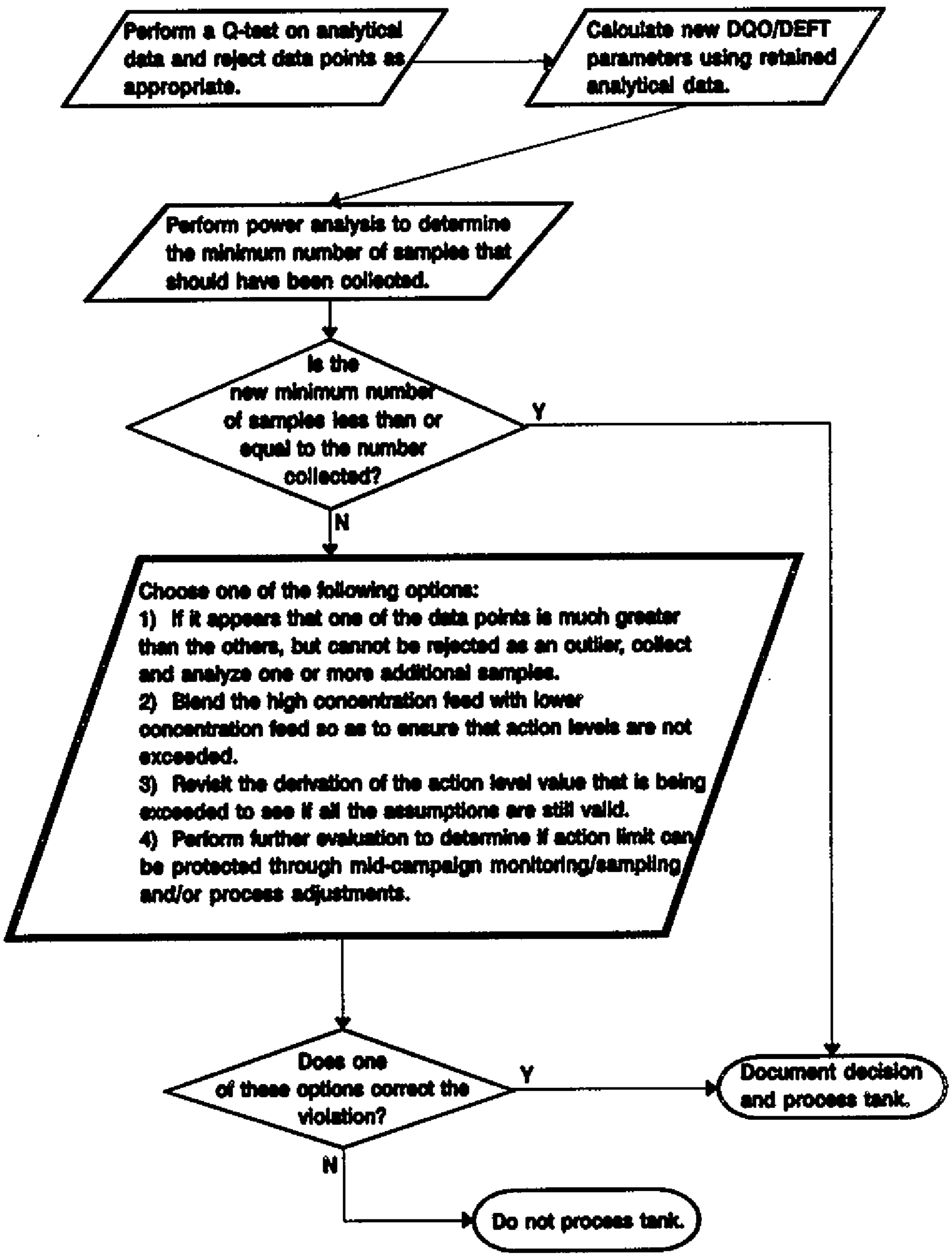

Figure 3. Strategy for Verifying the Number of Candidate Feed Tank Samples.

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5.0 242-A EVAPORATOR ACCEPTANCE CRITERIA

Acceptance criteria for the 242-A Evaporator have been established from regulatory requirements, operating experience, previous sample analyses, and engineering calculations. Processing criteria are maximum and/or minimum values of a waste analyte that, if exceeded, alert the operator that management of the waste requires further attention. The rationale for selecting a given analyte for inclusion in this WAP, as required by WAC 173-303-300, is indicated in this section.

Additional analyses (such as specific gravity and radionuclide analysis) of the feed tanks, process condensate, and other streams are performed to ensure that the facility is operating within established parameters. This process control sampling and analysis is outside the scope of this plan because it is not used to assess compatibility of the waste with other waste and with the 242-A Evaporator tank systems.

5.1 CANDIDATE FEED TANK WASTE ACCEPTANCE CRITERIA

The following sections discuss waste acceptance criteria for candidate feed tanks to be processed in the 242-A Evaporator.

5.1.1 Exothermic Reactions

WAC 173-303-395 requires waste handling be conducted to prevent an uncontrolled reaction that could damage the tank system structural integrity or threaten human health or the environment. To evaluate the possibility of an uncontrolled reaction at the elevated temperatures in the evaporator vessel, a differential scanning calorimeter (DSC) test is performed on sample of all candidate waste to be processed. DSC measures the amount of heat absorbed or released by a sample as the temperature is increased. Waste exhibiting exotherms below 168°C, or with an absolute value of the exotherm-to-endotherm ratio greater than one, will not be processed in the 242-A Evaporator without further technical evaluation.

5.1.2 Compatibility

WAC 173-303-395 requires waste handling be conducted to prevent an uncontrolled reaction that could damage the tank system structural integrity or threaten human health or the environment. To verify there will be no adverse affects because of mixing the contents of different waste tanks in the feed tank and evaporator vessel, a compatibility evaluation is performed on waste in the candidate feed tanks. As samples from each of the planned waste sources are mixed, observations are made to note any changes in color, temperature, clarity, or any other visually determinable characteristic. This would indicate an unexpected chemical reaction that might have an impact on 242-A Evaporator operations. If such visible changes are observed when mixing samples, the waste would not be processed in the 242-A Evaporator without further technical evaluation.

5.1.3 Organic Constituents

The 242-A Evaporator performs distillation of waste containing organic concentrations greater than 10 parts per million by weight; therefore, organic air emissions are subject to WAC 173-303-690 (which incorporates 40 CFR 264, Subpart AA, by reference). Organic emissions from TSD units at the Hanford Site subject to 40 CFR 264, Subpart AA are controlled to ensure emissions to do not exceed 1.4 kilograms per hour (3 pounds per hour) and 2800 kilograms pe year (3.1 tons per year). To ensure these requirements are met, the levels of volatile organics in the 242-A Evaporator feed must be limited to prevent excessive organic emissions during processing. Engineering calculations were used to determine the feed limits given in Table 2. The limits include a modifier "(R-1)/R", which adjusts the limits based on the campaign's planned boiloff rate. R is the ratio of feed flow rate to slurry flow rate. Typically, R is equal to 2, making (R-1)/R equal to 0.5.

In addition analysis of the individual components in Table 2, total carbon (C_T) and total inorganic carbon (IC_T) analysis are performed as a screening tool to account for other organic species that might be present in the waste. The value of C_T minus IC_T represents the total organic concentration in the waste. If the C_T minus IC_T limit is exceeded, additional volatile organic species might be present and a more detailed evaluation will be conducted to determine organic emissions out of the vessel vent. The limit for evaluation is 174.4 milligrams per liter, based on the conservative assumption that all organic species present in the waste are as volatile as acetone. Acetone was chosen because of its relatively high volatility and low percentage of carbon.

The level of volatile organics in the feed must also be limited to ensure organic constituents that transfer to the process condensate are compatible with the LERF liner. The high density polyethylene (HDPE) liner used at the LERF is exposed to process condensate that could contain trace quantities of chemicals that could cause degradation of the liner material. Based on the liner manufacturer's compatibility data, the concentration limits in Table 3 are imposed on those classes of constituents that could potentially degrade the liner. To ensure that these limits are not exceeded in the process condensate, the concentration limits are applied to the candidate feed tanks as well, with the modifier "(R-1)/R". A C_T minus IC_T analysis, similar to the one described previously, is also applied to the LERF liner limits. The strictest limit for organic species in Table 3 is 2,000 milligrams per liter. Assuming the organic is acetone (with its low percentage of carbon), this converts to a carbon value of 1,240 milligrams per liter.

The calculations in Tables 2 and 3 require use of the "sum of the fractions" technique. A calculation is performed where the analysis of each constituent is divided by its associated limit to produce a fraction of the limit. If the sum of these fractions is less than 1, the waste meets the requirements in the Table.

5.2 PROCESS CONDENSATE ACCEPTANCE CRITERIA

The waste acceptance criteria for process condensate sampling, including treatability, LERF liner compatibility, compatibility with other waste, etc., is given in the LERF/ETF WAP (HNF-SD-ENV-WAP-008).

Table 2. Candidate Waste Tank Limits for Vessel Vent Organic Discharge[a].

Feed constituent	Limit (milligrams per liter)[b,c]
Acetone	174.4 ([R-1]/R)
1-Butanol	452 ([R-1]/R)
2-Butoxyethanol	190.4 ([R-1]/R)
2-Butanone	116 ([R-1]/R)
Tri-butyl phosphate	2.03E+4 ([R-1]/R)
Total carbon and Total inorganic carbon	$(C_T\text{-}IC_T) < 174.4$ ([R-1]/R) (as acetone)

[a]Limits are based on a maximum continuous operating time equivalent to 6 months per year. If total operating time is expected to exceed 6 months per year, the limits must be re-evaluated.

[b]The limits are applied using the sum of the fractions technique:

where i is the number of organic constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

$$\sum_{n=1}^{i} \left(\frac{Conc_n}{LIMIT_n}\right) \leq 1$$

[c]R is the ratio of feed flow rate to slurry flow rate (typically R = 2).

Table 3. Candidate Feed Tank Limits for LERF Liner Compatibility.

Chemical family/parameter[a]	Current target compounds	Limit (milligrams per liter)[b,c]
Alcohol/glycol	1-Butanol	500,000 ([R-1]/R)
Alkanone[d]	Sum of acetone, 2-butanone	200,000 ([R-1]/R)
Alkenone[e]	None targeted	2,000 ([R-1]/R)
Aromatic/cyclic hydrocarbon	None targeted	2,000 ([R-1]/R)
Halogenated hydrocarbon	None targeted	2,000 ([R-1]/R)
Aliphatic hydrocarbon	None targeted	500,000 ([R-1]/R)
Ether	2-Butoxyethanol	2,000 ([R-1]/R)
Other hydrocarbons	Tri-butyl phosphate	2,000 ([R-1]/R)
Oxidizers	None targeted	1,000 ([R-1]/R)
Acids, bases, and salts	Ammonia	100,000 ([R-1]/R)
Total carbon and total inorganic carbon	Not applicable	(C_T-IC_T) < 1,240 ([R-1]/R) (as acetone)

[a]If a chemical fits in more than one chemical family, the more restrictive limit applies.

[b]The limits are applied using the sum of the fractions technique: where i is the number of constituents detected in analysis of the waste feed tank. Total carbon and total inorganic carbon analysis are not part of the summation.

$$\sum_{n=1}^{i} \left(\frac{Conc_n}{LIMIT_n}\right) \leq 1$$

[c]R is the ratio of feed flow rate to slurry flowrate (typically R = 2).

[d]Ketone containing only saturated alkyl group(s)

[e]Ketone containing unsaturated alkyl group(s)

6.0 SAMPLE COLLECTION AND ANALYSIS

This section discusses sampling and analysis, including sampling procedures, sample collection points, sample quality assurance/quality control (QA/QC), and selection of analytes.

6.1 SAMPLE COLLECTION

This section describes collection of candidate feed tank and process condensate samples for RCRA analysis. Candidate feed tank waste is sampled and analyzed before the start of each 242-A Evaporator campaign. Process condensate samples are taken at the 242-A Evaporator only if the decision is made before the start of the campaign that sampling will be done at the 242-A Evaporator instead of LERF.

6.1.1 Candidate Feed Tank Sample Collection

Candidate feed tank samples are obtained by using a grab sampling method (e.g. "bottle on a string method") specified in ASTM E300, *Standard Practices for Sampling Industrial Chemicals* (ASTM 1986). The number of lateral sampling locations in candidate feed tanks is limited by the availability of tank risers providing access into the tank. Generally, only a few risers in each tank are actually available for sampling because the risers are dedicated to instrumentation or other uses. Sampling within a vertical column is generally limited only by the depth of waste in the tank. The criteria in Table 4 is used when determining the specific sampling locations.

Riser selection is made by numbering the available risers that are at least 4.6 meters (15 feet) from each other and using a random number generator to select which risers will be used. Sample depths are determined by dividing the tank level into 1 foot increments and using a random number generator to determine a depth which meets the criteria given in Table 4.

6.1.2 Candidate Feed Tank Sampling Quality Assurance and Quality Control

For each candidate feed tank sample, four 100-milliliter bottles are drawn: one bottle for the mixing and compatibility study, two bottles for organic analysis (one each for volatile organic analysis [VOA] and semi-volatile organic analysis [semi-VOA]), and one bottle for inorganic analysis. All sample bottles are precleaned, amber-colored glass bottles sealed with Teflon* caps, except for the sample bottle for VOA, which is sealed with septum cap and lined septum.

For candidate feed tank sampling quality control, one field blank, consisting of four 100-milliliter bottles, is taken during the sample event: two bottles for organic analysis (one each for VOA and semi-VOA) and two bottles for inorganic analysis. Field blanks are inserted approximately 1 foot into any one of the sample risers used during the sample event. One trip blank, consisting of two 100-milliliter bottles, is also taken during each sample event: one bottle for VOA and one bottle for semi-VOA. Trip blanks are analyzed for those constituents detected in the field blanks. Field and trip

**Teflon is a trademark of* E.I. DuPont de Nemours & Company blanks use the same types of sample bottles as the actual samples and are filled with reagent-grade water before shipment to the field.

Preservatives are not used with candidate feed tank samples because of concerns with high radiation exposure that would result from additional handling of sample solutions. It is not practical to refrigerate the bulky, shielded sample pigs and shipping containers. Biological activity, generally the largest problem in environmental samples, is unlikely in candidate feed tank samples because of the high salt content, pH, and radioactivity.

The chain of custody is documented on a data sheet that includes a discrete sample number, date and time sample was taken, custody seal number, and signature of the sampler. When possession of the sample is transferred to other persons, such as the shipper or laboratory, the signature of the relinquisher and receiver are recorded, along with date and time of the transfer. The receiver at the laboratory also documents on the data sheet that the sample seal number is correct and the seal is intact. The chain-of-custody data sheets are included in the operating record.

6.1.3 Process Condensate Sample Collection

Process condensate samples, when performed at 242-A Evaporator instead of LERF, are taken from the process condensate transfer line in the condenser room of the 242-A Building. Grab sampling is performed during the campaign on the transfer line downstream of the ion exchange column at the SAMP-RC3-2 sampler or other sample port. Samples of process condensate are collected in a manner consistent with SW-846 procedures (EPA 1986).

6.1.4 Process Condensate Sampling Quality Assurance and Quality Control

For information on process condensate sample collection, including the number and types of sample bottles, sampling QA/QC, etc., refer to the LERF/ETF WAP (HNF-SD-ENV-WAP-008).

6.2 ANALYTE SELECTION AND RATIONALE

The DQO analysis for the 242-A Evaporator examined the data needs for sampling the candidate feed tanks and determined that the analyses in Table 5 should be conducted to satisfy WAC 173-303-300 requirements. Table 5 also contains the rationale for these parameters being selected. Section 5.0 provides additional detail on the rationale.

For information on process condensate sample analyte selection and rationale, refer to the LERF/ETF WAP (HNF-SD-ENV-WAP-008).

Table 4. Candidate Feed Tank Sample Point Selection.

Number of samples	Location of sample points
Two samples	One sample taken from the upper half of the waste from one riser and the other sample taken from the lower half of the waste from another riser.
Three samples	Two Samples taken from one riser (one from the top half and the other from the bottom half of the waste) and one sample from another riser
Four samples	Two samples taken from each of two separate risers. One sample is to be taken from the top half of the waste and one from the bottom half of the waste from each of the selected risers.
Five samples	Same as for four samples except one sample from either the top or bottom half of the tank will be taken from a third riser

Table 5. Analytes for Candidate Feed Tanks.

Parameter	Test method	Analyte	Rationale
Exotherm	Differential scanning calorimeter	Temperature and energy	Verify the waste will not undergo an exothermic reaction (Section 5.1.1).
Compatibility test	Mixing and compatibility study	Visual physical changes	Verify the waste is chemically compatible (Section 5.1.2).
Organic compounds	Gas chromatograph/mass spectrometer	Acetone, 1-Butanol, 1-Butoxyethanol, 1-Butanone, Tri-butyl phosphate	Used in calculations to verify that vessel vent emissions will not exceed regulatory limits and to prevent compatibility problems with the LERF liner (Section 5.1.3).
	Carbon coulometric detector	Total carbon, Total inorganic carbon	Used in calculations to verify that vessel vent emissions will not exceed regulatory limits and to prevent compatibility problems with the LERF liner (Section 5.1.3).
Ammonia	Ion selective electrode	Ammonia	To prevent compatibility problems with the LERF liner (Section 5.1.3).

7.0 ANALYTICAL METHODS AND QUALITY ASSURANCE AND QUALITY CONTROL

This section provides information on the analytical methods and QA/QC for candidate feed tank samples, including discussions concerning laboratory selection and analytical methods. For information on process condensate analytical methods and QA/QC, refer to the LERF/ETF WAP (HNF-SD-ENV-WAP-008).

7.1 LABORATORY SELECTION

Because of the highly radioactive nature of the samples, it is anticipated that candidate feed tank sample analyses will be conducted at the 222-S Laboratory Complex. Other laboratories at the Hanford Facility could be used provided they are equipped to handle such samples. Laboratory selection depends on availability, analytical needs, and the ability of the laboratory to meet permit and quality assurance requirements.

7.2 ANALYTICAL METHODS

The analytical methods that must be followed for RCRA sampling of the candidate feed tanks are included in Table 6. Performance-based specifications rather than procedure-based specifications are used for determining the appropriate analytical methods. This allows for necessary adjustments to the methods for Hanford Facility-specific issues, related to high radioactivity of the sample matrix, while ensuring acceptable data quality. Because of the high radioactivity, the analytical method will in some cases deviate from those in national standards such as *Test Methods For Evaluating Solid Waste*, SW-846 (EPA 1986) and *Standard Methods for the Examination of Water and Waste Water* (AWWA 1989).

7.3 LABORATORY QUALITY ASSURANCE AND QUALITY CONTROL

Candidate feed tank analytical and sampling methods conducted as part of this plan meet the data quality requirements contained in Table 7. Quality control check samples (i.e., calibration samples and/or laboratory control samples) generally are performed once per sample event (e.g., once for all samples from one candidate feed tank). Matrix spike and matrix spike-duplicate analysis are performed once per sample event for all methods except differential scanning calorimetry (DSC). A duplicate analysis is performed for DSC analysis to determine method accuracy.

Table 6. Analytical Methods for Candidate Feed Tank Stream Analytes.

Category	Analyte	Performance-based analytical methods	Basis for method	Equipment/Method
Organics	Acetone 2-Butanol 2-Butanone	Purge and trap and GC/MS (VOA)	SW-846 Method 8260	A diluted sample is purged with nitrogen or helium and organic vapors are trapped in an adsorbent column. The column is desorbed at 180°C into a 30-m long wide- or narrow-bore capillary column. The GC column is heated/desorbed into an MS for analysis.
	2-Butoxyethanol Tri-butyl phosphate	Solvent extraction and GC/MS (semi-VOA)	SW-846 Method 3520B and 8270A	A diluted sample is adjusted to pH <2 (pH <6 in some cases) using sulfuric acid solution. The sample is placed in a continuous liquid-liquid extractor using methylene chloride as the extractant. The extractant is placed in an evaporator and volume is reduced. The extractant is injected into a GC/MS for analysis.
Inorganic	Ammonia	Ion selective electrode	AWWA Method 4500-NH_3	The sample is preserved by the addition of hydrochloric acid solution to pH <2. For analysis, a diluted sample is made alkaline by sodium hydroxide solution. The ammonia is measured by an ammonia gas sensing electrode. A standard ammonium chloride solution is added and measured by the electrode in two stages. Based on the three readings, an ammonia concentration is calculated.
Other	Exotherm	Differential scanning calorimeter	N/A	A sample is placed in the DSC unit and heated to 500°C. The differential heat flow between the sample and a reference pan is monitored by thermocouples. A duplicate sample is run on the equipment.
	Mixing and compatibility study	Lab specific	N/A	Solution from each sample are mixed and visually checked for gas evolution, heat generation, precipitation, dissolution of solids, color change, clarity, and any other observable characteristics.
	Total carbon	Combustion with IC_T/TOC coulometric detection OR Persulfate oxidation with IC_T/TOC coulometric detection	Combustion and persulfate treatment: AWWA Method 5310. Coulometry: ASTM D4129 (AWWA approval pending)	A diluted sample is injected into a furnace heated to 800°C while purged with oxygen. The furnace converts carbon to carbon dioxide, which is carried by the oxygen. The gas sample passes through adsorbent columns to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer. OR: A diluted sample is acidified with sulfuric acid, converting inorganic carbon to carbon dioxide. The sample purged with oxygen, stripping the carbon dioxide. Then, persulfate is added to the sample to oxidize the organic carbon. The sample is again acidified with sulfuric acid and purged with oxygen. The gas samples from both steps pass through an adsorbent column to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer.
	Total Inorganic Carbon	Acidification with IC_T/TOC coulometric detection	Acidification: AWWA Method 5310. Coulometry: ASTM D4129 (AWWA approval pending)	A diluted sample is acidified with sulfuric acid/sulfamic acid, converting inorganic carbon to carbon dioxide. The sample purged with oxygen, stripping the carbon dioxide. The gas sample passes through scrubbers to remove acid vapors, sulfur oxides and nitrogen oxides. The carbon dioxide is absorbed in an organic solution and measured with a coulometric carbon analyzer.

Table 6. Analytical Methods for Candidate Feed Tank Stream Analytes.

Category	Analyte	Performance-based analytical methods	Basis for method	Equipment/Method

1 GC/MS - gas chromatography/mass spectrometry
2 VOA - volatile organic analysis
3 IC_T - total inorganic carbon
4 TOC - total organic carbon

Table 7. Quality Assurance Objectives for Candidate Feed Tank Stream Analytes.

Category	Analyte	Estimated quantitation limit (matrix specific)	Precision (RPD between matrix spike duplicates[1]), %	Accuracy (recovery of matrix spike[1]), %	Action level[2]
Organics	Acetone	28 mg/L	<25	40-110	> 87 mg/L[3]
	1-Butanol	20 mg/L	<25	30-110	> 226 mg/L[3]
	2-Butoxyethanol	30 mg/L	<25	30-110	> 95.2 mg/L[3]
	2-Butanone (methyl ethyl ketone)	18 mg/L	<25	40-110	> 58 mg/L[3]
	Tri-butyl phosphate	50 mg/L	<25	40-125	> 1.015E+4 mg/L[3]
Inorganic	Ammonia	400 μg/ml	<20	75-125	> 50,000 mg/L
Other	Exotherm	None	<20[4]	N/A	< 168 °C or absolute value of ratio of exotherm to endotherm > 1
	Mixing and compatibility study	Not applicable	Not Applicable	Not Applicable	Visual: unusual changes in color, temperature, clarity, etc.
	Total carbon	25 μg/mL	<20	75-125	C_T-IC_T > 87 mg/L
	Total inorganic carbon	25 μg/mL	<20	75-125	C_T-IC_T > 87 mg/L

Table 7. Quality Assurance Objectives for Candidate Feed Tank Stream Analytes.

Category	Analyte	Estimated quantitation limit (matrix specific)	Precision (RPD between matrix spike duplicates[1]), %	Accuracy (recovery of matrix spike[1]), %	Action level[2]

1. One matrix spike and one matrix spike duplicate analysis performed for each sample event.
2. In deriving the action levels, the ratio of feed flow rate to slurry flow rate (R) is assumed to be 2.
3. For organic species limits, sum of the fractions rule applies (refer Tables 2 and 3). Total carbon and total inorganic carbon are not included in the summation of organics.
4. Precision for this method is evaluated by the deviation between sample (unspiked) and sample replicate.

RPD - relative percent difference
C_T - total inorganic carbon
IC_T - total inorganic carbon
mg/L - milligram per liter
μg/L - microgram per liter

8.0 REFERENCES

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This plan covers the following buildings and structures:

242-A Building, 242-AB Building, 242-A-81 Water Service Building, 207-A North Retention Basin.

Approved:

Building Emergency Director — Date: 5-14-98

Emergency Preparedness — Date: 5-14-98

Hanford Fire Department — Date: 5-13-98

This document will be reviewed annually and updated if necessary by the Building Emergency Director, unless Hanford Facility RCRA Permit coordination requirements provides otherwise. The document will be approved by the primary Building Emergency Director, and approved by the Manager of Emergency Preparedness (or delegate) and the Hanford Fire Department.

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1.0 GENERAL INFORMATION

The 242-A Evaporator, which is part of the 200 Area Liquid Waste Processing Facilities (LWPF), is located on the Hanford Site, a 560-square-mile U.S. Department of Energy (DOE) site in southeastern Washington State. The 242-A Evaporator is located in the southeast portion of the 200 East Area near the center of the Hanford Site. The Hanford Site Emergency Preparedness Program is based upon the incident command system which allows a graded approach for response to emergency events. This plan contains a description of facility specific emergency planning and response. It is used in conjunction with DOE/RL-94-02, *Hanford Emergency Response Plan*. Response to events is performed using facility specific and/or site-level emergency procedures.

1.1 Facility Name: U.S. Department of Energy Hanford Site,
200 Area Liquid Waste Processing Facility,
242-A Evaporator.

1.2 Facility Location: Benton County, Washington; within the 200 East Area.

Buildings/facilities covered by this plan are:

242-A Building
242-AB Building
242-A-81 Water Service Building
207-A North Retention Basin

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

FACILITY MANAGER: Waste Management Federal Services of Hanford, Inc.
P.O. Box 700
Richland, Washington 99352

1.4 Description of the Facility and Operations

The 242-A Building is a five-story, concrete structure consisting of a main process area (i.e., pump room, load-out room, evaporator room, condenser room), support system area (i.e., aqueous makeup room, heating ventilation and air conditioning (HVAC) room, etc.), and the adjacent office area (i.e., lunch room, lavoratories, offices, etc.). The main process and support system areas are designed and constructed to withstand a 0.25 g horizontal acceleration seismic event, and a 100-mile-per-hour, high wind/tornado.

The evaporator room and pump room are posted as high radiation/high contamination/airborne radioactivity areas, with some hot spots inside. The load-out room is posted as a radiation/contamination area. The condenser room is posted as a radiological buffer/fixed contamination area with some small contamination areas inside.

APPENDIX 7A

BUILDING EMERGENCY PLAN FOR 242-A EVAPORATOR

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The 242-AB Building was constructed to house the upgraded 242-A Evaporator monitoring and control system. This building adjoins the 242-A Building and includes the control room (room 18) and electrical room (room 19).

The 207-A North Retention Basins are located east of the 242-A Building, and north of the AP Tank Farm. The Water Service Building (242-A-81) is located directly south of the 242-A Building.

The 242-A Evaporator is connected to Double-Shell Tank (DST) system tanks and valve pits through underground piping that is used for transferring feed and slurry solutions and miscellaneous drainage.

There is a satellite accumulation area located south of the 242-A Building.

1.5 Building Evacuation Routing

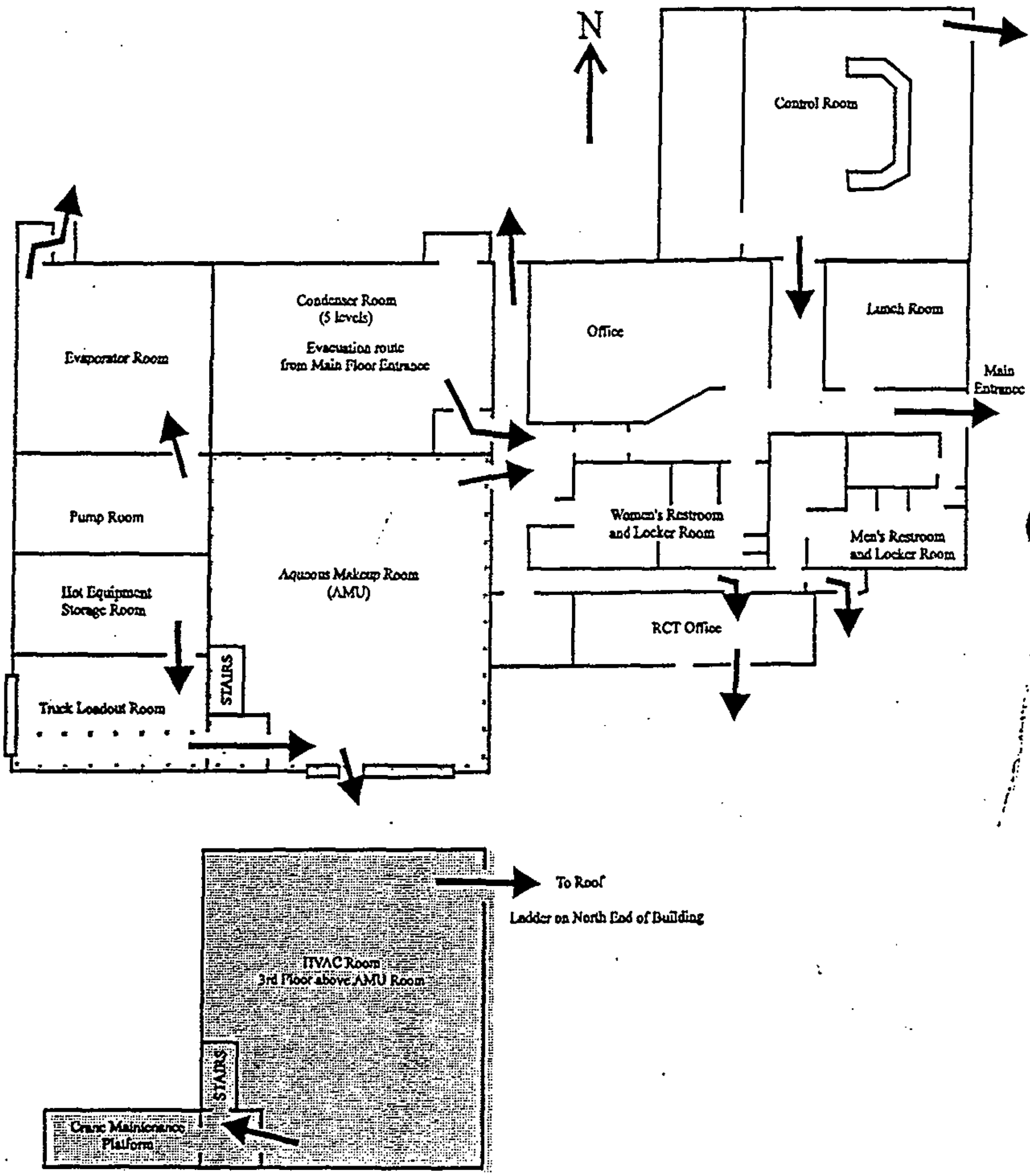
Figure 1 shows 242-A Evaporator evacuation routes. Figure 2 shows 242-A Evaporator staging areas.

2.0 PURPOSE

This plan describes both the facility hazards and the impacts of upset and/or emergency conditions. "Emergency" as used in this document includes events meeting the Washington Administrative Code (WAC) 173-303 definition of Emergency as well as DOE-0232.1, "Occurrence Reporting and Processing of Operations Information," categories of Unusual Occurrence and Emergency. These events include spills or releases, fires and explosions, transportation activities, movement of materials, packaging, storage of hazardous materials, and natural and security contingencies. When used in conjunction with DOE/RL-94-02, *Hanford Site Emergency Response Plan*, this plan meets the requirements for contingency planning as required by WAC 173-303.

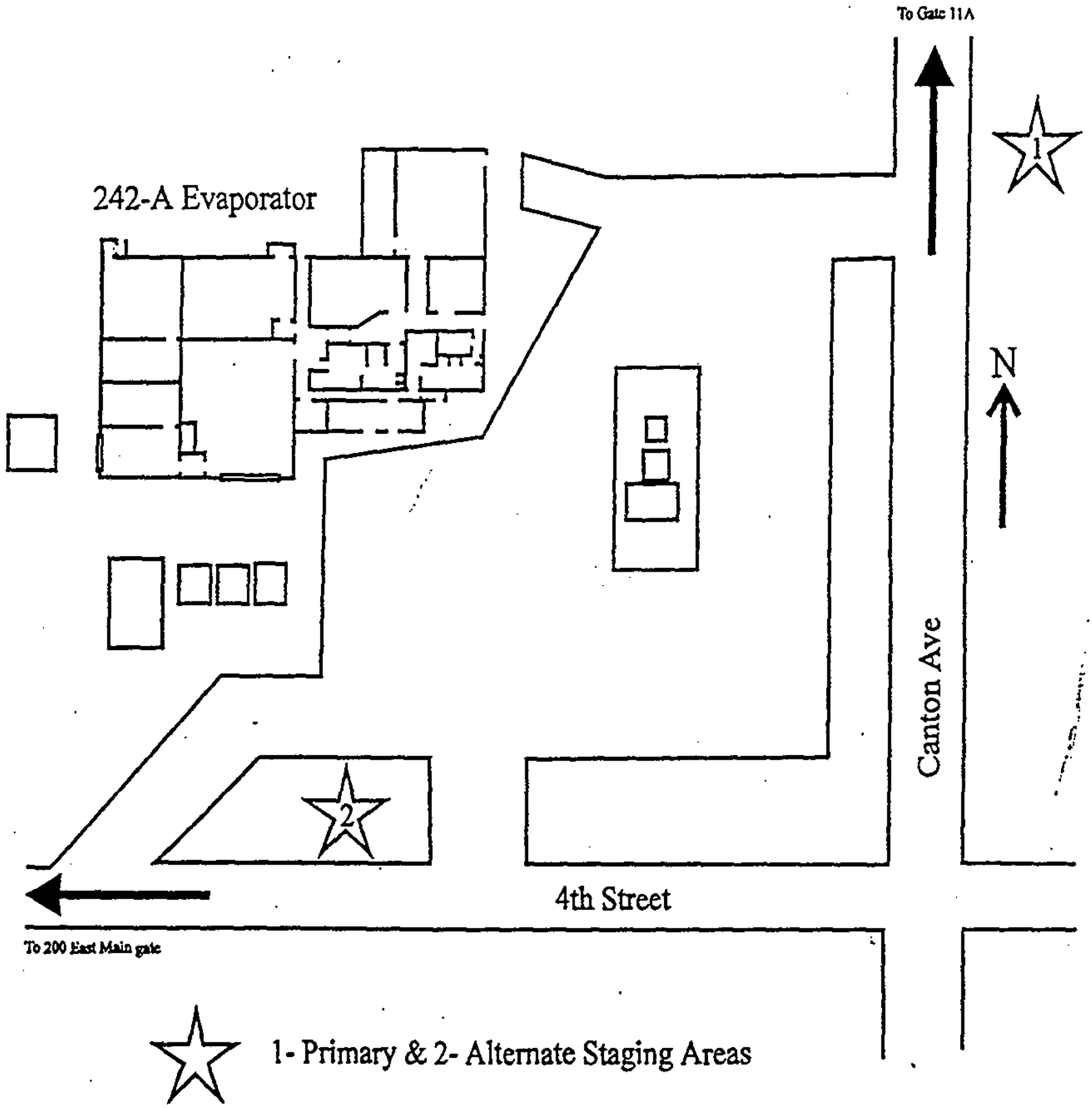
Figure 1, 242-A Evaporator Evacuation Routes

RCT: radiation control technologist



HVAC: heating, ventilation, and air conditioning

Figure 2, 242-A Evaporator Staging Areas



3.0 BUILDING EMERGENCY ORGANIZATION

The LWPF is staffed 24 hours each day, and is prepared to respond to emergencies through designated personnel with specific primary, on-call and alternate responsibilities. The 242-A Building Emergency Director (BED) directs the emergency response until the Incident Commander arrives at the event scene. The BED is on duty 24 hours each day. The on-duty Shift Operations Manager is the designated primary BED. There is a designated alternate BED on day shift available for directing emergency response if required. Other personnel required as part of the building emergency organization are also on duty with either primary or alternate responsibilities. The following paragraphs describe this organization and the duties of designated personnel.

3.1 Building Emergency Director

Emergency response is directed by the Building Emergency Director (BED) until the Incident Commander arrives. The incident command structure and staff with supporting on-call personnel fulfill the responsibilities of the Emergency Coordinator as discussed in WAC 173-303-360.

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

A listing of the primary and alternate BEDs by title, work location, and work telephone numbers is contained in Section 13 of this plan. The BED is on the premises or is available through an "on-call" list 24 hours a day. Emergency Preparedness maintains a listing of BED names and work and home telephone numbers at the Patrol Operations Center (POC) in accordance with *Hanford Facility RCRA Permit*, Dangerous Waste Portion, General Condition II.A.4.

3.2 Other Members

As a minimum, the BED or designee appoints and trains individuals to perform as Personnel Accountability Aides and Staging Area Managers. The accountability aides facilitate the implementation of protective actions (evacuation or take cover) and the accountability of personnel after the protective actions have been implemented. Staging Area Managers coordinate/conduct activities at the staging area. Staging Area Managers and Personnel Accountability Aids are trained annually and are required to participate in two drills per year. In addition, the BED may identify additional support personnel (Radiological Control, Maintenance, Engineering, Hazardous Material Coordinators, etc.) to be part of the building emergency organization. Sections 13.0, BUILDING EMERGENCY ORGANIZATION, of this plan discusses the location of information regarding positions, names, and telephone numbers. Copies are distributed to appropriate facility locations and to the Hanford Site Emergency Preparedness organization.

4.0 IMPLEMENTATION OF THE PLAN

To meet the requirements of WAC 173-303, this plan will be implemented when the BED has determined that a release, fire, or explosion involving dangerous waste or dangerous waste constituents that could threaten human health or the environment (WAC 173-303-350, Emergencies) has occurred at the facility. An incident requiring evacuation of personnel or the summoning of emergency response units will not necessarily indicate that the plan will be implemented. The incident classification process is described in DOE/RL-94-02, Section 4.2.

Under DOE guidance, this plan will be implemented whenever the BED determines that one of the incidents listed in Section 6.0 of this plan has or will occur and that the severity is or will be such that there is a potential to endanger human health or the environment (DOE Unusual Occurrence or Emergency).

DOE Declared Emergencies are assigned one of three classifications which in the order of increasing severity are: 1) Alert Emergency, 2) Site Area Emergency, and 3) General Emergency. The 242-A Evaporator implements responses to these DOE emergencies through this plan and criteria identified in DOE-0223, RLEP 1.1, Appendix 1-2.M, and other documents listed in Attachment A of this plan.

The BED assesses each incident to determine the response necessary to protect personnel, the facility, and the environment. If emergency assistance from Hanford Patrol, Hanford Fire Department, or ambulance units is required, the Hanford Emergency Response Number (911) is used to contact the POC and request the desired assistance. To request other resources or assistance from outside the facility, the POC business number is used (373-3800).

5.0 FACILITY HAZARDS

Facility hazards and potential targets are identified and evaluated in a hazards assessment required by DOE Orders for the 242-A Evaporator. The hazards assessment is not used in the Hanford Facility contingency planning program. This section describes hazards that pose significant risks to human health or the environment and identify quantitative values for those risks.

Certain information in this plan pertains only to DOE Order considerations (e.g., discussions pertaining to hazards from hazardous materials and radioactive-only materials). Terms such as Emergency Response Protective Guidelines (ERPG), Alert Emergencies, Site Area Emergencies, and General Emergencies pertain only to DOE Order planning considerations. These hazards and terms are not part of the Hanford Facility contingency planning program. The only portion of this section that is part of the Hanford Facility contingency planning program are the chemical constituent hazards discussed in Section 5.3.

5.1 Hazardous Materials

- Materials at the 242-A Evaporator defined in DOE Order guidance as potentially hazardous are used for normal maintenance and support functions. These could include acids, caustics, oils, diesel fuel and solvents. Diesel fuel also presents a flammability hazard. A significant release of materials would be classed as a WAC 173-303 or DOE Emergency.

An ammonia cylinder, capable of releasing 0.34 cubic meters of 5000 part per million (ppm) ammonia, is located on the third floor level in the northeast corner of the HVAC room. The ammonia is used for calibration of the stack ammonia monitor. The worst case ammonia concentration from release of the entire contents of the cylinder would be less than 25 ppm in the HVAC Room. This is less than the ERPG-1 value and the threshold limit value. No emergency planning is required.

Material Safety Data Sheets (MSDSs) are at the following locations:

- 2025EA Building:
  - Room 101
  - Room 104
- 2025E Building
  - Maintenance Shop, Room 103
  - Control Room
- 242-A Evaporator Control Room.

5.2 Industrial Hazards

Industrial hazards associated with the 242-A Evaporator include electrical equipment, pressurized equipment, high temperature equipment, rotating equipment, confined spaces, and compressed gas cylinders. These industrial hazards do not pose a threat to the health and safety of the general public or the environment. Industrial hazards are addressed in the building health and safety plan and maintenance programs.

5.3 Dangerous/Mixed Waste Hazards

5.3.1 Solid Form

Dangerous/mixed waste is generated at the 242-A Evaporator during sampling, decontamination, and maintenance activities. This waste is accumulated in a designated accumulation area south of the 242-A Building and transported to a 90-day accumulation area when required.

5.3.2 Liquid Form

Highly radioactive mixed waste solution is processed at the 242-A Evaporator and contained in the vapor-liquid separator, C-A-1, and ancillary equipment. Low radioactive, mixed waste solution is contained in the condensate collection tank, C-100, and ancillary equipment. Although the mixed waste solution contains chemicals that are hazardous (primarily ammonia and sodium hydroxide), the bounding consequence for spills or releases of this waste are based on its radiological components. Major radioactive isotopes and potential concentrations in the waste are shown in Table 1.

Table 1. Major Contributors to the 242-A Evaporator Waste Bounding Source Term

Isotope	Bq/L	Ci/L
Sr-90	8.14E+09	2.20E-01
Ru-106	1.96E+09	5.30E-02
Cs-137	5.55E+10	1.50E+00
Pu-239	5.92E+06	1.60E-04
Pu-241	5.55E+08	1.50E-02
Am-241	3.70E+07	1.00E-03

The total volume of the vapor-liquid separator and recirculation loop (85,000 to 95,000 liters) is used to determine the potential radiological hazard. Sr-90 and Cs-137, along with their daughter products (Y-90 and Ba-137m), are the primary radiological hazards. Ru-106, Pu-239, Pu-241, and Am-241 also are significant contributors.

5.3.3 Gaseous Form

A waste blending error in the DST system potentially could generate large amounts of ammonia gas from the 242-A Evaporator vent system during processing. This could require an emergency classification

5.4 Radioactive Materials

Radioactive material in solid form consists of waste materials which have not contacted mixed waste solutions. Radioactive waste materials removed from radiation areas are packaged and transported to an approved radioactive waste storage facility.

Radioactive materials in liquid form are mixed wastes and are described in Section 5.3.2.

Radioactive materials in gaseous form are emitted from the vessel vent and building exhaust ventilation systems. These systems have HEPA filters to remove radioactive particulate, reducing emissions to acceptable discharge levels. Failure of HEPA filters could result in a loss of confinement as described in Section 6.1.8.

5.5 Criticality

A criticality is not a credible accident at the 242-A Evaporator. Emergency planning is not required.

6.0 POTENTIAL EMERGENCY CONDITIONS

The objective of this section is to identify WAC 173-303 and DOE Order potential emergency conditions and to identify the appropriate DOE Order emergency classification level. Protective action responses based on these classifications are discussed in Section 7.0. Technical justification for the values and limits identified in this section are provided in the hazards assessment required by DOE Orders for the 242-A Evaporator. The hazards assessment is not used in the Hanford Facility contingency planning program.

Potential emergency conditions fall into three basic categories: operational (process upsets, fires and explosions, loss of utilities, spills, and releases), natural phenomena (earthquakes and storms), and security contingencies (bomb threats, hostage situations). For operational emergencies, event frequency coupled with accident severity provide the criteria for emergency plan response.

Potential radioactive/dangerous/mixed waste release modes include fires, explosions, spills, or releases. These events are evaluated based on the potential impact to operations and subsequent release of waste materials. Potential consequences to human health or the environment are the ultimate criteria for event classification and protective response actions. Additionally, prolonged small releases are evaluated for their potential to impact human health or the environment.

6.1 Operational Emergencies

The conditions for operational emergencies are present only when mixed waste is present in the vapor-liquid separator, C-A-1, recirculation loop, and ancillary equipment.

6.1.1 Loss of Utilities

6.1.1.1 Loss of Electrical Power

A loss of electrical power could lead to a loss of compressed air, causing the vapor-liquid separator, C-A-1, drain valve to open and suddenly dump the contents to DST system tank 241-AW-102. A potential over pressurization and subsequent radiological release could occur from that tank. Mitigating actions for a radiological release from the DST system are taken by Tank Waste Remediation System (TWRS) per the tank farms building emergency plan.

A loss of electrical power would interrupt processing but would not produce an emergency event at the 242-A Evaporator.

6.1.1.2 Loss of Compressed Air

A loss of compressed air would cause the vapor-liquid separator, C-A-1, drain valve to open and suddenly dump the contents to DST system tank 241-AW-102. A potential over pressurization and subsequent radiological release could occur from that tank. Mitigating actions for a radiological release from the DST system are taken by TWRS per the tank farms building emergency plan.

A loss of compressed air would interrupt processing but would not produce an emergency event at the 242-A Evaporator.

6.1.1.3 Loss of Raw Water

Raw water can be used as seal water for the mechanical seals on P-B-1 recirculation pump and P-B-2 slurry pump when the normal supply of process condensate is not available. If raw water is supplied to the seals, and loss of raw water occurs, failure of mechanical seals could occur, causing a spray release of mixed waste into the facility. The spray release scenario is discussed in Section 6.1.8. Interlocks are provided to stop the pumps on low seal water flow.

Raw water supplies cooling to the air compressors, with sanitary water available as a backup. If loss of raw water occurs, and backup cooling by sanitary water is not initiated within 15 to 20 minutes, the air compressors could overheat, causing a loss of compressed air. A loss of compressed air is discussed in section 6.1.1.2.

6.1.1.4 Loss of Sanitary Water

If sanitary water is supplying cooling to the air compressors with raw water unavailable, the air compressors could overheat causing a loss of compressed air. A loss of compressed air is discussed in section 6.1.1.2.

6.1.1.5 Loss of K1 or Vessel Ventilation System

The K1 ventilation system maintains contaminated areas of the 242-A Building at a negative pressure (with respect to atmospheric) to prevent contamination spread to uncontaminated areas. The ventilation system includes two stages of high efficiency particulate air (HEPA) filters, two exhaust fans, and stack sampling and monitoring equipment. Both fans are electrically powered, however the backup fan can be powered by a diesel powered standby generator. The fans are interlocked so that if primary electrical power is lost, the backup fan automatically starts once the generator is on line. The K1 ventilation system is interlocked to shut down the primary fan and prevent the secondary fan from starting if high radioactive particulate level is detected in the exhaust stream.

The vessel ventilation system maintains the condenser vent system and the C-100 tank under vacuum to prevent contamination spread from the processing equipment to the rooms. The vessel vent system includes a demister, prefilter, heater, two HEPA filters in series, an exhaust fan, and stack sampling and monitoring equipment. The vessel ventilation monitoring system alarms in the control room if high radiation is detected.

The K1 and vessel ventilation systems are required for 242-A Evaporator processing. A loss of either ventilation system would require the 242-A Evaporator to be shut down but would not result in an emergency condition. A ventilation system shutdown due to a radiological material release is discussed in section 6.1.8.1. A loss of confinement is discussed in section 6.1.8.3.

6.1.1.6 Loss of Steam

A loss of steam would interrupt the processing but would not produce an emergency event. Emergency planning is not required.

6.1.2 Major Process Disruption/Loss of Plant Control

A major process disruption/loss of plant control would be caused by failure of the Monitor and Control System (MCS) computer. A loss of MCS could cause the vapor-liquid separator, C-A-1, drain valve to open and suddenly dump the contents to DST system tank 241-AW-102. A potential over pressurization and subsequent radiological release could occur from that tank. Mitigating actions for a radiological release from the DST system are taken by TWRS per the tank farms building emergency plan.

6.1.3 Pressure Release

Consequences of a pressure release of mixed waste during processing are radiological in nature and are discussed in Section 6.1.8.

6.1.4 Fire and/or Explosion

A fire/explosion could generate highly toxic and/or corrosive fumes. Flying debris could result from explosions or compressed gas cylinder failure. Process system disruption, loss of plant control, and breach of process system boundaries could result from the flying debris.

An Alert Emergency in accordance with DOE Orders would be declared if mixed waste is present in the vapor-liquid separator, C-A-1, process recirculation loop, and ancillary equipment and a fire occurs in the control room, aqueous makeup room, HVAC room, condenser room, pump room, or evaporator room lasting longer than 30 minutes and requiring fire department actions for suppression.

An Alert Emergency in accordance with DOE Orders would be declared if an explosion is confirmed to have occurred at the 242-A Evaporator and the explosion threatens areas containing hazardous chemicals and/or radioactive material. An alert Emergency would also be declared if the explosion breaches the external 242-A Building walls when the vapor-liquid separator contains solution. Emergency classifications are per site-wide procedures listed in Attachment A.

6.1.5 Hazardous Material Spill or Release

A waste blending error in the DST system potentially could generate large amounts of ammonia gas from the 242-A Evaporator vent system during processing. Ammonia releases of more than 5 grams per second (40 pounds per hour) meet Alert Emergency criteria in accordance with DOE Orders. Ammonia releases of more than 38 grams per second (300 pounds per hour) meet Site Area Emergency criteria in accordance with DOE Orders.

The bounding consequences for mixed waste releases are radiological in nature. Radiological releases are discussed in Section 6.1.8.

6.1.6 Radioactive/Mixed Waste Spill

The bounding consequences for mixed waste releases are radiological. Radiological releases are discussed in Section 6.1.8.

6.1.7 Transportation and/or Packaging Incidents

A transportation and/or packaging incident involving hazardous chemicals or samples could result in exposure to hazardous and radioactive materials. Potential environmental damage by their release could also occur. General criteria discussed in Section 5.0 will be used to classify these events.

6.1.8 Radiological Material Release

6.1.8.1 Ventilation System Release

If a mixed waste release causes K1 ventilation or vessel ventilation system high radiation, it is necessary to quickly assess whether any radioactive material was released. A Cutie Pie (CP) open window (near contact) reading of $\geq$ 15 millirad per hour but < 150 millirad per hour on a ventilation system sample filter, requires an Alert Emergency classification in accordance with DOE Orders. Results $\geq$ 150 mr/hr require a Site Area Emergency classification in accordance with DOE Orders.

6.1.8.2 Release of Mixed Waste into Facility

An Alert Emergency classification is required for a catastrophic dumping of vapor-liquid separator C-A-1 contents into the evaporator room or pump room .

A Site Area Emergency Classification is required for a catastrophic dumping of vapor-liquid separator C-A-1 contents into the evaporator room or pump room, the K1 vent system high radiation shutdown interlock fails, and the ventilation system fans continue to operate.

6.1.8.3 Loss of Confinement

An Alert Emergency is required for a loss of confinement in the 242-A Building, as indicated by activation of two or more Area Radiation Monitors in the AMU and HVAC room, or Continuous Air Monitor alarm in the survey area, and local confirmation [on two of the three contamination area pressure indicators for rooms A, B, or C (located on the HVAC panel)] that pressure is greater than 0.0 inches water gauge.

6.1.9 Criticality

A criticality is not a credible accident at the 242-A Evaporator. Emergency planning is not required.

6.2 Natural Phenomena

The conditions for natural phenomena emergencies are present only when mixed waste is present in the vapor-liquid separator, C-A-1, recirculation loop, and ancillary equipment.

6.2.1 Seismic Event

Depending on the magnitude of the seismic event, severe structural damage could occur at the 242-A Evaporator, resulting in serious injuries or fatalities and the release of hazardous or radioactive materials to the environment. Damaged electrical circuits and wiring could result in the initiation of fires.

Any seismic event that is felt by personnel, with some minor facility damage, and disturbance of tall objects at the 242-A Evaporator locations that house hazardous chemicals and/or radioactive materials requires classification as an Alert Emergency. An emergency classification upgrade could occur based on facility conditions and/or actual hazardous material or radioactive/dangerous/mixed waste releases determined by personnel assessing quake damage.

6.2.2 Ashfall/Snow Fall Roof Overloading

Ash or snow accumulation causing actual roof or other structural damage to buildings containing hazardous material or radioactive/dangerous/mixed waste is classified as an Alert Emergency. There should be ample warning of an approaching large ashfall to allow the facilities to be placed in a stable condition.

6.2.3 High Winds/Tornados

An Alert Emergency classification is suggested when sustained wind speeds in excess of 40 meters per second (90 miles per hour) are observed and cause degradation of the facility safety equipment/confinement barriers. An emergency classification upgrade could occur based on actual facility damage or release of hazardous materials, radioactive/dangerous/mixed waste.

6.2.4 Flood

A flood is not a credible accident at 242-A Evaporator because the facility is not within the Columbia River flood plain. Emergency planning is not required.

6.2.5 Range Fire

An Alert Emergency is suggested in the event that a range fire threatens any 242-A Evaporator building containing hazardous material or radioactive/dangerous/mixed waste.

6.2.6 Aircraft Crash

A Site Area Emergency classification is suggested if an aircraft crash occurs into or near the 242-A Evaporator. An emergency classification upgrade could occur based on actual facility damage or release of hazardous material or radioactive/dangerous/mixed waste.

6.3 Security Contingencies

6.3.1 Bomb Threat/Suspicious Object

An Alert Emergency classification is required if there is a credible bomb threat or a confirmed explosive device located in the 242-A Building rooms housing hazardous chemicals and/or radioactive material. If the device explodes, classification of the event will be performed as stated in Section 6.1.4.

6.3.2 Hostage Situation/Armed Intruder

A hostage situation or armed intruder(s) at the 242-A Evaporator requires an Alert Emergency classification. An emergency classification upgrade could occur based on actual facility damage or release of hazardous material or radioactive/dangerous/mixed waste.

6.3.3 Suspicious Object

The major effect on the facility due to recognizing a suspicious object is that the facility should be placed in a safe configuration, if time permits, and the facility evacuated.

7.0 INCIDENT RESPONSE

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

The following sections describe the process for implementing basic protective actions as well as descriptions of response actions for the events listed in Section 6.0. DOE/RL-94-02, Section 1.3, provides concept of operations for emergency response on the Hanford Site

Incident responses are coordinated from the 242-A Evaporator control room or a designated alternate location.

7.1 Protective Actions Responses

7.1.1 Evacuation

The objective of a facility evacuation order is to limit personnel exposure to hazardous materials or radioactive/dangerous/mixed waste by increasing the distance between personnel and the hazard. The scope of the evacuation includes evacuation of the facility due to an event at the facility as well as evacuation of the facility in response to a site evacuation order. Evacuation is directed by the BED when conditions warrant and applies to all personnel not actively involved in the event response or in emergency plan-related activities.

The BED initiates the evacuation by directing an announcement be made to evacuate along with the evacuation location over the public address system and facility radios, activate the evacuation siren for three minutes, and, as conditions warrant, by activating the 200 Area evacuation alarms by calling the POC using 911 (preferred) or 373-3800. Personnel proceed to a predetermined staging area (shown in Figure 1), or other safe upwind location, as determined by the BED. The BED determines the operating configuration of the facility and identifies any additional protective actions to limit personnel exposure to the hazard.

Emergency organization personnel or assigned operations personnel conduct a sweep of occupied buildings to ensure that all non-essential personnel and visitors have evacuated. For an immediate evacuation, accountability is performed at the staging area. The BED assigns personnel as accountability aides and staging area managers with the responsibility to ensure that evacuation actions are taken at the 242-A and 242-AB Buildings. All implementing actions executed by the aides/managers are directed by the emergency response procedures identified in Attachment A. When evacuation actions are complete, the aides/managers provide a status report to the BED. The BED provides status to the Incident Commander.

7.1.2 Take Cover

The objective of the take cover order is to limit personnel exposure to hazardous or radioactive/dangerous/mixed waste when evacuation is inappropriate or not practical. Evacuation might not be practical or appropriate because of extreme weather conditions or the material release might limit the ability to safely evacuate personnel.

The BED initiates the take cover by directing an announcement be made over the public address system and facility radios, by activating the take cover siren for three minutes, and, as conditions warrant, by activating the 200 Area take cover alarms by calling the POC using 911 (preferred) or 373-3800. Actions to complete a facility take cover order are directed by the emergency response procedure in Attachment A. Protective actions associated with operations include configuring, or shutting down, the ventilation systems. Determination of additional take cover actions is based on operating configuration, weather conditions, amount and duration of release, and other conditions, as applicable to the event and associated hazard. As a minimum, personnel exposure to the hazard are minimized. The BED assigns personnel as accountability aides with responsibility to ensure that take cover actions are taken at all occupied buildings at the 242-A Evaporator. All implementing actions executed by the aides/managers are directed by the emergency response procedures in Attachment A. When take cover actions are complete the aides/managers provide the BED with a status report.

7.2 Response to Operational Emergencies

Operational activities to isolate, contain, and mitigate the event can be performed in parallel with classification and protective action implementation. The responses are structured to allow parallel activity with clearly established priorities. The division of actions and workload between various personnel is such that coordinated team responses result in the successful implementation of both emergency operating actions and emergency planning requirements. Specific event mitigation strategy for each type of accident is provided in the following sections.

7.2.1 Loss of Utilities

7.2.1.1 Loss of Electrical Power

Should there be a loss of electrical power to the 242-A Evaporator, all personnel are evacuated from radiation areas due to the potential loss of radiation monitoring equipment (i.e., continuous air monitors, area radiation monitors). In addition, all non-essential personnel leave the facility. Access into the radiation and adjacent areas is restricted to response personnel who are properly clothed and equipped. Radiation monitoring by radiological control personnel is established, and facility operations are properly shutdown to a safe configuration.

If back-up power is not automatically placed in service, the diesel powered standby generator is manually placed in service. Operation of the Backup K1 Ventilation system exhaust fan is checked and, if not operating, actions are taken to start the fan, to restart the normal fan, or to secure the confinement area. If an exhaust fan is operating, verification is made that the exhaust stack radiation monitor is returned to service.

If the evaporator is in operation mode and a dump of C-A-1 vessel does occur, AW Tank Farm personnel are notified of impending pressurization of DST system tank 241-AW-102, and all personnel in the AW Tank Farm evacuate to the change trailer. The 200 East Area Tank Farms Shift Manager is notified of the event as is the 242-A Evaporator plant management.

All implementing actions executed by the aides/managers are directed by the emergency response procedures in Attachment A.

7.2.1.2 Loss of Compressed Air

Upon loss of the compressed air at the 242-A Evaporator, restoration of the air supply system is immediately attempted. If this fails, non-essential personnel are notified to exit the facility. Automatic dumping of the C-A-1 vessel is stopped; the vessel could dump later when air pressure that holds the drain valve fails open. If a dump of C-A-1 vessel does occur, AW Tank Farm personnel are notified of impending pressurization of DST system tank 241-AW-102, and all personnel in the AW Tank Farm evacuate to the change trailer.

Plant conditions are monitored as components fail and shutdown interlocks activate, and the facility is placed into a safe shutdown condition. The K1 ventilation system is monitored for potential failure due to loss of damper control (caused by loss of air supply), and plant management is notified of the facility condition. A backup air compressor is placed in service as soon as possible.

7.2.1.3 Loss of Raw Water

On loss of the raw water system, 242-A Evaporator personnel are immediately notified, and non-essential personnel are directed to leave the facility. Essential personnel are directed to the 242-A Evaporator control room for support as required.

The P-B-1 and P-B-2 pumps are shutdown to prevent damage to the mechanical seals. If seal water is being supplied by the process condensate system, pump operation may continue through a controlled shutdown. The compressors are placed on sanitary water cooling. If air compressor failure occurs due to loss of cooling water, the automatic dumping of the C-A-1 vessel is terminated; the vessel could dump later when air pressure that holds the drain valve fails open. If a dump of C-A-1 vessel does occur, AW Tank Farm personnel are notified of impending over-pressurization of DST system tank 241-AW-102, and all personnel in the AW Tank Farm evacuate to the change trailer. The 200 East Area Tank Farms Shift Manager is notified of the facility condition.

Facility operations are properly shutdown, and plant management is notified of the facility condition.

7.2.1.4 Loss of Sanitary Water

On loss of the sanitary water, 242-A Evaporator Operations personnel perform the following:

1. Notify facility personnel
2. Ensure all air compressors are placed on raw water cooling
3. Ensure all chemical operations are terminated until safety showers and eye wash stations are operational (i.e., return of sanitary water system).

7.2.1.5 Loss of K1 Ventilation System

On loss of the K1 ventilation system, restoration of the primary backup K1 ventilation exhaust fan is immediately attempted. If the K1 ventilation system cannot be restored immediately, personnel are notified to exit contaminated areas, and non-essential personnel are directed to exit the facility. Essential personnel report to the 242-A control room for support as required. Continued adequate contamination control is ensured by having the K2 ventilation system operating. The K2 ventilation system maintains positive pressure in non-contaminated areas. If the primary and backup K1 ventilation system exhaust fans are not running, actions are taken to shutdown the facility and tape up contamination area entrances. Plant management is notified of facility conditions.

7.2.2 Major Process Disruption/Loss of Plant Control

Upon loss of the MCS, the 242-A Evaporator Shift Operations Manager is notified while an attempt is made to return the MCS to service. If a dump of C-A-1 vessel does occur, AW Tank Farm personnel are notified of impending over-pressurization of DST system tank 241-AW-102, and all personnel in the AW Tank Farm evacuate to the change trailer. Non-essential personnel exit the 242-A Evaporator facility.

The system condition is assessed, and corrective actions are implemented. Operations are placed on recirculation by securing the slurry pump and waste feed to the plant. Facility shutdown is accomplished by performing manual, localized actions such as system isolation, equipment shutdown, etc.

7.2.3 Pressure Release

If mixed waste release occurs, perform actions identified in Section 7.2.5.

7.2.4 Fire and/or Explosion

On becoming aware of a fire and/or explosion, the discoverer notifies personnel (if any) in the immediate area and directs them to a safe location. The discoverer then activates the nearest fire alarm pull station, contacts 911 to request fire fighting assistance, and contacts the 242-A Evaporator control room to report the fire. As soon as non-essential personnel are notified of a fire (verbally or by fire alarm activation), they immediately exit the facility to a safe upwind location, account for their personnel, and follow the instructions of responding personnel. If personnel are reported as missing, and might be within the facility, the Hanford Fire Department conducts a search.

The BED is notified and initiates activation of the event command post and resources.

Operations personnel initiate a plant shutdown with the method (controlled or emergency) depending on the location and severity of the fire and the location and type of hazards in the affected area. A controlled shutdown is performed unless it is unsafe to remain in the control room. An emergency shutdown is performed if the control room must be evacuated. The Shift Operations Manager interfaces with the Hanford Fire Department and provides the following:

a. Location and health of personnel, including missing personnel and possible locations for fire fighters to search.

b. Location and severity of fire.

c. Known hazardous (radiological and nonradiological) conditions.

d. Facility operating status.

e. Utility systems status.

f. Support by radiological control personnel (i.e., monitoring, surveys, sampling, decontamination).

g. Facility layout, and facility known hazardous conditions, (i.e., electrical, thermal, flammable materials, pressurized cylinders, toxic gas, pressure systems, batteries, radiation areas, etc.).

h. Support for fire fighter activities as required.

Once the fire is extinguished, the Shift Operations Manager/BED ensures administrative restrictions are implemented to protect the facility, the workers, and the environment. The Shift Operations Manager/BED makes notifications as required and assists with recovery actions.

7.2.5 Hazardous Material, Dangerous and/or Mixed Waste Spills or Releases

If a spill or release is discovered, the discoverer performs the following actions:

1. Notifies the 242-A Evaporator control room and evacuates to a safe area
2. Remains available for consultation with the BED, Hanford Fire Department, or other emergency response personnel.

The control room operator performs the following actions:

1. Uses the public address system to notify the facility occupants of the event
2. Notifies the BED/HFD and relays information received from the event scene
3. Places the facility in a safe condition
4. Remains available to support further notification and response activities

The BED performs or arranges for personnel to perform the following actions:

1. Coordinates response activity and establishes a command post at a safe location
2. Obtains all available information pertaining to the incident and determines if the spill or release warrants implementation of the contingency plan in accordance with Sections 4.0, 6.1.5, and 6.1.8. In the case of ammonia releases, described in Section 6.1.5, this information includes monitoring stack ammonia concentrations.
3. Determines need for assistance from outside agencies and arranges for their mobilization and response
4. Initiates the appropriate announcements, if building or area evacuations are necessary
5. Arranges for care of any injured persons
6. Requests activation of the affected area emergency sirens/crash alarm system if a threat to surrounding facilities
7. Provides for event notification
8. Maintains access control at the incident site by keeping unauthorized personnel and vehicles away from the area. Security personnel can be used to assist in site control if control of the boundary is difficult. In determining controlled access areas, considers environmental factors such as wind speed and direction

9. Arranges for proper remediation of the incident after evaluation

10. Remains available for HFD, Hanford Patrol, and other authorities on the scene and provide all required information

11. Enlists the assistance of alternate BED(s), if around-the-clock work is anticipated

12. Refers media inquiries to the Media Relations/Communications offices of the contractors or DOE-RL.

13. Ensures the use of proper protective equipment, remedial techniques (including ignition source control for flammable spills), and decontamination procedures by all involved personnel, if remediation is performed by 242-A Evaporator personnel

14. Remains at the command post to oversee activities and to provide information, if remediation is performed by the HFD Hazardous Materials Response Team or other response teams

15. Ensures proper containerization, packaging, and labeling of recovered spill materials and overpack containers

16. Ensures decontamination (or restocking) and restoration of emergency equipment used in the spill remediation before resuming operations

17. Provides required reports after the incident.

7.2.5.1 Damaged and/or Unacceptable Shipments

The 242-A Evaporator does not receive dangerous or mixed waste shipments.

7.2.6 Radiological Material Release

7.2.6.1 K1 Ventilation or Vessel Ventilation System Release

If high radiation alarms or HEPA filter failure indicate a radiological material release from the K1 ventilation or vessel ventilation system, the ventilation system is immediately shutdown. A near contact radiation survey is performed on a ventilation system sample filter to determine extent of the radiological material released. The actions described in Section 7.2.5 are then performed.

7.2.6.2 Release of Mixed Waste into Facility

If a catastrophic dumping of mixed waste from vapor-liquid separator C-A-1 occurs, the facility is immediately shutdown. AW Tank Farm personnel are notified of impending over-pressurization of DST system tank 241-AW-102, and all personnel in the AW Tank Farm evacuate to the change trailer. The 200 East Area Tank Farms Shift Manager is notified of facility condition. The actions in Section 7.2.5 are then performed.

If a catastrophic dumping of the vapor-liquid separator causes high radiation alarm on the K1 ventilation system, the actions described in Section 7.2.6.1 are performed.

7.2.6.3 Loss of Confinement

If a loss of confinement occurs, the proper operation and lineup of the K1/K2 ventilation systems are verified. The actions described in Section 7.2.5 are performed. If the high radiation alarm on the K1 ventilation system is actuated, the actions described in Section 7.2.6.1 are performed. If the loss of confinement results in a radiological release outside the facility, the actions described in Section 7.1.2 are performed.

7.2.7 Criticality

A criticality is not a credible accident at the 242-A Evaporator. Emergency planning is not required.

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

The BED, in coordination with emergency response organizations, takes the steps necessary to ensure that a secondary release, fire, or explosion does not occur. The area of the initial incident is isolated by shutting off power, closing off ventilation systems, etc. The affected area containment is inspected for leaks, cracks, or other damage and for toxic vapor generation. Released material and waste remaining inside of containment structures are removed as soon as possible, and residual waste material is contained and isolated using dikes and adsorbents. Outside areas where residual released materials remain are covered or otherwise stabilized to prevent migration or spread from wind or precipitation run-off.

New structures, systems, or equipment are installed as required based on engineering evaluations to enable better management of hazardous materials or dangerous waste. Adjacent operations in affected areas are reactivated only after residual waste materials are removed to levels acceptable to control contamination spread.

7.4 Response to Natural Phenomena

If other emergency conditions arise as a result of a natural phenomena event, response is appropriate for the condition created. For example: A fire due to lightning initiates the fire response actions and a spill of hazardous material due to an earthquake initiates spill response actions.

7.4.1 Seismic Event

The Hanford Site emergency response organization's primary role in a seismic event is coordinating the initial response to injuries, fires, and fire hazards, and acting to contain or control radioactive and/or hazardous material releases.

Individuals should remain calm and stay away from windows, steam lines, and hazardous material storage locations. Once the shaking has subsided, individuals evacuate carefully and assist personnel needing help. The locations of any trapped individuals are reported to the BED or are reported to 911 or 373-3800.

The BED takes whatever actions are necessary to minimize damage and personnel injuries, including:

- Coordinating searches for personnel and potential hazardous conditions (fires, spills, etc.),
- Conducting accountability,
- Securing utilities and facility operations,
- Arranging for rescue efforts, and notifying 911 or 373-3800 for assistance,
- Determining if hazardous materials were released,
- Determining current local meteorological conditions,
- Warning other facilities and implementing protective actions if release of hazardous materials poses a danger,
- Providing personnel and resource assistance to other facilities.

7.4.2 Volcanic Eruption/Ashfall

When notified of an impending ashfall, the BED implements measures to minimize the impact of the ashfall, including the following:

- Installing filter media over building ventilation intakes,
- Installing filter media or protective coverings on outdoor equipment that could be adversely affected by the ash (diesel generators, equipment rooms etc.),
- Shutting down some or all operations and processes,
- Sealing secondary use exterior doors,

7.4.3 High Winds/Tornados

On notification of impending high winds, the BED takes steps necessary to secure all outside doors and windows, and secure all outdoor waste and hazardous material handling activities. All doors and windows are shut, and personnel are warned to use extreme caution when entering or exiting the building.

7.4.4 Flood

Flooding of the 242-A Evaporator is not credible. No emergency planning response is required.

7.4.5 Range Fire

Responses to range fires are handled by preventive measures (i.e., keeping hazardous material and waste accumulation areas free of combustible materials such as weeds and brush). If a range fire breaches the facility boundary, the response is as described for a fire.

7.4.6 Aircraft Crash

Response to an aircraft crash is appropriate for the condition created. For example, a fire due to explosion or electrical shorts, initiates the fire response actions specified in Section 7.2.4.

7.5 Security Contingencies

7.5.1 Bomb Threat/Suspicious Object

7.5.1.1 Telephone Threat

Personnel receiving telephoned threats attempt to get as much information as possible from the caller. A form is available for personnel to keep by their telephone to use as a guide for getting useful information from the caller. On conclusion of the call, personnel notify the BED and Security.

The BED evacuates the facility and questions personnel at the staging area regarding any suspicious objects in the facility. When Security personnel arrive, their instructions are followed.

7.5.1.2 Written Threat

Receivers of written threats handle the letter as little as possible and notify the BED and Security. Depending on the content of the letter, the facility may or may not be evacuated. The letter is turned over to Security personnel and their instructions are followed.

7.5.2 Hostage Situation/Armed Intruder

The discoverer of a hostage situation/armed intruder reports the situation to the BED and to the POC via 911 or 373-3800, if possible. The BED, after conferring with Security personnel, may covertly evacuate areas of the facility not observable by the hostage taker(s)/intruder. No alarms will be sounded.

Security will determine the remaining response actions and will activate the Hostage Negotiating Team, if necessary.

7.5.3 Suspicious Object

The discoverer of a suspicious object reports it to the BED and to the POC via 911 or 373-3080, and, if possible, ensures that the object is not disturbed.

The BED orders evacuation of the facility and (based on the description provided by the discoverer) attempts to determine the identity or owner of the object. This may be done by questioning facility personnel at the staging area.

If the identity/ownership of the object cannot be determined, then Security assumes command of the incident. The canine unit is used to determine if the package contains explosives. If there is a positive indication of explosives or it cannot be assured that there are no explosives, then the Richland Police Department's Emergency Ordinance Disposal Team is dispatched to the facility to properly dispose of the device.

8.0 TERMINATION OF EVENT, INCIDENT RECOVERY, AND RESTART OF OPERATIONS

The DOE/RL-94-02, *Hanford Emergency Response Plan*, Section 8.0, describes these considerations. The extent by which these actions are employed is based upon the incident classification of each event. In addition, DOE/RL-94-02 contains considerations for the management of incompatible wastes, which may apply.

8.1 Termination of Event

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

8.2 Incident Recovery and Restart of Operations

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

If this plan is to be implemented for a WAC emergency (see Section 4.0), the Washington State Department of Ecology is notified before operations can resume. The DOE/RL-94-02, *Hanford Emergency Response Plan*, Section 6.1 discusses different reports to outside agencies. This notification is in addition to other required reports and includes information documenting the following conditions:

1. There are no incompatibility issues with the waste and released materials from the incident.

2. All the equipment has been clean, fit for its intended use, and placed back into service. The notification may be made via telephone conference. Additional information that Ecology requests regarding these restart conditions will be included in the required 15-day report identified in WAC 173-303-360(2)(k).

For emergencies not involving activation of the RL-EOC, the BED ensures that conditions are restored to normal before operations are resumed. If the Hanford Site Emergency Organization was activated and the emergency phase is complete, a special recovery organization could be appointed at the discretion of DOE-RL to restore conditions to normal. This process is detailed in DOE-RL and contractor emergency procedures. The makeup of this organization depends on the extent of the damage and its effects. The onsite recovery organization is appointed by the appropriate contractor's management.

8.3 Incompatible Waste

After an event, the BED or the onsite recovery organization ensures that no waste that might be incompatible with the released material is treated, stored, and/or disposed of until cleanup is completed. Cleanup actions are taken by facility personnel or other assigned personnel. DOE/RL-94-02, Section 8.3, describes actions to be taken.

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

If incompatibility of wastes was a factor in the incident, the BED or the onsite recovery organization ensures that the cause is corrected.

8.4 Post-Emergency Equipment Maintenance and Decontamination

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

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

9.0 EMERGENCY EQUIPMENT

Hanford Site emergency resources and equipment are described and listed in DOE/RL-94-02, Appendix C.

9.1 Fixed Emergency Equipment

FIXED EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Safety shower/eye wash station	1 - Aqueous makeup room - south side. Next to truck load-in airlock and chem storage tank. 1 - Condenser room basement, SE corner. 1 - Condenser room 4th floor	Assist in flushing chemicals/materials from body and/or eyes and face.
Wet pipe sprinkler system	Located throughout the facility.	Assist in the control of fire.
Fire alarm pull boxes	Located throughout the facility.	Activates the building fire alarm and notifies the HFD.
Emergency lighting - (lanterns)	Located throughout the facility	Provide 1 hour of temporary lighting.
Back-up diesel generator	50 ft SE of the 242-A main entrance	Provide back-up power.

9.2 Portable Emergency Equipment

PORTABLE EMERGENCY EQUIPMENT		
TYPE	LOCATION	CAPABILITIES
General purpose fire extinguishers	Throughout the 242-A Evaporator facility.	Fire suppression for class A,B,C, fires.
Halon fire extinguishers	Two in control room.	Suppress electrical fires.

9.3 Communications Equipment/Warning Systems

COMMUNICATIONS EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Fire alarms	Located throughout the facility in halls, corridors, and locker rooms.	Audible throughout the 242-A Evaporator Building
Roof siren	242-A Evaporator roof	Provide warning to personnel to take cover or evacuate.
Operations process alarm	242-A Evaporator control room	Audible in the 242-A Evaporator control room.
Public address system (PAX)	Located throughout the 242-A Evaporator Building (except in pump and evaporator rooms)	Provides communications and public address capabilities.
Portable Radios	242-A control room	Communication to the 242-A control room.
Telephone	242-A control room, office area's, AMU room, and condenser room.	Internal and external communications. Allows notification of outside resources (HFD, Hanford Patrol, etc.)
Crash alarm	242-A control room	Audible in the 242-A control room

9.4 Personal Protective Equipment

PERSONNEL PROTECTIVE EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Self-contained breathing apparatus (SCBA)	Two located in the 242-A Evaporator control room	Provides breathable air for initial response to emergency, and recovery activities when required
Respirators	242-A respirator storage room	Filtered air for recovery of known hazards

9.5 Spill Control and Containment Supplies

SPILL KITS AND SPILL CONTROL EQUIPMENT		
TYPE	LOCATION	CAPABILITY
Organic and inorganic spill kits.	Survey area next to personnel protective equipment storage room, wall mounted	Provides spill control for organic and inorganic materials

9.6 Emergency Response Center

For emergencies not requiring evacuation, the BED and support personnel will assemble in the 242-A Evaporator control room, or other location as identified by the BED.

10.0 COORDINATION AGREEMENTS

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

11.0 REQUIRED REPORTS

Post incident, written reports are required for certain incidents on the Hanford Site. The reports are described in DOE/RL-94-02, Section 6.1.

12.0 PLAN LOCATION

Copies of this plan are maintained at the following locations:

- 242-A Evaporator Control Room
- 200 Area Effluent Treatment Facility Control Room
- Operations Managers Office (Building 2025EA Room 101)
- 200 Area LWPF Regulatory File

13.0 BUILDING EMERGENCY ORGANIZATION

BED	TITLE	WORK LOCATION	WORK PHONE
Primary	Shift Operation Manager (SOM)	242-A Evaporator control room or 200 Area Effluent Treatment Facility Control Room	373-2737, Evap control room 373-4446, Evap shift office 373-0993, ETF shift office 373-9000, ETF control room
Alternate	Operations Manager	2025EA Building, Room 101	373-4565

The complete building emergency organization listing of positions, names, work locations and telephone numbers for essential LWPF personnel is maintained in the organization administrative procedures. Copies are distributed to appropriate facility locations and to Emergency Preparedness. In addition, work and home telephone numbers of the BEDs and alternates are available from the POC (373-3800) in accordance with Hanford Facility RCRA Permit, Dangerous Waste Portion, General Condition II.A.4.

14.0 REFERENCES

DOE-0223, *Emergency Plan Implementing Procedures*:

DOE-0232.1, "Occurrence Reporting and Processing of Operations Information", U.S. Department of Energy, Washington D.C.

DOE/RL-94-02, Hanford Site Emergency Response Plan

DOE Order 5500.1B, *Emergency Management Systems*

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Washington State Department of Ecology, Olympia, Washington.

29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response*

NIOSH, *Pocket Guide to Chemical Hazards*, National Institute of Occupational Safety and Health, U.S. Department of Health and Human Resources, Public Health Service, Centers for Disease Control, Washington, D.C.

ATTACHMENT A

Listing of Procedures and Guides

Site-Wide Procedures

DOE-0223, *Emergency Plan Implementing Procedures*:

- RLEP-1.1, "Hanford Incident Command System and Event Recognition and Classification," Appendix 1-2.M;
- RLEP-3.4, "Emergency Termination, Reentry, and Recovery."

Facility-Specific Emergency Response Procedures and Guides

HNF-IP-1053, *242-A Evaporator Response Manual*
(includes the ERGs and PCPs listed below)

Emergency Response Guides

- ERG No. 1 Evacuation
- ERG No. 2 Take Cover
- ERG No. 3 Volcanic Eruption and Ashfall
- ERG No. 4 Seismic Event
- ERG No. 5 Fire and/or Explosion
- ERG No. 6 High Area Radiation
- ERG No. 7 Bomb Threat

Plant Casualty Plans

- PCP No. 1 Emergency Shutdown of Utility Systems
- PCP No. 2 Loss of Electrical Power
- PCP No. 3 Loss of the Raw Water System
- PCP No. 4 Loss of the K1 Ventilation system
- PCP No. 5 Loss of the Steam System
- PCP No. 6 Loss of Compressed Air System
- PCP No. 7 Loss of MCS Control
- PCP No. 8 Pressure Hazard
- PCP No. 9 Process Upset

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APPENDIX 8A

TRAINING PLAN

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1.0 PURPOSE

This document outlines the Dangerous Waste Training Program (DWTP) for the 200 Area Liquid Waste Processing Facilities (LWPF) organization. The 200 Area Effluent Treatment Facility (ETF), Liquid Effluent Retention Facility (LERF), and 242-A Evaporator are under the control of LWPF and each is permitted as a Treatment, Storage, or Disposal (TSD) unit on the Hanford Facility.

The program is designed for compliance with the requirements of Washington Administrative Code (WAC) 173-303-330 and Title 40 Code of Federal Regulations (CFR) 264.16 for the development of a written dangerous waste training program. These training requirements were determined after assessment of employee duties and responsibilities.

2.0 SCOPE

This Dangerous Waste Training Plan applies to personnel who perform work at, or in support of, the 200 Area Effluent Treatment Facility (ETF), Liquid Effluent Retention Facility (LERF) and the 242-A Evaporator. This Dangerous Waste Training Plan defines the minimum required training for employees to perform tasks associated with dangerous waste(s).

The LWPF training program is designed to ensure that employees who operate and maintain LWPF systems/equipment receive the training they require to safely operate and maintain LWPF systems/equipment in a effective and environmentally sound manner. In addition to preparing employees to operate and maintain LWPF equipment/systems under normal conditions, this training program ensures that employees are prepared to respond in a prompt and effective manner should off-normal or emergency conditions occur.

3.0 DEFINITION

NONE

4.0 RESPONSIBILITIES

4.1 Training Manager

The LWPF Facility Manager has overall responsibility for all training required by Washington Administrative Code (WAC) 173-303-330 and Condition II.C of the Hanford RCRA Permit (DW portion) at LWPF. To meet the training requirements in WAC 173-303-330(1)(a), the training director position is described in Chapter 8.0 of DOE/RL-91-28, *Hanford Facility Dangerous Waste Permit Application, General Information Portion.*

4.2 Facility Management (including Team Leaders)

Develop and administer a comprehensive training program for employees.

Ensure annual training on dangerous waste(s) is provided to affected employees.

Ensure all applicable training requirements are met.

4.3 Operations Management

Ensure Operations personnel are trained.

Ensure required certifications are maintained.

4.4 Training Personnel

Maintain knowledge in the area of waste management, including updates.

Re-evaluate training courses at least every year to ensure waste training requirements continue to be met.

4.5 Employees

Handle dangerous waste(s) in accordance with applicable regulations.

Minimize personal exposure to all dangerous wastes.

Inform management of problems concerning dangerous waste handling / storage / disposal.

5.0 PROCEDURE

The LWPF Dangerous Waste Training Program is implemented based on training requirements related to job responsibilities. Personnel affected by the Dangerous Waste Training Program complete those portions of the training curriculum delineated in the company level environmental compliance manuals, and tracked by the (computerized) Training Matrix (TMX), prior to performing unsupervised work in a facility.

Personnel new to LWPF, or changing positions within LWPF, complete the required dangerous waste training within six months of the assignment. Personnel who have not completed required training are permitted to perform work requiring handling dangerous wastes at LWPF only under the supervision of a trained employee. LWPF operations management is responsible for ensuring that all operations personnel are trained and required certifications are maintained.

5.1 Identification of Training

The required training is specified by the employee's specific job duties as determined by a job analysis or management assessment. Training requirements for individual operations personnel can be found in TMX. Required training is based on worker positions/job titles described in this plan and listed on Attachment 3, Required LWPF Training.

5.2 Dangerous Waste Worker Positions

Employee duties have been categorized within six worker positions. In the event personnel duties and responsibilities overlap and fall into more than one position, the employee will complete the training requirements for each position. The six worker positions are: 1) All Employee, 2) General Worker, 3) Advanced General Worker, 4) General Manager, 5) General Shipper, and 6) Waste Designator.

The level of training is determined by the duties associated with each worker position. The description of job duties for each position can be matched to individual job titles held by employees at the Hanford Site. The determining factor for placing a specific worker within any of the worker positions are the duties of the worker's job.

5.3 Job Title and Descriptions

Each employee is assigned a job title and job description. The job descriptions include requisite skills, work experience, education, and other qualifications, and a brief list of duties and/or responsibilities for each position. Work experience, education, and other qualifications required for each position are maintained by the company's human resources department.

In the following sections, brief job titles and job descriptions of employees associated with dangerous waste management at LWPF are listed within the appropriate position.

1) **All Employees**

Employees included in this position are those personnel who do not fall into one of the other five positions and have no duties or responsibilities directly associated with dangerous waste. The types of personnel in this position typically include Secretaries, Clerks, and Oversight (example: Quality Assurance) Personnel.

Most non-Hanford Facility Personnel will be categorized as All Employees since they generally tour, provide oversight, or are brought on site for interviews. Other non-Hanford Facility Personnel who gain access to the LWPF facilities to complete work in controlled areas but do not become involved in the management of dangerous or mixed waste will be categorized as All Employees.

2) **General Worker**

Facility or support personnel with limited dangerous waste management duties, which include general activities associated with the generation of waste, facility maintenance or modification, are categorized as General Workers. Job duties and responsibilities for general workers are not unit specific.

Hanford Facility personnel categorized as General Workers may be assigned duties and responsibilities for:

Placing waste generated into pre-approved containers and filling out log sheets where applicable.

Completing radiological surveys of dangerous or mixed wastes.

The loading of packaged containers onto trucks or movement of containers.

Responding to a spill or release of known contents where the duties and responsibilities are limited to containing the spill/release, returning the drum to an upright position, and placing the known spilled material or waste into a pre-approved container.

Applying advanced container markings or labels based on direction from an Advanced General Worker, General Manager, or General Shipper.

Support organizations management and technical support personnel assist management in the safe, effective, efficient, and environmentally acceptable operation and maintenance of the facilities. Personnel who function as general workers may include, but are not limited to: maintenance personnel, radiological control technicians (RCTs), craftspeople, supervisors of general workers, truck drivers, and laboratory personnel.

3) **Advanced General Worker**

Nuclear Process Operators (NPOs) and designated environmental engineering personnel are categorized as advanced general workers, based on job duties. Their activities either generate and manage dangerous waste or they operate the facility systems and processes.

Examples of the duties and responsibilities of an Advanced General Worker for management of dangerous waste in containers include: container inspection, determining advanced container markings and preparing container log sheets, completing waste inventories, sampling of waste, responding to spills and releases of waste in accordance with approved procedures, etc.

LWPF NPOs responsibilities and duties include:

- Operate the ETF, LERF and 242-A Evaporator facilities.
- Package and transport waste samples.
- Perform sampling.
- Conduct routine inspections.
- Provide surveillance.
- Respond to facility alarms.
- Respond to abnormal and/or emergency conditions.

4) **General Manager**

Personnel identified as General Managers coordinate, direct and oversee the work of general or advanced general workers in the management of dangerous waste or in the operation and control of the facility. Other duties may include command responsibilities during emergency events requiring implementation of the contingency plan. The personnel at LWPF who may be categorized as General Managers include: the Operations Manager (OM), Shift Operations Managers (SOMs), Environmental Compliance Officer (ECO), Cognizant Engineers (Cogs), Persons In Charge (PICs), and Hazardous Material Coordinator (HMC). The TMX identifies employees currently filling these positions.

a) **Operations Manager (OM) responsibilities include:**

- Supervise, coordinate, and direct the activities of the SOMs.
- Maintain control over the LWPF unit operations in accordance with established operating procedures and policies, DOE Orders, and Federal and State regulations.
- Direct, control, and coordinate the storage and transfer of dangerous waste.
- Comply with LWPF discharge permits, delisting, and operating limits.
- Provide guidance to SOMs during abnormal or emergency conditions.

b) **Shift Operations Managers (SOMs) responsibilities include:**

- Supervise and coordinate LWPF operation and maintenance activities.
- Maintain control of LWPF unit operations in accordance with established policies and operating procedures, DOE Orders, and Federal and State regulations.
- Conduct pre-job safety meetings with personnel.
- Maintain operational records.
- Review and revise LWPF operations procedures.
- Recognize and respond to abnormal and/or emergency conditions.
- Supervise the storage, handling, and transfer of dangerous waste.
- Comply with LWPF discharge permit/Delisting requirements and operating limits.

c) **Environmental Compliance Officer (ECO) responsibilities include:**

- Maintain Operations Management awareness of environmental compliance requirements and issues.
- Provide support to ensure compliance with applicable environmental rules and regulations.
- Serve as LWPF's liaison on environmental issues and permits.
- Advise LWPF management of emerging environmental. requirements and policies, and recommend implementation strategies to ensure compliance.
- Ensure compliance with LWPF discharge permit/Delisting requirements.

d) **Cognizant Engineers (Cog Engs) responsibilities include:**

- Ensure emergency and monitoring equipment, process equipment, procedures, designs, etc., comply with DOE Orders, Federal and State regulations, national standards, and applicable engineering procedures and management standards.
- Issue and maintain operating documentation, operating procedures, flowsheets, sample schedules, specifications, process test plans and procedures, operational safety requirements, etc.
- Perform evaluations of LWPF unit process to ensure compliance with process control requirements and discharge permits/Delisting.
- Prepare and approve engineering design documents and drawings in compliance with applicable policies, procedures, and instructions per national standards and codes.
- Provide technical assistance for hazardous material and dangerous waste spill response.

e) **Person In Charge (PIC) responsibilities include:**

- Provide in-field direction of tasks in progress.

f) **Hazardous Material Coordinator (HMC) responsibilities include:**

- Create and maintain Satellite Accumulation Areas (SAAs), as needed, for maintenance of waste generated at LWPF in accordance with applicable requirements.
- Supervise and coordinate dangerous waste storage and transfer.
- Provide approved storage containers and applicable markings.
- Interface with other organizations to ensure proper and timely disposal of waste.
- Prepare and maintain applicable waste handling documentation in accordance with DOE Orders and Federal and State regulations.
- Ensure non-regulated alternatives are used whenever possible.
- Provide review and waste disposition instructions as required.

5) **General Shipper**

General Shippers prepare and sign waste movement documentation for on-site and off-site shipments of dangerous waste. Additionally, at LWPF they are involved in the development and approval of hazardous waste procedures. Designated environmental engineering personnel are categorized as General Shippers as noted on the TMX. The Environmental Compliance Officer should also meet all training requirements for a General Shipper.

6) **Waste Designator**

Personnel who perform and/or complete waste designations at unit/buildings are categorized as waste designators under the RCRA training program.

5.4 Type and Amount of Training

This section provides an overview of dangerous waste management and job-specific training provided to employees in job titles and positions discussed in the previous sections. In addition to normal operating conditions, all employees are trained on emergency equipment, systems, and procedures to include the following, as applicable to meet the requirements in WAC 173-303-330(1)(d):

- Procedures for using, inspecting, and maintaining emergency response equipment.
- Automatic and manual waste feed cut-off systems.
- Communication and alarm systems.
- Response to fires and explosions.
- Response to dangerous waste contamination incidents and spills.
- Shutdown of operation.

LWPF uses existing courses to the maximum extent practical, ranging from introductory to task specific waste training. Attachment 1 gives listing of the classes, with brief descriptions, required for the stated job classifications and Attachment 2 provides a matrix of job positions and required training.

Support organization employees are also required to complete identified facility specific training applicable to their involvement with dangerous waste management. LWPF Managers and Team Leaders are responsible for identifying individual employee training requirements, in accordance with this plan, and for ensuring training requirements are met.

1) Training for Emergency Response

Federal and state regulations require all employees be able to respond effectively to emergencies and employees be familiar with emergency procedures, emergency equipment, and emergency systems. Specific topics required by federal and state dangerous waste regulations are addressed throughout the Dangerous Waste Training Program and are included in the following training, as applicable:

- Waste Management Awareness.
- Facility Specific Orientation, including Building Emergency Plan.
- Facility Emergency and Hazard Information Checklist.
- Nuclear Process Operator certification.
- Building Emergency Director training.

2) **Non-Hanford Facility Personnel Training**

Non-Hanford Facility personnel who will be performing unsupervised work at LWPF must complete training required by WAC 173-303 and 40 CFR 264.16.

Non-Hanford Facility personnel who not will be performing un-supervised work in a facility, such as touring a facility, must be escorted by facility personnel with the training required for the tasks.

The TSD Unit Manager is responsible for ensuring non-Hanford Facility personnel meet applicable access requirements before granting access to the facilities.

5.5 Relevance of Training to Positions

The dangerous waste training program for LWPF employees was developed after reviewing state and federal regulations and the completion of a job analysis for selected positions. Tasks performed by employees were identified and evaluated to determine training requirements. In addition, training needs are evaluated continually in relation to current state and federal regulations.

The LWPF Dangerous Waste Training Program ensures personnel responsible for waste handling are trained properly to perform the job duties pertinent to the handling, storage, treatment, and/or disposal of dangerous wastes.

5.6 Conduct of Training

Training is provided using classroom instruction, On-the-Job Training, and/or computer based training methods. Training is developed and provided by personnel knowledgeable in dangerous waste management policies/procedures.

Hanford Facility personnel shall maintain appropriate knowledge and skills by reviewing training material, required reading, self-paced instruction manuals, lessons learned, group discussions, continued training, etc.. Employees requiring certification are required to recertify annually or biennially, as applicable.

5.7 Documentation of Training

Classroom training is documented on course completion rosters, which are signed by students attending the course. Written examinations are signed by the student at the time of taking the exam and when reviewed with the instructor who grades the examination.

Training record files for LWPF employees are stored in the TMX computer database, which is accessed by the Facility Records Specialist. A report is generated from the database to inform facility management when an employee's training is within 90 days of expiration. An example of a TMX report is included in Attachment 3. Copies of completed TSD unit-specific training certifications/qualifications are available from the LWPF Training Department. Additional information regarding training records can be accessed through the Human Resources Information System (HRIS). The HRIS system is managed by the Hanford Training Records organization.

Training record summaries for support organization employees are also stored in the HRIS system. Training records for former employees are kept on the HRIS system for three years from the date the employee last worked at LWPF. Original signed and dated training records are maintained by the Hanford Training Records organization. These records are transferred quarterly to the Records Holding Facility in Richland, Washington. After approximately one year at the Records Holding Center, the original training records are archived.

1) **Access of Training Records**

When a training record is requested during an inspection, an electronic data storage record will be provided. If an electronic data storage record does not satisfy the inspection concern, a hard copy training record will be provided. Training records of former employees may not be readily available to facility personnel and may require a representative from the Training Records organization to access this information.

2) **Determining Current Training Status**

The electronic data storage training record, coupled with this training plan, will give the ability to quickly determine the training status of personnel in the field.

3) **Personnel List**

A list of personnel for Advanced General Workers, General Managers, General Shippers and Waste Designators is maintained on TMX, including the direct link between these positions and the individuals filling the positions. The TMX is updated quarterly.

6.0 ATTACHMENTS

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS
ATTACHMENT 2. REQUIRED LWPF TRAINING
ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

ATTACHMENT 1. RCRA TRAINING PROGRAM COURSE DESCRIPTIONS

The following list of courses constitutes the RCRA training program courses as determined by
(1) the Dangerous Waste Regulations WAC 173-303,
(2) the Hanford Facility RCRA Permit, and
(3) correspondence between RL and Ecology on dangerous waste training.

HANFORD TRAINING COURSES

Title / course number	**000001 Hanford General Employee Training**
Description	Course covers DOE orders and applicable policies pertaining to employer and employee rights and responsibilities, general radiation training, hazard communications, dangerous waste, fire prevention, personal protective equipment, safety requirements, certain unit/building orientation refresher training, emergency preparedness, accident reporting, and avenues for addressing safety concerns. The RCRA training program identifies this course as a program element as an annual refresher to the Hanford Facility RCRA permit condition concerning training.
Mandating Document(s)	Hanford Facility RCRA Permit, General Condition II.C.2 and 4
Target Audience	All Hanford Facility personnel working on the Hanford Site.
Frequency	Initially and annually thereafter

Title	02006G Waste Management Awareness
Description	Course introduces workers to federal laws governing chemical safety in the work place. The course provides the hazardous material/waste worker with the basic fundamentals for safe use of hazardous materials and initial accumulation or storage of dangerous or mixed waste in containers. The concepts covered in this course instruct personnel on specific waste generation procedures and requirements which includes: (1) Applicable waste management practices (i.e., waste stream identification, waste segregation practices, completing container logsheets, and housekeeping requirements), (2) proper responses to incidents pertaining to the waste in the initial accumulation containers, (3) proper responses to dealing with waste of unknown origins, and (4) proper responses to questions posed in the field concerning the above elements.
Mandating Document(s)	Satellite accumulation areas: Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4 90-day accumulation areas: WAC 173-303-330(1) Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4 TSD unit storage containers: WAC 173-303-330(1) Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Conditions II.C.1 and II.C.4
Target Audience	Hanford Facility personnel categorized as a General Worker, Advanced General Worker, and General Manager. Subcontractors categorized as General Workers. Other courses may provide equivalent training so that credit for this course is provided when the electronic data storage training record is generated.
Frequency	One-time-only Justification: The initial accumulation of waste can be conducted under satellite accumulation area provisions in WAC 173-303-200(2), during a project where the 90-day accumulation period starts when the waste is first placed into a container, inside an Area of Contamination during CERCLA or RCRA past practice activities, or in a TSD unit storage container. Annual refresher training is not required because unit/building specifics are adequately covered through the annual BEP and container waste management courses.

Title	**020159 Advanced Course 2 - Hazardous Waste Shipper Certification**
Description	Course introduces General Shippers to identify shippers' responsibilities and liabilities with regard to compliance to manifesting requirements and DOT regulations, including placarding, identifying proper shipping names, and loading requirements.
Mandating Document(s)	WAC 173-303-330(1), -180, -190, and -370. Hanford Facility RCRA Permit, General Condition II.Q as applicable.
Target Audience	General Shippers of dangerous or mixed waste on roadways anywhere on the Hanford Facility.
Frequency	Every three years.

Title	**02028B Building Emergency Director Training**
Description	Course provides an overview of the responsibilities of the Building Emergency Director, identifies the building emergency organizations, actions required during an event, implementing the contingency plan, and discusses drill and exercise requirements.
Mandating Document(s)	WAC 173-303-330(1), -340, -350, and -360
Target Audience	Hanford Facility personnel categorized as a General Managers because they perform the responsibilities of a RCRA Emergency Coordinator through the title of Building Emergency Director or alternate. The BED can function over TSD units or generator activities.
Frequency	Initial (Retrained annually by Building Emergency Director Requalification)

Title	**035010 Waste Designation**
Description	Course teaches dangerous waste designation according to WAC 173-303. Class content includes section-by-section lecture on the regulations, with examples following each section. Students complete examples using a waste designation flow chart. Examples addressed include: listed waste, characteristic waste, and Washington State criteria: toxicity and persistence.
Mandating Document(s)	WAC 173-303-330(1), -070, and -080 through -100
Target Audience	General Shippers and Waste Designators
Frequency	One-time only Justification: Another course, the Waste Designation Qualification course, annually qualifies those personnel who designate waste. General Shippers do not need to be annually retrained in this course because they

Title	**035012 Waste Designation Qualification**
Description	Course provides qualification to become a qualified waste designator.
Mandating Document(s)	WAC 173-303-330(1), -070, and -080 through -100
Target Audience	Waste Designators
Frequency	Annual

Title	**035020 Facility Waste Sampling and Analysis**
Description	Course presents waste sampling methodologies according to EPA Protocols SW-846, "Test Methods for Evaluating Solid Waste Physical/Chemical Methods." This course also covers documentation requirements in a sampling plan, waste analysis plan, field and laboratory quality control/assurance, data quality objectives process, and use of actual sampling equipment as specified by WAC 173-303-110. Finally topics on listed waste management pertaining to sample management and available on-site sampling services are covered.
Mandating Document(s)	WAC 173-303-330(1), -070, -110, and -300
Target Audience	General Shippers
Frequency	One time only Justification: In most cases on the Hanford Facility, the General Shipper will utilize resources from outside organizations to physically acquire samples. In addition, the General Shipper will also rely on the review and approval process for the development and issuance of Sampling and Analysis Plans regarding a sampling effort. This training provides an overview of information to ensure that sampling efforts are properly arranged for and planned.

Title	**035100 Container Waste Management - Initial**
Description	Course covers general training requirements pertaining to waste management in container at 90-day accumulation areas and TSD units. The course incorporates WAC 173-303-200(1), -630, DOE orders, and FDH policy for container management. Includes practical exercises for hands-on experience with the packaging of dangerous or mixed waste, and preparation of packages for final destination. This course does not cover waste management aspects pertaining to other RCRA waste management units such as tank systems, surface impoundments, containment buildings, landfills, etc.
Mandating Document(s)	WAC 173-303-330(1), -630, -200(1) and Waste Minimization
Target Audience	Advanced General Workers and General Managers categorized because they are immediate managers of Advanced General Workers who manage containers of dangerous or mixed waste.
Frequency	Initial only (refresher - Container Waste Management Training)

Title	**035110 Container Waste Management - Refresher**
Description	Refresher Course - Container Waste Management - Initial
Mandating Document	WAC 173-303-330(1), -630, -200(1), and waste minimization
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers.
Frequency	Annual

Title	**035120 Waste Management Administration - Initial**
Description	Course is designed for personnel preparing to become shippers of dangerous and/or mixed waste. This course covers regulatory and company policies, forms, reports, forecasts, and plans. Topics also covered include: waste characterization, waste storage disposal request, low level waste storage/disposal record, transuranic waste storage/disposal record, and radioactive mixed waste attachment sheet. In addition, students will learn how these forms are used to complete shipping papers.
Mandating Document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target Audience	General Shippers
Frequency	Initial only (Refresher - Waste Management Administration)

Title	**035130 Waste Management Administration - Refresher**
Description	Refreshes course - Waste Management Administration - Initial
Mandating Document(s)	WAC 173-303-330(1), -630, -200, -210, -220, -380, and -390.
Target Audience	General Shippers
Frequency	Annual

Title	**037510 Building Emergency Director Requalification**
Description	Refresher for Building Emergency Director Training
Mandating Document(s)	WAC 173-303-330, -340, -350, and -360
Target Audience	General Manager categorized because they can act as RCRA Emergency Coordinator in WAC 173-303-360.
Frequency	Annual

Title	**03E096 Unit/building-Specific Contingency Plan/Hazard Communication/Emergency Preparedness Training for 242-A Evaporator/LERF** (Uses "Facility Emergency and Hazard Information Checklist", A-6000-784R)
Description	Course consists of a review of specific chemical hazards associated with each RCRA waste management unit and job assignment, as covered by a RCRA contingency plan. The training is completed by the supervisor, manager, or a designated individual using a checklist available on the Hanford Local Area Network under Jet Forms. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The training is completed by the immediate manager, or a designated individual using a checklist. The checklist acts as a guide to ensure consistent coverage of necessary topics.
Mandating Document(s)	WAC-173-303-330, -340, and -350 Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4
Target Audience	All Hanford Facility personnel assigned to, or performing work at 242-A Evaporator/LERF. Non-Hanford personnel who will perform work unsupervised.
Frequency	Annual
Title	**03E074 Unit/Building-Specific Contingency Plan/Hazard Communication/Emergency Preparedness Training for ETF/LERF** (Uses "Facility Emergency and Hazard Information Checklist", A-6000-784R)
Description	Course consists of a review of specific chemical hazards associated with each RCRA waste management unit and job assignment, as covered by a RCRA contingency plan. The training is completed by the supervisor, manager, or a designated individual using a checklist available on the Hanford Local Area Network under Jet Forms. The unit/building-specific information is reviewed concerning hazards in the work area and emergency response requirements, including where applicable, waste feed cut-off, communication and alarm systems, and response to fires. The training is completed by the immediate manager, or a designated individual using a checklist. The checklist acts as a guide to ensure consistent coverage of necessary topics.

Mandating Document(s)	WAC-173-303-330, -340, and -350 Letter: RL/US Army Corps of Engineers to Ecology "State of Washington Department of Ecology Administrative Order No. DE 94NM-063" dated April 14,, 1994, items 3 and 4. Hanford Facility RCRA Permit, General Condition II.C.4
Target Audience	All Hanford Facility personnel assigned to, or performing work at ETF/LERF. Non-Hanford Facility personnel who will perform work unsupervised.
Frequency	Annual

Title	**350400 242-A Evaporator Operator Certification**
Description	Qualifies NPOs to control 242-A Evaporator systems.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**350540 242-A Evaporator Orientation**
Description	Introduction to the 242-A Evaporator, including facility mission, hazards and emergency response procedures. (Includes BEP)
Mandating Document(s)	WAC-173-303-330 Hanford Facility RCRA Permit, General Condition II.C.2
Target Audience	All Hanford Facility personnel assigned to, or doing work at, the 242-A Evaporator. Non-Hanford Facility Personnel who will perform work unsupervised.
Frequency	Annual

Title	**705020 LWPF Hazardous Material/Waste Handling**
Description	Presents Waste Handlers with state, federal and Hanford specific regulations on waste handling, including: segregation, packaging, and disposal.
Mandating Document(s)	WAC-173-303-330, -630
Target Audience	All General Workers, and Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers.
Frequency	Annual

Title	**705120 LWPF Outside Operator Certification**
Description	Qualifies NPOs to operate those systems under the control of the LWPF Outside Operator, including: TEDF, Load-In Station, and LERF.
Mandating Document(s)	WAC-173-303-330, -640, -650
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in tank systems and/or surface impoundments.
Frequency	Biennial

Title	**705125 LWPF Primary Systems Operator Certification**
Description	Qualifies NPOs to operate the ETF's Primary Treatment Train systems, including the UV/OX and the RO systems.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**705130 LWPF Secondary Systems Operator Certification**
Description	Qualifies NPOs to operate the ETF's Secondary Treatment Train systems, including the Secondary Waste Receiving Tanks and the ETF Evaporator and Thin Film Dryer.
Mandating Document(s)	WAC-173-303-330, -640
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage mixed waste in tank systems.
Frequency	Biennial

Title	**705135 ETF Control Room Operator Certification**
Description	Qualifies NPOs to control ETF and TEDF systems from a centralized computer system, including emergency response procedures.
Mandating Document(s)	WAC-173-303-330, -340, -350, 360, -630, and -640.
Target Audience	Advanced General Workers and General Managers who are categorized because they are immediate managers of Advanced General Workers who manage dangerous or mixed waste in containers and/or tank systems. General Managers who are Building Emergency Directors.
Frequency	Biennial

Title	**705700 200 Area LEF Facility Orientation**
Description	Introduction to the ETF, LERF and TEDF facilities including: facility missions, hazards, and emergency response procedures.
Mandating Document(s)	WAC-173-303-330 Hanford Facility RCRA Permit, General Condition II.C.2
Target Audience	All Hanford Facility personnel assigned to, or doing work at ETF, LERF, or TEDF. Non-Hanford Facility Personnel who will perform work unsupervised.
Frequency	Annual

ATTACHMENT 2. REQUIRED LWPF TRAINING

Position	Job Title	Required Training
All Employee	All other Job Titles not specifically listed below.	000001, 350540[1], 705700[2], 03E096[1], 03E074[2]
General Worker	Radiological Control Technician, Maintenance Personnel, including: Electrician, Instrument Technician, Insulator, Millwright, Painter, Pipefitter, Power Operator, Process Crane Operator, Rigger, Sign Painter, Truck Driver, Welder Maintenance Manager, Radiological Control Manager	000001 02006G 350540[1] 705700[2] 03E096[1] 03E074[2]
Advanced General Worker	Nuclear Process Operator	000001, 02006G, 035100, 035110, 705120[2], 705125[2], 705130[2], 705135[2], 350400[1], 03E096[1], 03E074[2]
General Manager	Operations Manager, Shift Operations Managers, Environmental Compliance Officer, Person-in-Charge, Hazardous Material Coordinator	000001, 02006G, 02028B, 037510, 035100, 035110, 350540[1], 705700[2], 03E096[1], 03E074[2]
General Shipper	Shipper	000001, 02006G, 020159, 035010, 035020, 035100, 035110, 035120, 035130, 350540[1], 705700[2], 03E096[1], 03E074[2]
Waste Designator	Waste Designator	000001, 035010, 035012, 350540[1], 705700[2], 03E096[1], 03E074[2]

Notes:

1. These classes are specific to the 242-A Evaporator and are not required for personnel who work exclusively at LERF/ETF. TMX provides information on personnel who work exlusively at 242-A Evaporator or LERF/ETF.

2. These classes are specific to the LERF/ETF and are not required for personnel who work exclusively at the 242-A Evaporator. TMX provides information on personnel who work exlusively at 242-A Evaporator or LERF/ETF.

ATTACHMENT 3. EXAMPLE OF TMX DATABASE REPORT

******* BUSINESS SENSITIVE ******* **POSITION TRAINING REPORT** *******BUSINESS SENSITIVE *******

Tracking Code:
Manager:
Organization : 200A EFFLUENT TREATMENT FAC OPS
Position: Shift Ops Mgr - ETF (GM)

Matrix Last Modified on 07/19/97
30 Days Delinquent Forecast

07/21/97 Position 1
16:16:46 Sheet 1 of 2

	Course No.	Title	Retrain Course	Individual #1	Individual #2	Individual #3	Individual #4
M	000001	HGET	000001	09/30/97	10/10/97	01/10/98	08/26/97
M	003034	LOCK & TAG - AUTH WRKR INITIAL	003037	11/15/97	10/29/97	11/18/97	03/10/98
M	020001	RAD WORKER TRNG II - INIT	020003	08/06/98	11/09/97	07/11/98	09/24/98
M	020030	SCBA ANNUAL	020030	05/09/98	10/04/97	05/22/98	06/04/98
M	020032	SCOTT SKA-PAK AIRLINE SYSTEM	020032	05/09/98	10/04/97	05/22/98	06/04/98
M	020041	BASIC RESP PROTECT TRNG	020041	01/10/98	10/30/97	09/05/97	11/19/97
M	020044	QUANTITATIVE MASK FIT	020044	01/10/98	10/30/97	09/05/97	11/19/97
M	02006G	WASTE MANAGEMENT AWARENESS	---------	OK	OK	OK	OK
M	020130	CONFND SPC ENTRY (CSE)	---------	OK	OK	OK	OK
M	02028B	BLDG EMER DIR TRNG	037510	02/18/98	02/04/98	01/28/98	01/11/98
M	020702	RAD WORKER I/II REFRESH	020702	09/30/98	10/10/98	01/09/99	08/26/98
M	031110	24 HR RCRA TSD HAZ WASTE	032020	05/09/98	10/09/97	05/22/98	06/04/98
M	350540	242-A EVAPORATOR ORIENT	---------	OK	OK	OK	OK
M	703036	LWPF LOCK & TAG	703036	12/31/98	12/31/98	01/09/99	12/31/98
M	705020	200 AREA WSTE HNDLING OPS	---------	OK	OK	OK	OK
M	705700	200A LEF FAC ORIENT	705700	09/30/97	10/10/97	01/10/98	08/26/97
D	000390	OJT TRAINING WORKSHOP	---------	OK	OK	OK	OK
D	020107	BHVR BASED SAFETY TRNG	---------	OK	OK	OK	OK
D	020704	RAD CON MANUAL TRNG - MGRS	---------	OK	OK	OK	OK
D	03E074	BLDG EMERG PLAN - 0263 - ETF	03E074	09/30/97	10/10/97	01/09/98	08/26/97
D	03E096	242A EVAP/LERF FAC EMERG ID CH	03E096	03/19/98	12/19/97	03/12/98	03/12/98
D	042720	AERIAL LIFT OPER TRNG	043920	05/17/98	/ /	06/15/98	04/07/00
D	044470	FORKLIFT OPERATNL SAFETY	041890	03/18/00	/ /	11/29/98	11/22/99
D	044480	MEDIUM RISK ELECT SAFETY	044480	12/12/97	04/30/00	<<08/16/97>>	09/13/97

LEGEND

Upper case (M/D/C/P) = Course needed by all
Lower case (m/d/c/p) = Course needed by some
* = Retrain not to be maintained
<< >> = Course delinquent
/ / = Course needed (upper case) but not taken

Date = Course retrain date
OK = Course taken; no retrain required
**** = Course taken; retrain requirement not maintained
Blank = Course not needed (lower case) and not taken

To delete specific employee retrain dates for lower case (m, d, c, p): See TMX Main Menu 5., TMX Course Alternates.

******* BUSINESS SENSITIVE ******* **POSITION TRAINING REPORT** *******BUSINESS SENSITIVE *******

Tracking Code:
Manager:
Organization : 200A EFFLUENT TREATMENT FAC OPS
Position: Shift Ops Mgr - ETF (GM)

Matrix Last Modified on 07/19/97
30 Days Delinquent Forecast

07/21/97 Position 1
16:16:46 Sheet 2 of 2

	Course No.	Title	Retrain Course	Individual #1	Individual #2	Individual #3	Individual #4
D	170500	BASIC MEDIC FIRST AID	170535	01/23/98	03/05/99	08/05/98	09/13/97
D	170640	QTRC - INTRO TO OCC RPTG	---------	OK	OK	OK	OK
D	170642	OCCURRENCE REPORT WRITING	---------	OK	OK	OK	OK
D	170656	HANDS-ON FIRE EXTINGSHR	170656	05/14/98	03/06/98	<<06/12/97>>	08/28/97
D	705035	200 AREA LEF EP/APC	705035	09/30/97	09/30/97	10/28/97	10/21/97
D	705120	200 LEF OUTSDE OPER CERT	705120	03/07/99	12/26/98	03/10/99	03/13/99
D	705125	200 AR PRMRY SYS OPR CER	705125	09/20/97	03/24/99	09/20/97	10/04/97
D	705130	200 LEF SCNDRY WSTE OPER	705130	09/20/97	03/24/99	09/20/97	10/04/97
D	705135	200 LEF CNTRL RM OP CERT	705135	09/20/97	03/24/99	09/20/97	10/04/97
m	020140	FALL PROTECTION TRAINING	---------				
d	001000	CONDUCT OF OPS - INTRO	---------	OK	OK	OK	OK
d	001005	OVERVIEW CONDUCT OPERTNS	---------	OK	OK	OK	OK
d	010108	WORK MGT & JCS OVERVIEW	010108	****		****	****
d	02006L	ASBESTOS CONTROL	02006L		05/27/98		
d	040784	BASIC CRANE & RIGGING SAFETY	040788		****		
d	060760	COND IND WTR HAMMER SFTY	060765		****	****	05/06/98
d	080969	NEW MANAGER ORIENTATION	---------			OK	
d	705115	200A LEF PIC TRAINING	---------	OK	OK	OK	OK
d	705140	200 ETF SHTDN SHFT OPS MGR QUL	705140		01/06/99		
p	080553	SELF ASSESS FOR MGT SKLS	---------				
p	080810	COM SKILLS WORKSHOP	---------		OK		OK
p	080925	SEXUAL HARASSMENT WRKPL	---------			OK	
p	170002	RISK EVALUATION	---------	OK		OK	
p	170654	SELF ASSES 1ST LIN SPVSR	---------				
p	170780	INTRO TO OSHA STDS	---------			OK	

Modifications to Part III, Chapter 6

325 Hazardous Waste Treatment Units

Chapter 2	(Class 1 modification from 6/30/98)
Chapter 4	(Class 1 modification from 12/31/98)
Chapter 6	(Class 1 modification from 12/31/98)
Chapter 7	(Modification D dated 6/1/98)
Chapter 14	(Modification D dated 6/1/98)
Appendix 3A	(Class 1 modification from 12/31/98)
Appendix 7A	(Modification D dated 6/1/98)
Appendix 8A	(Class 1 modification from 12/31/98)

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2.0 CONTENTS

2.0 CONTENTS I

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APPENDIX

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2.0 FACILITY DESCRIPTION AND GENERAL PROVISIONS [B AND E]

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, 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 enclosures with remote manipulators.

The 325 HWTUs consist of three units, all within the 325 Building, located in the 300 Area on the Hanford Facility. The Shielded Analytical Laboratory (SAL) is located in Rooms 32, 200, 201, 202, and 203. The HWTU is located in Rooms 520, and 528. The Collection/Loadout Station Tank will be located in the southeast corner of the basement of the 325 building.

The 325 HWTUs receive, 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). Storage in containers and bench-scale treatment of dangerous waste occur in the HWTU. At the SAL, dangerous waste is stored in a tank and is also stored in containers. Bench-scale treatment of dangerous waste also occurs at the SAL. This dangerous waste, along with contributors from the HWTU and Room 40, is currently discharged to the 340 Building via the Radioactive Liquid Waste System (RLWS). Due to the scheduled deactivation of the 340 Building, a modification to the existing 325 RLWS system is required. As part of this modification, dangerous waste will be collected, stored, and possibly treated in a tank before being transported to the Double-Shell Tank (DST) System. This modified system will be referred to as the RLWS load out tank system. As described in further detail 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.

This chapter provides a general overview of the 325 HWTUs, including:

- General description
- Topography
- Seismic consideration
- Traffic information.

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. It is the U.S. Department of Energy-Richland Operations Office (DOE-RL/PNNL's) position that information in this application related to radionuclides regulated pursuant to the Atomic Energy Act is provided for completeness purposes only. A further discussion of this issue is given in the General Information Portion of the Hanford Facility Dangerous Waste Permit Application (DOE/RL-91-28), Section 2.1.1.3.1.

2.1 DESCRIPTION OF 325 HAZARDOUS WASTE TREATMENT UNITS [B-1]

The 325 HWTUs are contained within the 325 Building, a two-story metal and concrete building with a basement level located within the 300 Area, as shown in Figure 2.1. The 325 HWTUs consist of three units: the HWTU, the SAL, and the RLWS load out tank system, which are located in portions of the basement and ground floors (Figures F2.2 and F2.3). Other non-Treatment, Storage, and Disposal (non-TSD) activities within the 325 Building include radiochemistry research, radioanalytical service, and radiochemical process development activities.

Container and tank storage limits, and annual and daily treatment limits are listed in Chapter 1.0. The regulated waste managed in the 325 HWTUs includes dangerous waste that designates as listed waste; waste from nonspecific sources; selected waste from specific sources, characteristic waste, and state-only. Waste treatment processes could include pH adjustment, ion exchange, carbon absorption, oxidation, reduction, 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. Analytical and waste treatment procedures are discussed in Chapters 3.0 and 4.0.

2.1.1 Shielded Analytical Laboratory

The west wing of the 325 Building houses the 325B hot cell area (completed in 1963 and upgraded in the mid-1970s). The SAL consists of five rooms: basement level Room 32 and ground-floor level Rooms 200, 201, 202, and 203 (Figure 2.2). Figure 2.3 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 to manage dangerous waste. These two hot cells are regulated under the Atomic Energy Act. Work space of each interconnected cell is 1.8 meters high, 1.8 meters wide, and 1.7 meters deep. The cells are designed to handle samples with dose rates up to 2,000 rem/hour and containing up to 1,000 curies of 1 million electron volts (MeV) gamma radiation. There are 30.5 centimeters of steel in the front wall and one end wall, and 66 centimeters of magnetite concrete in the rear wall and one end wall, providing shielding equivalent to 19 centimeters of lead. 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. An interconnected stainless steel trough runs along the front of all the hot cells. The trough is the means by which the liquid dangerous waste is drained through stainless steel piping to the SAL tank.

The back face of the SAL is divided into three rooms (Rooms 200, 202, and 203). A special storage area exists in Room 202 for containers of dangerous waste that have been placed in specially designed overpack containers. The overpack containers provide shielding to reduce the radiological dose rate of the exterior of the overpack and secondary containment for the primary container.

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 (Figure 2.4). Detailed tank system diagrams, including ancillary equipment, are located in Appendix 4A. The tank is placed within a cylindrical stainless steel containment structure that provides tertiary containment. The liquid dangerous waste is conveyed by gravity from the trough in the SAL hot cells to the SAL tank via stainless steel drain lines. The RLWS piping is a 316L stainless steel single pipeline inside the basement; once outside, this piping becomes a double-contained pipe line. The SAL tank utilizes a remote video monitoring system and three tank-level monitoring devices. Specific information on the monitoring devices is located in Chapter 4.0, Section 4.2.2.2.

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. Typical operations include analytical weighing, sample dissolution, sample dilution and aliquoting, digestion, distillation, titrimetric analysis, solvent extraction, and ion exchange separations. Dangerous waste treatment could include pH adjustment, ion exchange, 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. Operations in the SAL are described in detail in Chapter 4.0.

Secondary containment in the SAL is divided into three systems: the six hot cells, the front face, and the back face (Refer to Chapter 4.0).

2.1.2 Hazardous Waste Treatment Unit

The HWTU consists of two rooms (Rooms 520 and 528) located in the northeast corner of the main floor of the 325 Building. Dangerous waste is stored and/or treated in two of the rooms (Rooms 520 and 528). The storage of containers in the HWTU for greater than 90 days is conducted in compliance with WAC 173-303-630. A plan drawing of the HWTU is provided as Figure 2.5.

Room 520 has an overall floor area of approximately 78 square meters, which includes a main room that has a floor area of approximately 71 square meters and a closet with a floor area of approximately 6.7 square meters. A portion of the floor area in the main room is occupied by cabinets or work counter space. The closet is the primary dangerous waste storage area; however, waste storage can occur throughout Room 520. Treatment of dangerous waste is conducted within the main room. The floor of Room 520 is constructed of concrete and is overlaid with a seamless chemical resistant polypropylene coating that extends approximately 10 centimeters up the walls of the room and provides secondary containment for containers in Room 520. Specific information on the HWTU secondary containment system's design and operation is found in Chapter 4.0, Section 4.1.4.1 and structural integrity in Section 4.1.5.1. Dangerous waste is stored in containers that range in size from small laboratory glassware to 208-liter containers. The smaller waste containers typically are stored within flameproof storage cabinets. Larger waste containers that can contain liquids are stored on platforms and/or otherwise protected from contact with accumulated liquids (i.e., overpacks). Containers holding solid waste can be stored on the floor. Treatment activities within the room occur primarily within small containers inside open-faced hoods and involve small quantities of waste in each batch (Refer to Chapter 4.0, Section 4.1.1.1).

Room 528 has an overall floor area of approximately 71 square meters. A portion of the floor area is occupied by cabinets and work counter space. The floor of the room is constructed of concrete and is equipped with a chemical-resistant polypropylene coating that extends approximately 10 centimeters up the walls of the room and provides secondary containment for containers in Room 528. Storage and treatment of dangerous waste can occur throughout the room. Dangerous waste is stored in containers that range in size from small laboratory glassware to 208-liter containers. The smaller waste containers typically are stored within storage cabinets. Larger waste containers that can contain liquids are stored on platforms and/or otherwise protected from contact with accumulated liquids (i.e., overpacks) on the floor, while containers storing solid waste may be stored on the floor. Treatment activities within the room occur primarily within small containers in open-faced hoods or glove boxes and involve small quantities of waste in each batch.

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, waste concentration by evaporation, precipitation, filtration, phase separation, catalytic destruction, and solidification and/or stabilization.

2.1.3 Liquid Waste Drainage Systems

The 325 HWTUs have two drainage systems to handle liquid waste: the retention process sewer (RPS) and the RLWS. These two systems serve several laboratory and research areas in the 325 Building. Figure 2.3a shows the location of these systems in the 325 Building.

The RPS system is connected to drains in both the SAL and HWTU subunits. The RPS is utilized for disposal of wastewater that has been handled in radiation areas (including the SAL and HWTU areas) but is not expected to be radioactively contaminated. The RPS is not utilized for the disposal of dangerous waste. Unless diverted as stated in the next paragraph, the RPS effluent flows to the 300 Area Treated Effluent Disposal Facility via the process sewer lines.

RPS effluents are routed through a diversion station in the basement common area of the 325 Building. The diversion station is equipped with a radioactivity monitor, which diverts the RPS flow to the RLWS if radioactivity is detected in the RPS flow. A secondary diversion monitoring system backs up the building system. If a diversion occurs, an alarm sounds to alert the power operators who notify the building manager.

One laboratory fume hood in HWTU Room 528 is also connected to the RLWS. The liquid mixed waste is conveyed by pumps and gravity via stainless steel lines from the SAL tank, the HWTU, and the slab tanks into the RLWS. The slab tanks are located in Room 40A and collect waste water from other hot cell operations in the 325 Building that are not considered to be part of the HWTUs. As the RLWS is currently configured, liquid waste is then routed to the 340 Building where it is transferred to railroad tank cars and eventually transferred for storage to the DST System on the Hanford Facility.

Due to the scheduled deactivation of the 340 Building, the RLWS system is being modified. This modified system is scheduled to be completed in FY 1998. The modified system will collect mixed waste from the SAL tank, the HWTU, and the slab tanks in a stainless steel tank located in the basement of the 325 Building. The transfer piping of the modified system will consist of four new drain lines while also utilizing some of the existing piping. The four new lines include: an extension from the existing drain in Room 32, a new drain line from Room 528, a new drain from Room 50A that connects to the existing cell drain, and a new transfer line from the RLWS load out tank to the truck lock. Waste from the RLWS load out tank system will be transferred to the truck lock where the waste will be transported to the DST via a shielded cask trailer system. Two stretches of piping from the existing RLWS system that are associated with the HWTU will not be utilized in the modified system. As discussed in Chapter 11, these lines will be capped in place and closed during final closure activities of the RLWS load out tank system. Figure 2.3b provides a schematic of the modified RLWS load out tank system.

2.1.4 Other Environmental Permits

Applicable federal and state laws and local requirements are discussed in Chapter 13.0 of the General Information Portion (DOE/RL-91-28).

2.2 TOPOGRAPHIC MAP [B-2]

A topographic map, H-13-000197, showing a distance of at least 305 meters around the 325 HWTUs, is provided in Appendix 2A. The contour internal (0.5 meter) shows the general pattern of surface water flow in the vicinity of the 325 HWTUs. The map contains the following information:

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

2.3 SEISMIC STANDARD [B-3]

The 325 HWTUs are located in Benton County, Washington, in Zone 2B as identified in the *Uniform Building Code* (ICBO 1991). No active faults, or evidence of a fault that has had displacement during Holocene times, have been found on the Hanford Facility (DOE 1988). The youngest faults recognized on the Hanford Facility occur on Gable Mountain, approximately 38 kilometers northwest of the 300 Area. These faults are of Quaternary age and are considered "capable" by the U.S. Nuclear Regulatory Commission (NRC 1982).

The 325 Building was evaluated to assess building structure adequacy to withstand a Design Basis Earthquake (DBE) found in URCL-15910, Design and Evaluation Guidelines for Department of Energy Facilities Subjected to Natural Phenomena Hazards. This DBE corresponds to a horizontal ground acceleration of 0.135g with a 5000 year return period. The 325 building was found to be able to withstand the 0.135g site specific DBE without major structural damage (WHC 1992).

2.4 TRAFFIC INFORMATION FOR THE 325 HAZARDOUS WASTE TREATMENT UNITS [B-4]

General traffic information for the Hanford Facility is presented in the *Hanford Facility Dangerous Waste Permit Application, General Information Portion* (DOE/RL-91-28).

Access to the 300 Area by vehicular traffic is by Stevens Drive and George Washington Way. Traffic on Stevens Drive consists of personal vehicles, buses for the transport of personnel to and from work, and light- or medium-duty trucks for the transport of materials. Traffic on the capillary routes is private vehicles destined for designated parking areas, buses for the transport of personnel to and from work, and light- or medium-duty trucks for the transport of materials.

Personnel have access to the 325 Building through multiple pedestrian gates located on the 300 Area perimeter. Vehicular traffic to the 325 Building is limited to DOE-RL, or contractor-owned vehicles only. No new routes are needed. Maximum posted speed within the 300 Area is 24 kilometers per hour. Traffic destined for adjacent buildings averages 10 to 15 vehicles per day and ranges from passenger cars to heavy trucks. All roads within the 300 Area are paved, all-weather roads.

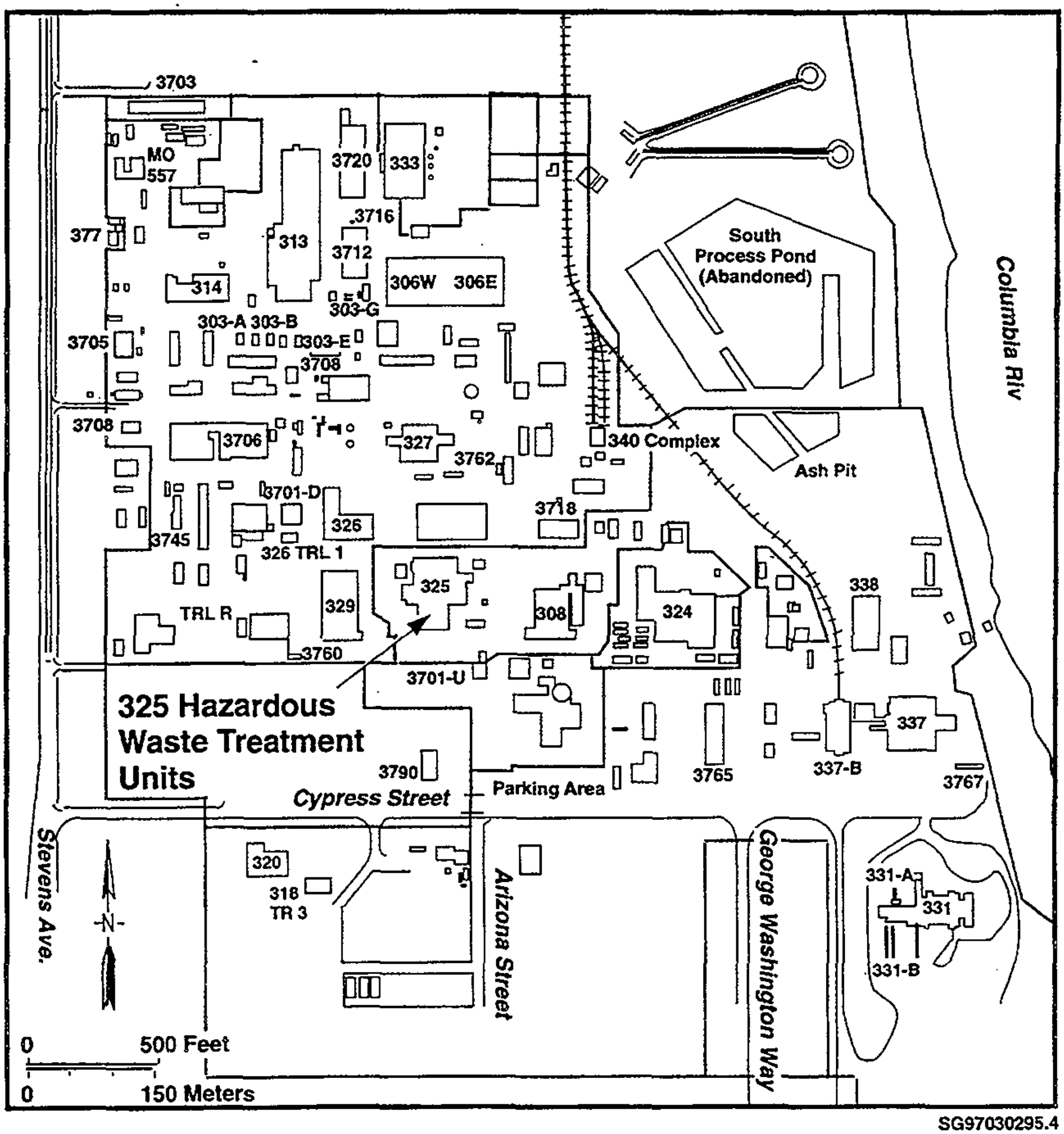
Waste generated at laboratories within the 300 Area will be transferred to the 325 HWTUs over roads where public access is prohibited. All access to the 300 Area (except the outer parking lot) is controlled by the DOE-RL and limited to personnel holding appropriate clearances. In the immediate area of the 325 Building, vehicular traffic is limited to vehicles on official business. Traffic destined for the 325 Building travels over roads designed to handle truck traffic. An estimated one or two waste transfers to or from the 325 HWTUs occur per week. Waste transfers from the RLWS load out tank system in the 325 Building to the 200 East Area will occur via an approved cask transportation system based on a Hanford Site Safety Analysis Report for Packaging. These waste transfers are anticipated to occur about three times per year.

The dangerous waste is transferred in accordance with applicable onsite and/or offsite requirements including Condition II.Q of the Hanford Facility RCRA Permit. Although many onsite waste transfers are exempt from the manifest requirements of WAC 173-303-370, onsite waste tracking is applied as a matter of good management practice. These onsite transfer requirements are designed to ensure that personnel exposures are maintained as low as reasonably achievable (ALARA), that loss of contamination control is prevented, and that applicable transportation regulations be obeyed.

2.5 RELEASE FROM SOLID WASTE MANAGEMENT UNITS [E]

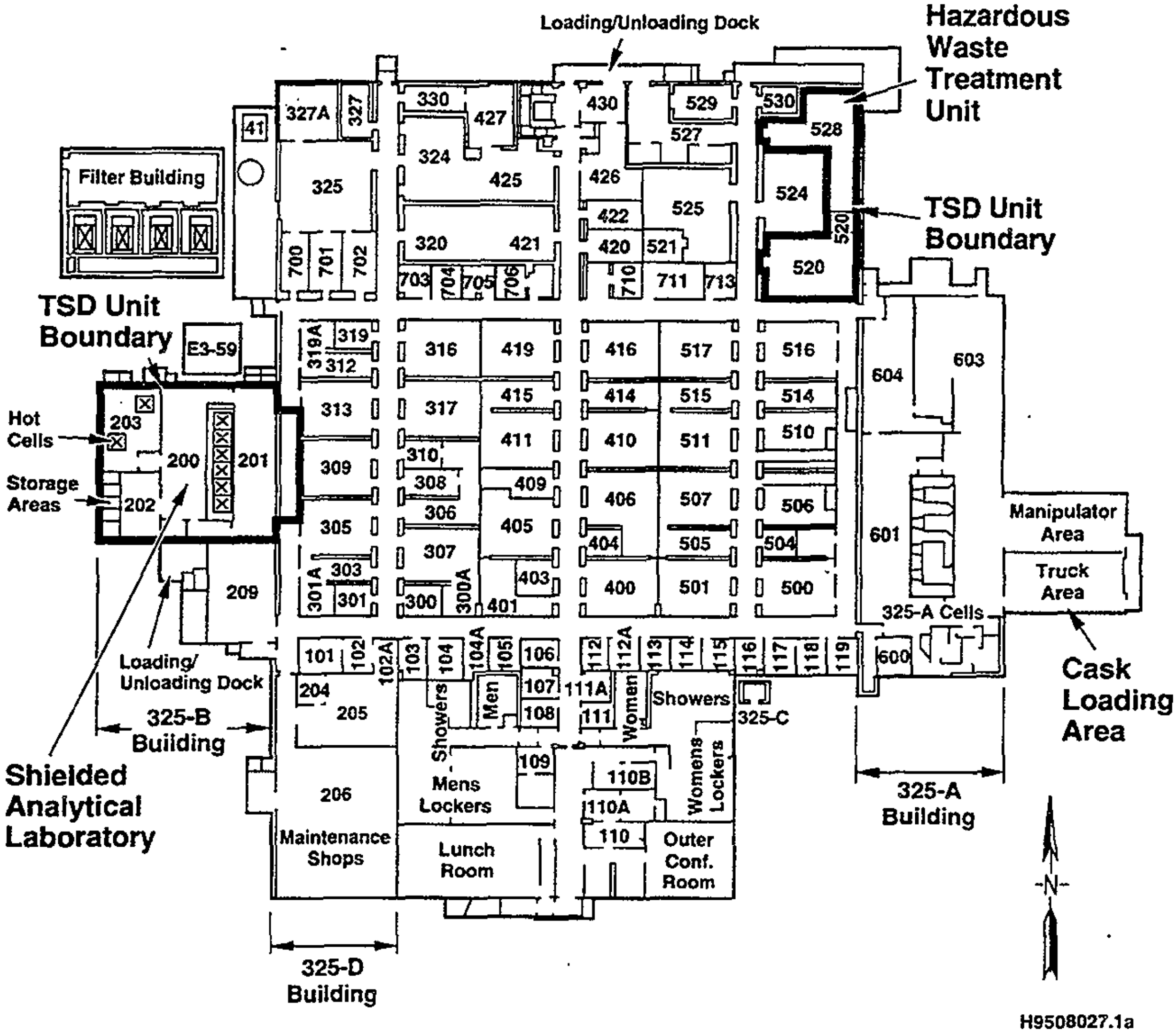
Information concerning releases from solid waste management units is discussed in the General Information Portion (DOE/RL-91-28).

Figure 2-1. 300 Area

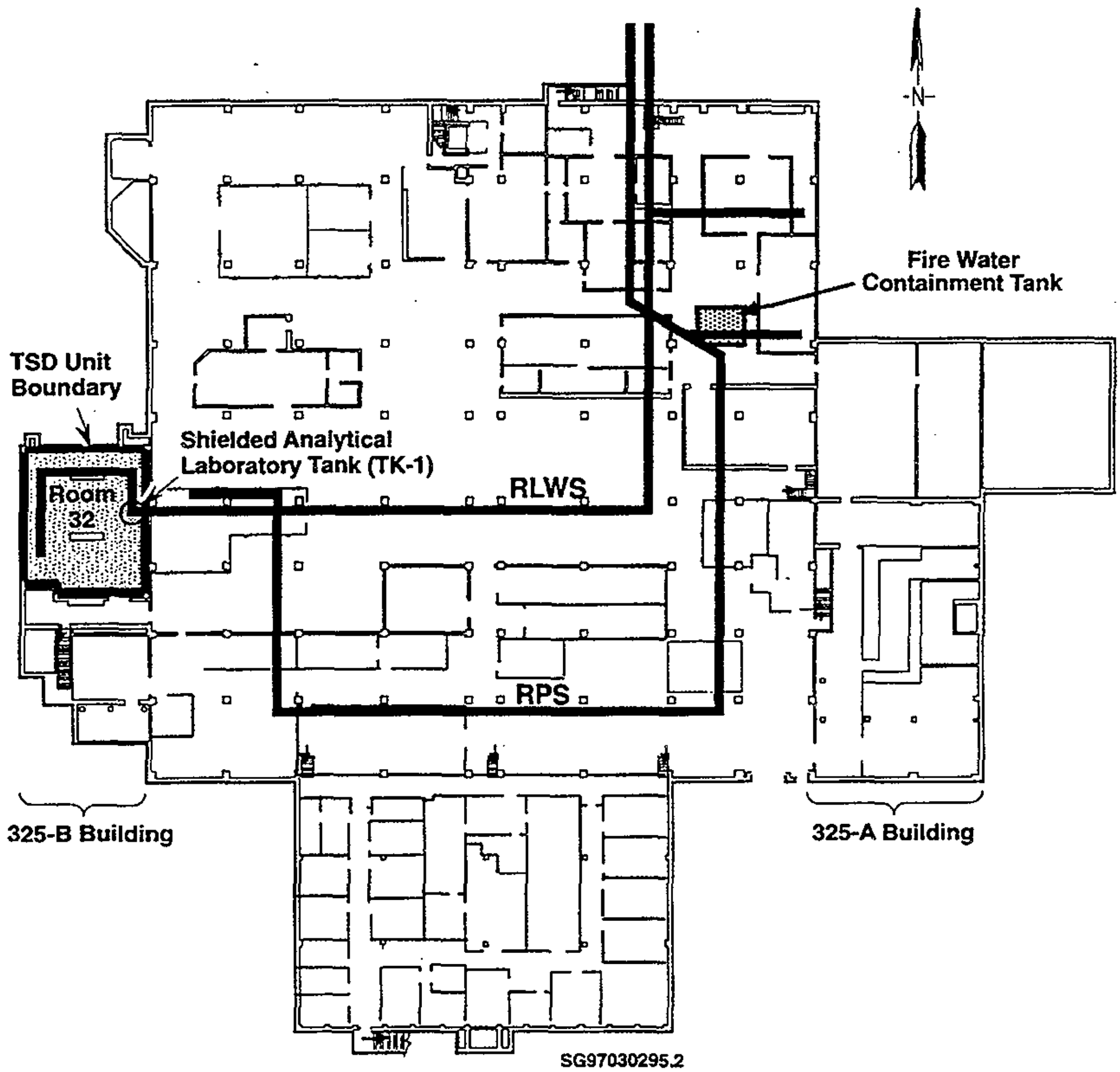


1

Figure 2-2. Location of 325 HWTUs--Ground Floor Areas

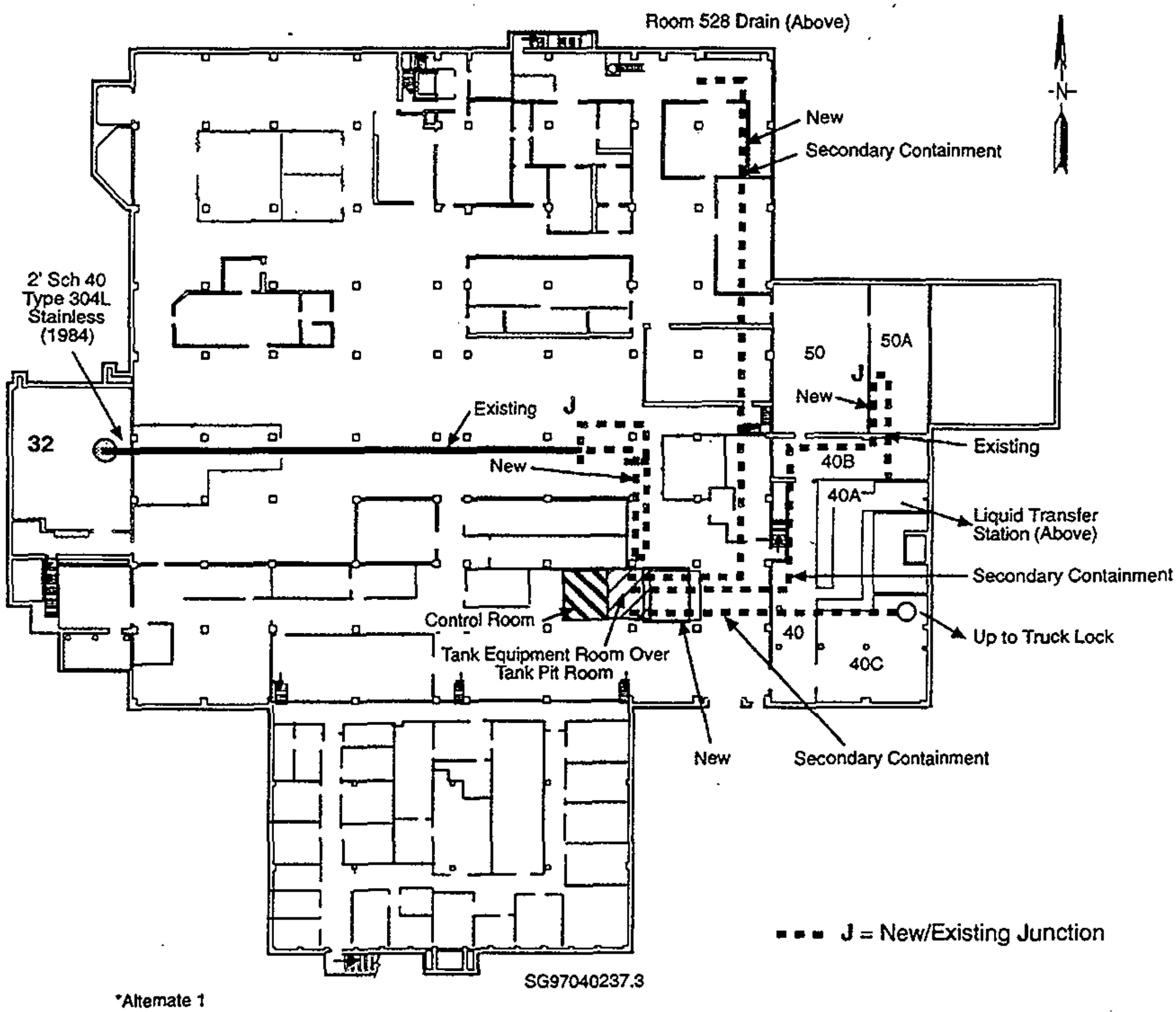


1 **Figure 2-3. Location of 325 HWTUs--Basement Areas**



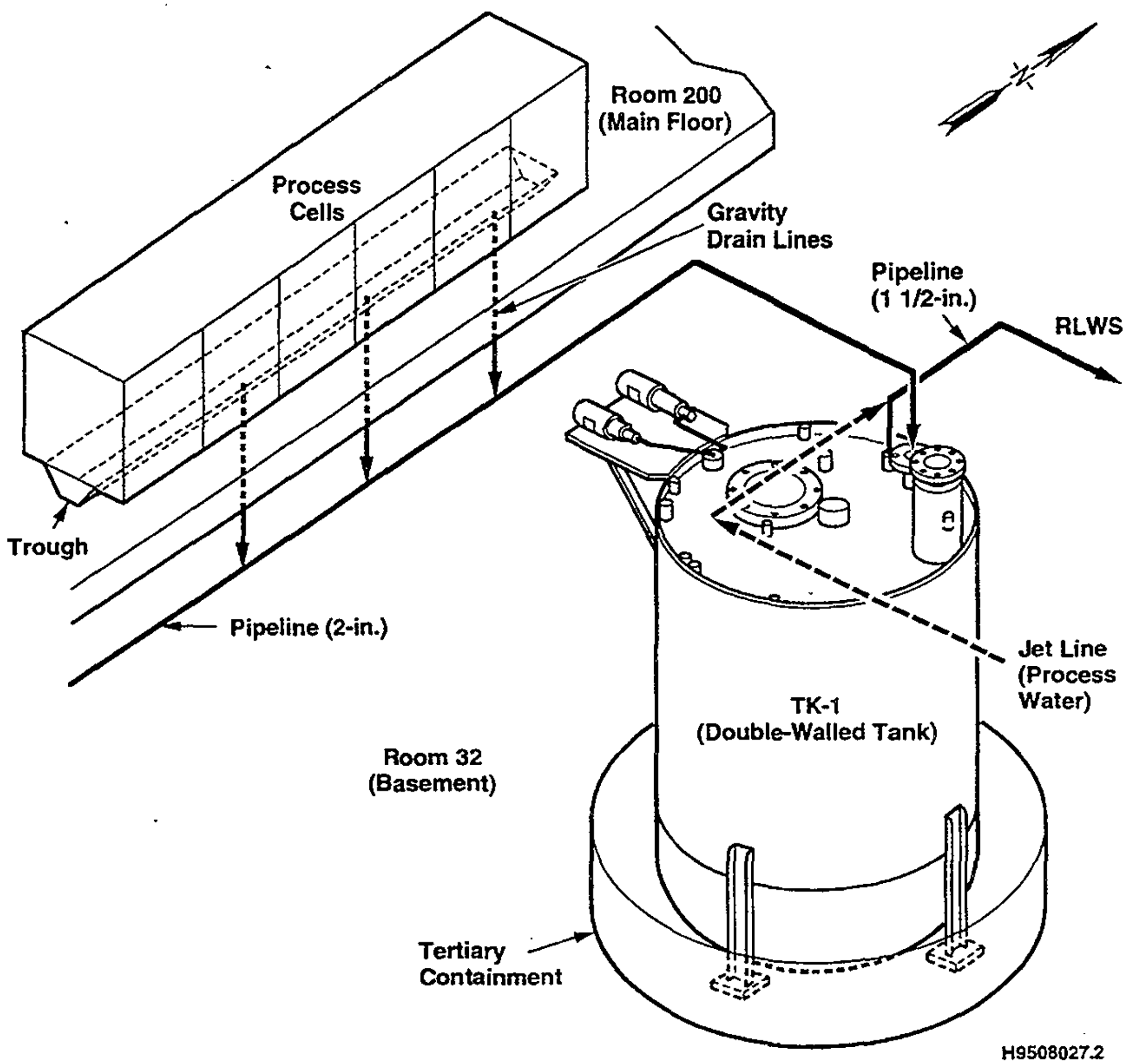
1 **Figure 2-4. 325 Building RWLS Modifications**

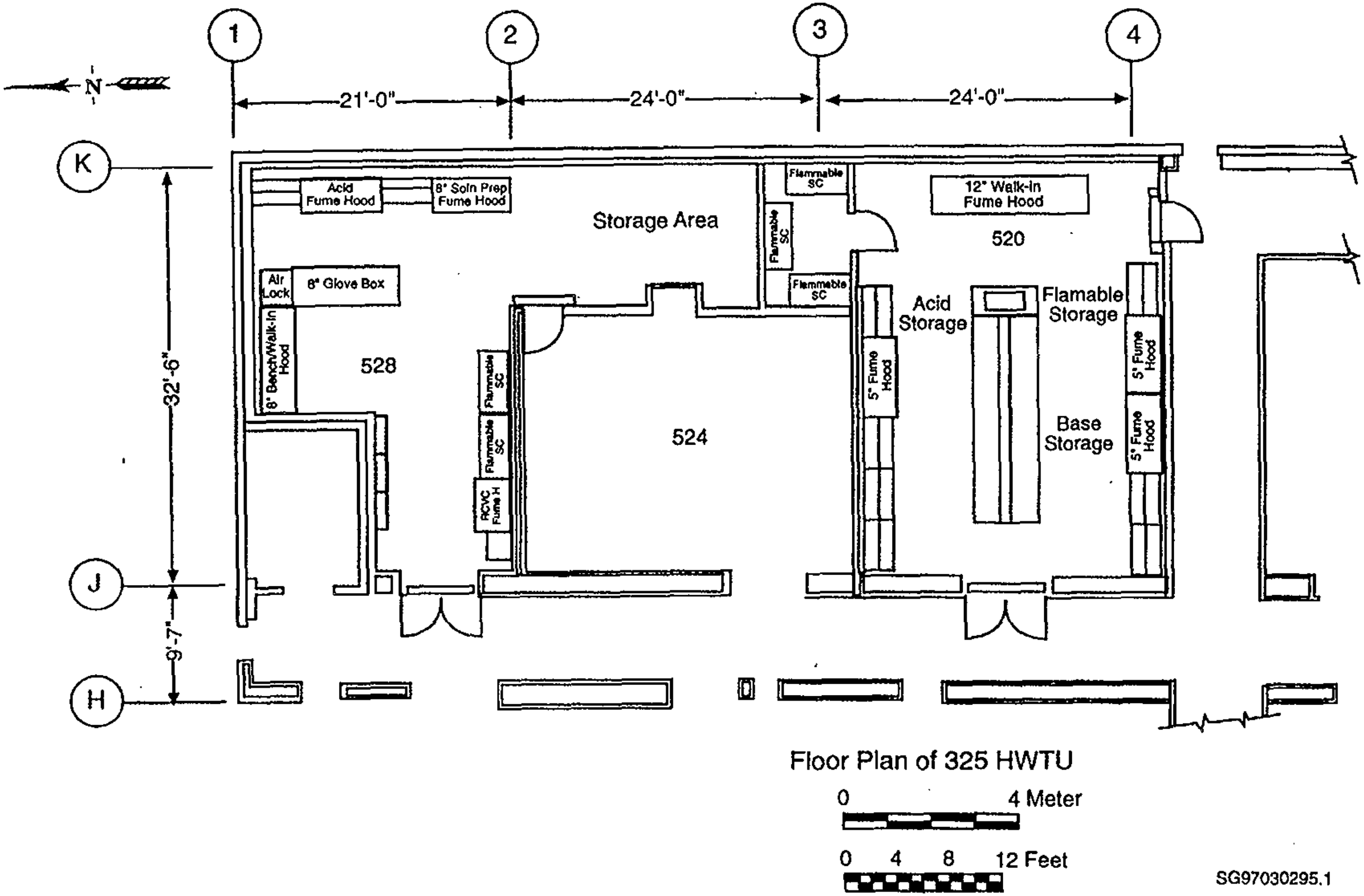
2



Basement Plan
Scale 1" = 61'

1 **Figure 2-5. Shielded Analytical Laboratory Tank**





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4.0 PROCESS INFORMATION [D]

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

4.1 CONTAINERS [D-1]

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 waste generated from onsite programs, primarily as a result of laboratory analytical activities in the 325 Building and other PNNL facilities. Descriptions of the containers used are provided in the sections that follow for the HWTU and SAL.

4.1.1 Description of Containers [D-1a]

The following sections describe the types of containers used for dangerous waste storage and treatment in the 325 HWTUs.

4.1.1.1 Containers Located in the Hazardous Waste Treatment Unit

Rooms 520 and 528 of the HWTU are used to store and treat dangerous waste generated primarily from laboratory operations 0throughout 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 in specifically designated areas based on the hazard classification.

4.1.1.2 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, 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 dangerous 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 reduce the hazard of the radioactive component of the dangerous waste stored in the container and are 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 to reduce the dose rate produced by the radiological component of the dangerous waste.

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 [D-1b]

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 and 528 is either picked up by HWTU personnel or moved to Rooms 520 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 or 528. 325 HWTUs staff move the dangerous containers in accordance with 325 HWTUs collection procedures that address safety and hazard consideration. These procedures cover various waste types (transuranic (TRU) and low-level) and transportation modes. 325 HWTUs staff do 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 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 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 to use professional judgment to determine whether the packaging could leak during handling, storage, and/or treatment. Container stacking is not performed.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections is in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Chapter 6.0, Section 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 are 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. 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. 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. Container stacking is not performed.

Inspection of Containers. A system of daily, weekly, monthly, and yearly inspections is in place to ensure container integrity, and to check for proper storage location, prevent capacity overrun, etc. Inspections are detailed in Chapter 6.0, Section 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 the radioactivity level of 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 Section 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 [D-1c].1.3

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 [D-1d and D-1d(1)(a)]

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 fire water containment system (Figure 4.1).

Mixed and/or 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 are stored in a hood located along the east wall of the room. 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 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 five storage cabinets, three for flammable waste and two for corrosive waste. Two cabinets (one flammable storage cabinet and one corrosive storage cabinet) are located along the north wall of the room. A cabinet for corrosive waste is located along the south wall. A cabinet for flammable waste also is 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.

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. In addition, because the floors are not sloped, waste containers stored on the floors are elevated or otherwise protected to prevent the container from coming in contact with spilled waste.

Major spills or leaks of liquid mixed waste flow into the fire water containment system. The fire water containment system consists of floor trenches located at each entrance to the rooms and the fire water 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 fire water containment tank.

The fire water 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 fire water 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 meter. 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 Section 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, 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 [D-1d(1)(b)

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 and 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 have been 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 any 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 fire water 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 the HWTU rooms 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 and 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 were to fail. Because the volumes of waste generated and stored are small, and because the hot cell floors are not sloped, any waste spilled during waste handling activities probably would remain in a localized area and be cleaned up expeditiously to ensure that no damage occurs to the stainless steel. As was previously discussed, the secondary containment system for the six cells is provided by a stainless steel tank. Liner and base requirements for the SAL tank are discussed in Section 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. In Room 200, the concrete slab is painted, and there is a trap door in the painted floor of Room 200 that enables transfer of equipment between Rooms 200 and 32. The air flow 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. All containers of dangerous waste are stored either in drums, on shelves within open-faced hoods, or within flammable or corrosives 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 drains across each exit drain spill to an emergency fire water containment tank (22,710-liter capacity) located in the basement of the 325 Building. All drained liquid is captured by the tank, 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 [D-1d(1)(c)

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 fire water containment tank provides secondary containment for both HWTU rooms. The capacity of the fire water 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 largest container of liquid waste to be stored in the hot cells is a 7.6-liter container.

The SAL tank is considered to be 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 each 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 vinyl tile. Floor drains flow to the retention process sewer (RPS) system, which has a diverter triggered by a radiation monitor that diverts radioactive liquids detected in the RPS line to the RLWS. 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. Any liquid that managed to flow to the room drains would be conveyed by gravity to the RPS system or, depending on radionuclide content, to the RLWS.

4.1.8 Control of Run-On [D-1d(1)(d)

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 possibility of run-on for the HWTU is mitigated by the 325 Building. 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 possibility of run-on for the SAL is mitigated by the 325 Building. 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 [D-1d(2)]

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 or Room 528 floor or within the fire water 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 fire water 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 the waste analysis plan, Appendix 3A. The tank is designed to allow easy access for material sampling. Depending on the results of the analysis, the collected spill material is pumped to the RLWS or pumped to the RPS.

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 Section 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 [D-1f(1) and D-1f(2)]

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 waste 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 waste 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 [D-1f(3)]

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, Section 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, Section 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, Sections 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. Radioactive and nonradioactive 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 are segregated in separate secondary containment.

4.2 TANK SYSTEMS

The following sections describe the management of dangerous waste in the 325 tank systems. Each tank system consists of the tank; associated piping, valves and pumps; and secondary containment. The first 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 Section 4.2.1. The second tank system is the RLWS load out tank system. This tank system will used to collect liquid waste discharged to the RLWS prior to being transferred to the DST System. Design for the RLWS load out tank system is scheduled for completion in September 1997 and construction is scheduled to be complete in fiscal year 1998. Currently, radioactive liquid waste is collected from the SAL tank and the HWTU and transferred to the 340 Building via the existing RLWS. There are no tanks associated with the existing RLWS. Once the RLWS modifications are complete, the RLWS load out tank system will be operated as described in Section 4.2.2.

4.2.1 Shielded Analytical Laboratory Tank System

The SAL is an analytical chemistry laboratory used primarily to prepare and analyze samples of dangerous waste streams for waste characterization. This work is conducted in six inter-connected hot cells that form the nucleus of the SAL. Liquid waste generated during these operations is collected, treated if necessary, and 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 batch transferred from the SAL tank to the radioactive liquid waste system. The SAL tank volume is 1,218 liters and has a throughput of 80,000 liters per year.

4.2.1.1 Design, Installation, and Assessment of Tank Systems [D-2a]

The following sections discuss the design and installation of the SAL tank and provides information on the integrity assessment.

4.2.1.1.1 Design Requirements [D-2a(1)]

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. All waste is treated or reacted before introduction into the tank to meet RLWS waste acceptance criteria.

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. Appendix 4A contains engineering drawings.

Solution enters the tank through a gravity flow, welded drain line piped from the hot cells. The SAL sources that tie into this drain pipe include 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. Waste solution is pumped from the SAL tank to the RLWS by either a transfer gear pump or a water jet, both of which are located on top of the tank. Both the transfer pump and jet suction lines drop down vertically through the top head to the bottom head and are bent to the center of the tank to minimize the remaining liquid heel when transferring the liquid to the RLWS. The transfer pump is a gear pump with 30 liter per minute capacity at 9 meter water head with 1.5 meters suction head. A flow indicator/totalizer is located on the upstream process water line to be used to verify process water flow during water jet transfer operations. A second, smaller sample pump also is located above the tank. The sample pump provides for solution transfer to the sample station located just north of the tank system. The operators draw a sample at the ventilated sample hood by opening a small sample valve. The sample pump is a gear pump with 3.8 liter per minute capacity at 1.5 meter water head with 1.5 meters suction head. Both gear pumps have magnetic drives to avoid shaft leakage. The discharge piping from each pump has a pressure relief valve installed to protect the gear pumps. The discharge piping from the pressure relief valve is piped back into the tank to contain the solution. 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 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 should occur after normal working hours, 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 de-energize 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 [D-2a(2) and D-2a(3)]

An independent, qualified, registered professional engineer's tank integrity certification has been completed and will be submitted as a separate document.

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 [D-2b(1), D-2b(2)(b), and D-2b(2)(c)]

The secondary containment system for the SAL Tank in Room 32 consists of two components: (1) the SAL tank is a double-walled vessel and the outer tank provides secondary containment for the inner tank; and (2) 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 drain pipe 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. For the existing RLWS, the transfer piping from the SAL tank to the 340 Building is single-walled, welded stainless steel pipe from the tank to the 325 Building boundary and double-walled stainless steel pipe from the RLWS tank to the cask loading station 325 Building boundary to the 340 Building. The modified RLWS system will utilize the single-walled, welded stainless steel pipe from the SAL tank to the RLWS load out tank, and a new double-walled stainless steel pipe will be used to transfer waste from the RLWS load out tank to the truck lock. New double-walled piping will also be installed to extend the drain line from Room 32 to the RLWS load out tank. Refer to Figure 2.3b for a schematic of the modified RLWS load out tank system. The welded single-walled transfer piping is visually inspected for leaks within 24 hours of a transfer. 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 and can also be moved to and operated in Room 201. The following is the system description.

<u>Materials of construction.</u> 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.

<u>Strength of materials</u>. 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). Also, 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 an 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 annulus that extends to the bottom and is capped at the top of the tank. 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 the liquid into the RLWS transfer line.

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 are allowed. The pumps are magnetic coupling pumps located above the pan. All material of construction is stainless steel; for 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.

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 [D-2d]

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. Once the SAL tank contains sufficient volume, the tank's solution is prepared for transfer to the RLWS. After waste characterization is completed, the transfer to the RLWS is initiated by following internal TSD procedures. Once started, the transfer continues until a low-level condition automatically stops the transfer pump or until it is stopped by operator action. The solution can be transferred to the RLWS by either the transfer gear pump or by the water jet. Currently, the RLWS piping is a 316L stainless steel single-walled pipeline inside the basement from the SAL tank to the boundary of the 325 Building; once outside the 325 Building, this piping becomes a double-contained pipeline. Once the RLWS modifications are complete, the piping from the SAL tank to the RLWS load out tank will be single-walled 316L stainless steel, while the piping from the RLWS load out tank to the truck lock will be double-walled 316L stainless steel.

4.2.1.4 Marking or Labeling [D-2e]

Due to the high radiation levels associated with the SAL tank, the tank itself is not labeled. The tank is located in a locked room to prevent unnecessary radiation exposure. 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 radioactivity, criticality, and hazard concerns.

4.2.1.5 Ignitable, Reactive, and Incompatible Waste [D-2h]

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 radiation, 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.

The following factors will ensure a safe and reliable tank system with regard to ignitable, reactive, and incompatible waste: the tank system operates at ambient temperatures and pressures; all waste added to the tank meets the RLWS waste acceptance criteria; the tank construction material is stainless steel; and the operators are trained in the applicable procedures and have past operating experience.

4.2.2 Radioactive Liquid Waste System Load Out Tank System

The RLWS load out tank system modification is scheduled to be complete in FY 1998. This tank system will be placed in service prior to closing the 340 Building. Information provided in this permit application is based on information available in the conceptual design phase. Slight modifications to the design may be required as the final design is completed. All design changes will comply with the tank systems regulations in WAC 173-303-640.

The 340 Facility is scheduled for deactivation; therefore, the RLW will be collected and transported to the DSTs via an approved cask system when deactivation occurs. The RLWS load out tank system modifications include installing a tank system in the basement of the 325 Facility to collect radioactive liquid waste rather than directly piping the waste to the 340 Facility. The 325 Facility is expected to continue to generate approximately 5,678 to 7,570 liters of radioactive liquid waste each year. The tank will sit below the basement floor in a tank pit.

4.2.2.1 Design, Installation, and Assessment of Tank Systems [D-2a]

The following sections discuss the design of the RLWS load out tank system. Information on the integrity assessment will be provided when complete in accordance with WAC 173-303-640 and 810.

4.2.2.1.1 Design Requirements [D-2a(1)]

The RLWS tank will be constructed of 316L stainless steel. This material is compatible with any of the dangerous waste that is discharged to the tank. Waste in the RLWS tank will be treated or reacted, if needed, to protect the tank integrity.

The RLWS load out tank system design will be 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 before operations begin. The professional engineer evaluation will be included in the tank integrity assessment.

The RLWS tank will be a vertical single-shell tank supported by multiple legs and stand approximately 2.4 meters in height and 2.4 meters in diameter. The tank will have a welded construction of 316L stainless steel and sit approximately 15.2 centimeters above the floor in the tank pit with a formed bottom to minimized a heel in the tank. The tank will be located inside a concrete pit below the basement floor. The tank pit will be lined with a stainless steel liner on the floor and approximately 0.6 meters up the walls to allow for a secondary containment capacity of at least 100% of the tank. Sealant will be placed along the walls at the end of the liner, and the remaining portion of the concrete pit walls will be painted with a chemically resistant coating. A concrete shielding cover will be placed over the pit. A tank control room will be constructed of steel studs and gypsum and located on the west side of the tank pit.

The primary tank control panels will be located in the control room, and secondary control panels will be located in the truck lock, Room 601, Room 201, and in the operator's office. Conductivity probes will be installed in the tank at 305 mm intervals. Signals from the probes will indicate the liquid level in the tank by signal lights on all control panels. Other signals from the conductivity probes will alarm high liquid level by a signal light on each control panel plus sound on the panel in the operator's office.

Liquid waste will enter the RLWS tank through gravity flow piping. A mixing pump system will be installed to provide agitation of the tank contents. Mixing pump system controls will be installed on the control panel in the control room.

Samples will be collected prior to transferring the waste from the RLWS tank to the DST System. A sampling pump and recirculating loop will be installed on the tank. A small sample hood will be located in the control room. Controls for the sample hood will be located near the sample hood. This hood will be connected to the HEPA filtered exhaust system.

4.2.2.1.2 Integrity Assessments [D-2a(2) and D-2a(3)]

An independent, qualified, registered professional engineer's tank integrity certification will be completed and provided to Ecology before the tank system begins operation.

4.2.2.2 Secondary Containment and Release Detection for Tank System [D-2b]

This section describes the secondary containment systems and leak detection systems to be installed in the RLWS load out tank system.

4.2.2.2.1 Requirements for Tank Systems [D-2b(1), D-2b(2)(b), and D-2b(2)(c)]

The secondary containment system for the RLWS tank will consist of the stainless steel liner in the bottom of the concrete tank pit and 0.6 meters up the tank pit walls. The remaining portion of the concrete walls will be painted with a chemically resistant coating and the boundary between the steel liner and the coating will be sealed.

The welded single-walled transfer piping will be visually inspected for leaks within 24 hours of a transfer. The 325 Building provides additional containment. The basement floors are concrete, and any liquid release remains in the immediate area until cleanup.

The transfer piping from the SAL tank to the RLWS tank is single-walled, welded stainless steel pipe. Sections of the RLWS load out tank system piping will have secondary containment where feasible. Secondary containment for the piping system will consist of double-walled stainless steel pipe with sensors in the annulus. Secondary containment piping will be installed on the new line from Room 40A to the RLWS waste tank. Secondary containment piping will also be installed on the line between Room 528 and the RLWS tank and from the RLWS tank to the cask loading station.

4.2.2.2.2 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 will be able to detect and collect releases of accumulated liquids. Remote television cameras will provide a surveillance system for the tank, ancillary equipment, and general viewing of the tank pit. Viewing screens and controls will be located in the control room. The following is the system description based on conceptual design.

<u>Materials of construction.</u> The tank and components will be 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, and the chloride ion concentration averages less than 0.01 Molar.

<u>Strength of materials.</u> The system design will be 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 before operations begin.

<u>Strength of foundation.</u> The system design will be 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) before operations begin. This ensures that the foundation is capable of providing support to the tank and will resist settlement, compression, or uplift.

<u>Leak detection system description.</u> Conductivity probes will be installed inside the single-walled tank to detect the liquid level in the tank. Any leaks from the tank will be collected in the stainless steel lined tank pit. Liquid sensing tape will be installed in the bottom of the tank pit to detect any leak of liquid

from the primary containment. If liquid is detected, alarms will sound immediately in a local control panel and in the operator's room.

Removal of liquids from secondary containment. The tank secondary containment, the lined tank pit, is designed to contain a liquid leak from the tank 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 and the DST personnel. A dip tube will be installed in the tank pit that extends from the bottom of the pit to the tank control room and is capped at the top. If liquid were detected in the tank pit, the liquid will be removed by connecting a transfer pump to the dip tube. Any liquid removed from the secondary containment would be transferred to the DSTs in a manner consistent with the transfer of waste from the RLWS tank to the DSTs.

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 the tank pit.

4.2.2.2.3 Secondary Containment and Leak Detection Requirements for Ancillary Equipment

Secondary containment for the RLWS load out tank system ancillary equipment will be provided by the lined tank pit, double-walled piping, and daily visual inspection during use of the entire system including the existing single-walled piping. All material of construction will be stainless steel; for welded parts the material is 316L stainless steel. Stainless steel material is compatible with the expected corrosive, dangerous, and mixed waste stored in the tank. The strength and thickness of the piping, equipment supports and secondary containment are designed to onsite standards that take into account seismic requirements for the region and corrosion protection. The entire system will be 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 tank pit has a liquid element sensor that alarms immediately at the main control panel should any leakage be detected. The tank pit will hold the total capacity of the 11,355-liter 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.

4.2.2.2.4 Controls and Practices to Prevent Spills and Overflows

The RLWS load out 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 will be provided with redundant-level instrumentation to monitor tank levels. Conductance-level probes will be used for level monitoring and alarming, and a secondary tank level monitoring system will be provided. The tank will alarm on high level and interlock the process water to fail close.

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.

4.2.2.3 Tank Management Practices [D-2d]

The RLWS tank will be installed in an existing pit in the basement, entirely below grade. The top of the tank will be shielded by a concrete deck on top of the pit. The deck will be constructed of multiple stepped cover blocks to simplify installation/removal.

The single wall vertical tank is supported by multiple legs. Secondary containment is provided by lining the lower portion of the tank pit. The stainless steel liner will be sealed to the pit wall, and the wall above the liner will be coated with a chemical-resistant material. The tank will be operated near atmospheric pressure and vented through HEPA filters.

The primary panel in the control room is adjacent to the tank pit. Other Liquid level monitoring panels will be located in Room 601, 325A truck lock, Room 201, Room 527 and the power operator's office. The tank will be monitored with two liquid level instruments, and meters/indicating lights will be provided in all control panels. Several of the panels have high liquid level alarms. These alarms will be audible or visual, depending on location.

There will be a leak detection system for the double walled piping and the tank pit liner. Liquid sensing cable will be connected to alarms in the operator's office. There will be remotely operated TV cameras in the pit to inspect the tank and the liner. These cameras will be viewed by operators when performing the daily inspection of the tank for evidence of corrosion and releases of dangerous waste.

Because liquid waste is generated in a batch mode, waste drained to the RLWS tank will be effectively controlled through operating and administrative procedures in order to prevent high-level-alarm conditions. When there is an alarm, a safety cutoff system will shut off all incoming process water lines.

A backup tank system was determined to be unnecessary because of the presence of tank monitoring devices and the use of administrative and operational (batch-processing) controls.

Liquid waste will be transported from 325 Building to DSTs using the cask system. The 325A truck lock has been modified to handle the cask system. There will be a transfer line with secondary containment in 325 Building between the tank and the truck lock. A pump or other means will be used to transfer the waste from the RLWS tank to the truck lock.

Prior to transferring waste from the RLWS load out tank, responsible personnel will schedule the cask system for a waste transfer. A small quantity of waste will be obtained for characterization using a sample pump and small hood. The cask system will be positioned in the 325A truck lock. Transfer of the waste to the cask system will be performed in accordance with 325 Building and approved cask system procedures.

4.2.2.4 Marking or Labeling [D-2e]

Due to the high radiation levels associated with the RLWS tank, the tank itself will not be labeled. The tank will be located below grade in a sealed pit. Access points to the tank pit will be labeled to meet the requirements of WAC 173-303-395. The marking of the access points will be legible from a distance of 15 meters and identify the waste. The label will adequately warn employees, emergency response personnel, and the public of the major risks associated with the waste being stored within the tank. The tank will also have a written placard identifying important radioactivity, criticality, and hazard concerns.

4.2.2.5 Ignitable, Reactive, and Incompatible Waste [D-2h]

Many different types of samples and waste materials will be brought to the SAL hot cells, and the HWTU. 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 radiation, corrosive/flammable chemicals, and hazardous chemicals.

Prior to transferring wastes to the RLWS system, the wastes are evaluated to ensure compatibility with the system and to preclude introduction of flammable or reactive waste in order to protect the integrity of the new RLWS tank. The RLWS load out tank system will be equipped with treatment capabilities including neutralization and chloride removal. These treatment systems will include chemical additive tanks and a tank agitator.

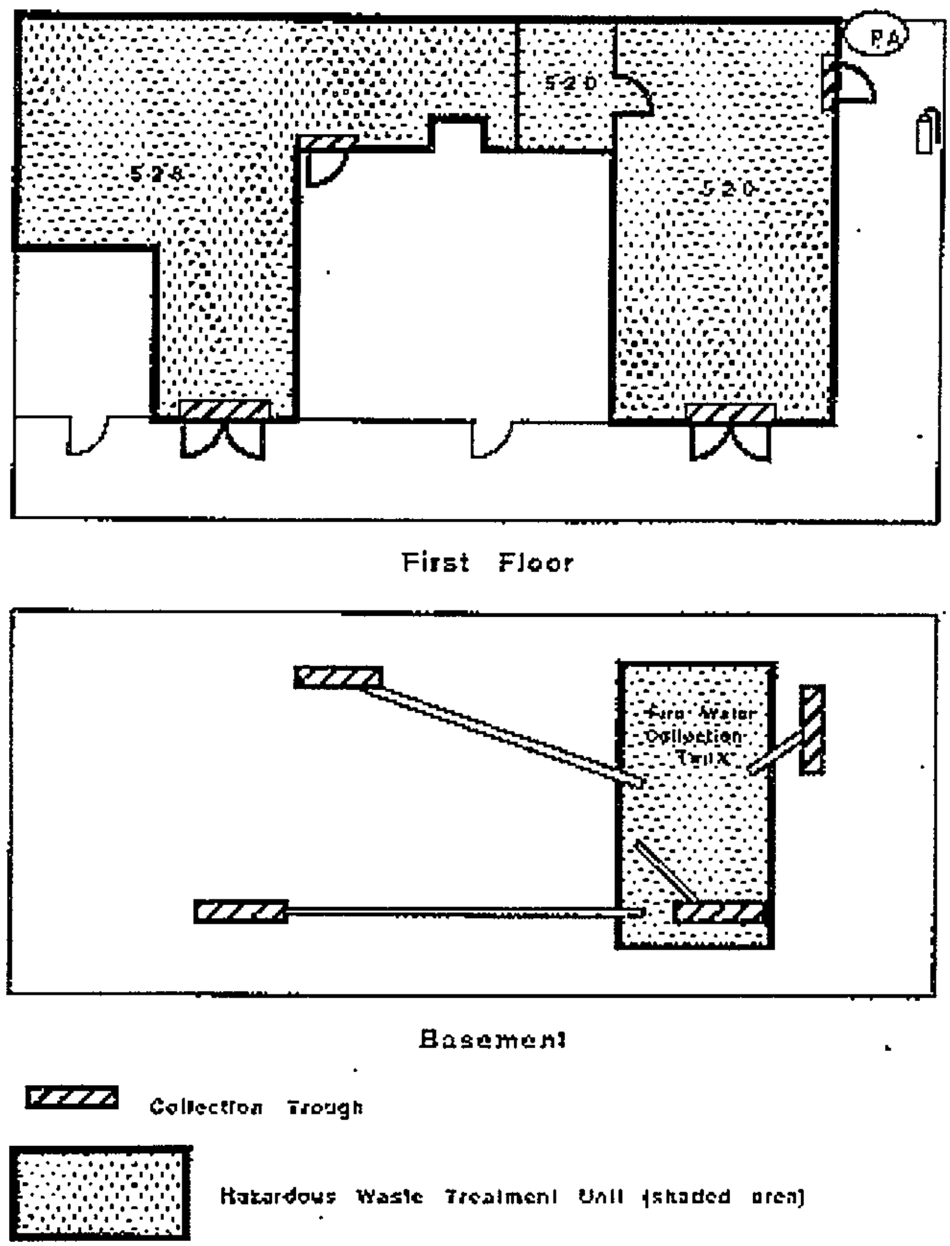
Based on analytical results and process knowledge of the 325 laboratories generating the waste, treatment of the SAL generated waste prior to discharge, and agitation and treatment capabilities in the RLWS tank, waste solutions are not expected to be ignitable, reactive, or incompatible.

The following factors will ensure a safe and reliable tank system with regard to ignitable, reactive, and incompatible waste: the tank system operates at ambient temperatures and pressures; all waste added to the tank meets the RLWS waste acceptance criteria; the tank construction material is stainless steel; and the operators are trained in the applicable procedures and have past operating experience. Closure of the RLWS tank is addressed in Section 11.4.

4.3 AIR EMISSIONS CONTROL [D-8]

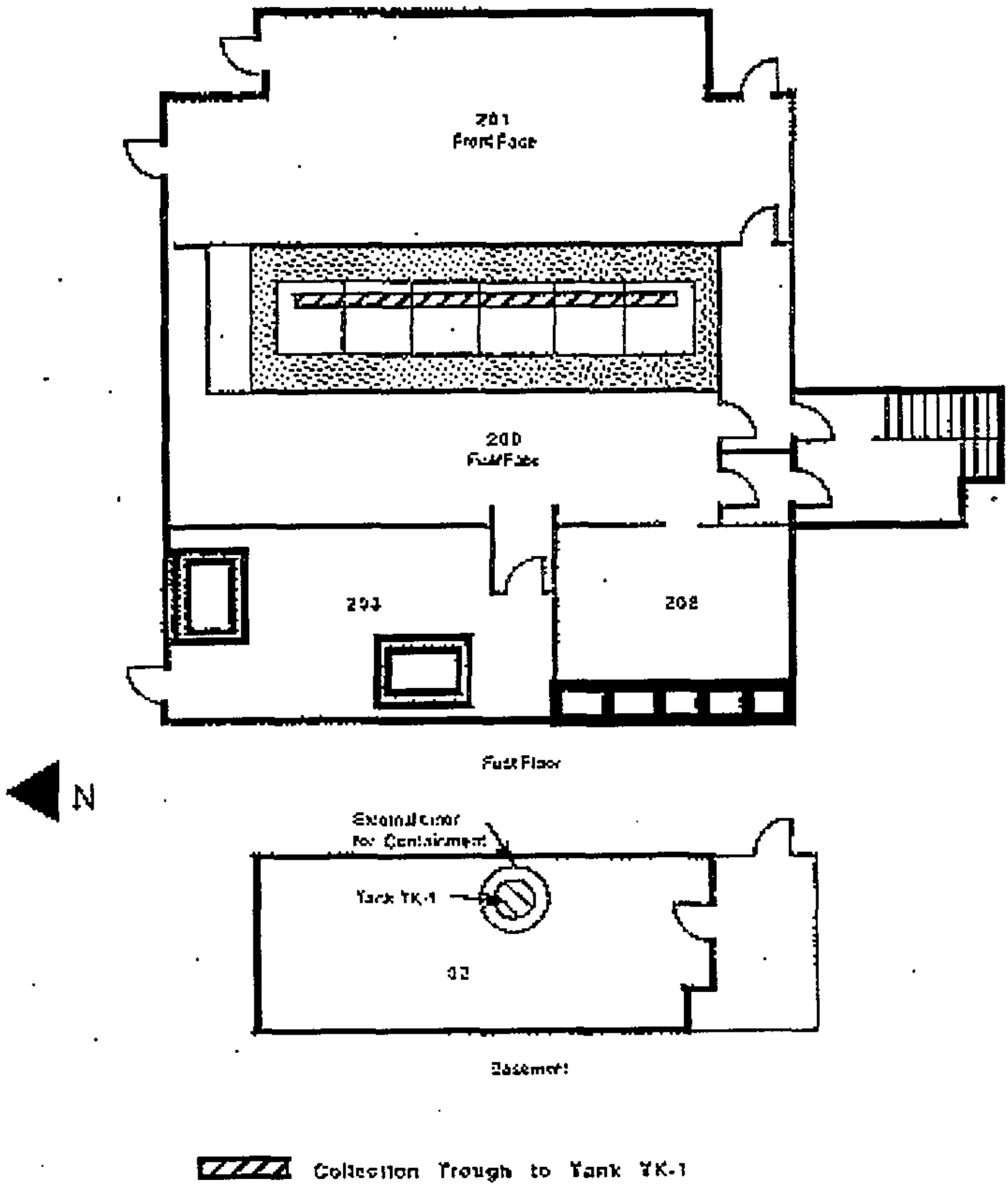
The air emissions standards on 40 CFR 265, Subpart AA and BB, do not apply to any part of the 325 HWTUs. Containers in the 325 HWTUs are primarily managed as mixed waste. Such containers are exempt from 40 CFR 264, Subpart CC by 40 CFR 264.1080(6).

1 **Figure 4-1. Hazardous Waste Treatment Unit Secondary Containment System.**



990521.1245

Figure 4-2. Hot Cell Secondary Containment System.



990521.1243

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

APPENDIX 4A

Engineering Drawings

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6.0 PROCEDURES TO PREVENT HAZARDS [F]

The 325 HWTUs are operated to minimize exposure of the general public and operating personnel to dangerous wastes.

6.1 SECURITY [F-1]

The following sections describe the security measures, equipment, and warning signs used to control entry to the 325 HWTUs.

6.1.1 Security Procedures and Equipment [F-1a]

The following sections describe the 24-hour surveillance system, barrier, and warning signs used to provide security and control access to the 325 HWTUs.

6.1.1.1 24-Hour Surveillance System [F-1a(1)]

The entire Hanford Facility is a controlled access area [refer to General Information Portion (DOE/RL-91-28)].

6.1.1.2 Barrier and Means to Control Entry [F-1a(1)(a), (1)(b)]

The entire 300 Area is surrounded by a 2.4-meter chain link fence topped with three strands of barbed wire. There is no separate fence surrounding the 325 Building.

Entry to the 325 Building is indirectly controlled at all entry points to the 300 Area. Both active and passive controls are in place. Trespass warning signs are posted at all entry points. The Hanford Patrol periodically spot checks traffic entering the 300 Area. Entry to the 325 Building is controlled through the use of locked entrances with contact of 325 staff required for building access. The 325 HWTUs also are kept locked at all times. Access and access records to the 325 HWTUs are maintained by PNNL Security. The BED or designee has access to the 325 HWTUs and can provide access in an emergency. Personnel in possession of keys have been instructed to admit only persons having official business. All visitors to the 325 HWTUs must be escorted by HWTUs personnel.

Personnel have pedestrian access to the 325 Building through multiple pedestrian gates. For access, all persons must have a valid U.S. Department of Energy-Richland Operations Office (DOE-RL) security badge or temporary badge with proper escort. There is no general, authorized public access to the 325 Building.

6.1.1.3 Warning Signs [F-1a(2)]

Signs bearing the legend "DANGER--UNAUTHORIZED PERSONNEL KEEP OUT," or an equivalent legend, are posted at each entrance of the 325 HWTUs. The signs are in English, legible from a distance of 7.6 meters, and visible from all angles of approach. In addition to these signs, the fence around the 300 Area is posted with signs, printed in English, warning against unauthorized entry. These signs are also visible from all angles of approach.

6.1.2 Waiver [F-1b]

Waiver of the security procedures and equipment requirements for the 325 HWTUs are not requested. Therefore, the waiver requirement outlined in WAC 173-303-310(1)(a) and (b) are not applicable.

6.2 INSPECTION PLAN [F-2]

The purpose and intent of implementing inspection procedures at the 325 HWTUs are to prevent malfunctions, deterioration, operator errors, and/or discharges that might cause or lead to the release of regulated waste to the environment or threats to human health. A system of daily, weekly, and monthly, inspections involving various PNNL departments and levels of management has been implemented at the 325 HWTUs. The Hanford Facility 300 Area Fire Department performs a once-every-four months inspection of the fire suppressant and notification systems and annually an inspection of the sprinkler systems.

6.2.1 General Inspection Requirements [F-2a]

The content and frequency of inspections performed at the 325 Building are described in this section. Also described is maintenance of inspection records.

Observations made and deficiencies and corrective actions noted during an inspection are recorded on the inspection checklist. The checklist includes the inspector's printed name, signature, date, and time. Once approved, the checklist is kept in 325 HWTUs files. The inspection records and dates are used to help determine any necessary corrective actions. Problems identified during the inspections are prioritized and addressed in a timely fashion as appropriate to mitigate health risks to workers, and to maintain integrity of waste management units.

6.2.1.1 Types of Problems [F-2a and F-2c]

Daily, weekly, monthly, quarterly, once every four months, and annual inspections are performed at the 325 HWTUs. The types of problems addressed by each of these inspections are described as follows.

Daily Inspections.

The 325 HWTUs staff perform daily inspections whenever waste packaging, transfer, shipping, or movement operations are conducted. HWTU personnel monitor container condition and integrity, the building waste containment system, and other building areas daily where waste is handled. Specific inspection points include, but are not limited, to the following:

- Container integrity
- Mislabeled or opened containers
- Improper storage (e.g., incompatible waste storage)
- Disorderliness or uncleanliness of storage unit
- Accumulation of waste in containment systems.

Results of these daily inspections are documented as part of the 325 HWTUs operating record.

Weekly Inspections.

The 325 HWTUs personnel conduct weekly inspections of both safety and operating equipment in the 325 HWTUs. Safety and emergency equipment are inspected for functionality and adequacy of supply. The weekly inspection usually is conducted on or before the last workday of each week and covers the same inspection points as the daily inspections (Section 6.2.1.1.1). Results of these weekly inspections are documented as a part of the 325 HWTUs operating records.

Monthly Inspections.

Monthly oversight inspections are conducted by 325 HWTU's line management or their designees. These monthly inspections are conducted on or near the last workday of each month. Items targeted for monthly inspections include, but are not limited to, equipment function and condition, housekeeping, chemical inventory, weekly inspections and corresponding corrective actions, safety equipment operation, spill control and cleanup supplies, and general packaging material inventory. Inspection reports are part of the 325 HWTUs operating records.

Quarterly, Once Every Four Months, and Annual Inspections.

The Hanford Facility 300 Area Fire Department performs a once-every-four-months inspection of fire suppressant and notification systems (i.e., sprinkler system and fire alarm pull boxes). This inspection includes flow tests of the sprinklers to ensure that there is no blockage in the system lines; the alarm system is activated to ensure proper pull box operation. Annually, the Fire Department performs a full inspection of the sprinkler system, smoke detectors, heat detectors, and pull boxes. A complete flow test of the sprinkler system is performed from the furthest valve to ensure proper flow through the entire system. Fire extinguishers also are checked for proper pressure and function. Records of these fire inspections and their results are retained by the Hanford Fire Department.

Additional documented inspections are performed quarterly of the emergency eyewash/shower units, the fume hoods, and other ventilation system components. Records of these safety equipment inspections and the results, as well as documentation of any required corrective actions, are maintained by the appropriate facilities and operations staff.

6.2.1.2 Frequency of Inspections

The frequency of inspections is based on specific regulatory requirements and on the rate of possible deterioration of equipment and probability of environmental or human health incidents.

Areas where dangerous and mixed waste are actively handled, including all of the hot cells, the front and back face of the SAL, Rooms 520 and 528 in the HWTU, and the visible single wall transfer piping associated with the RLWS are considered to be areas subject to spills. These areas are given daily inspections when in use as required by WAC 173-303-320(2)(c).

The primary and secondary containment systems (i.e., floors, troughs, and sumps) are inspected daily when in use for accumulation of spilled material. The containment systems are inspected weekly for structural integrity (i.e., no cracks, gaps, leaks that could result in environmental release of wastes in the event of a spill). This frequency is based on the need to perform timely corrective actions in the event that problems are noted.

Aisle space between containers is inspected weekly when applicable. As the objective of the aisle space requirements is to allow for unobstructed movement of personnel and equipment in case of an emergency, the aisle space requirements do not apply to the hot cells, shielded cubicles, or storage cabinets. If quantities of waste are packaged in large containers or drums, temporarily stored before a transfer, a minimum aisle space of 76 centimeters is maintained in accordance with WAC 173-303-340(3), As-Low-As-Reasonably-Achievable (ALARA) concerns, and with applicable standards of the Uniform Building Code and Life Safety Code. Weekly inspections, where applicable, allow container spacing problems to be identified and corrected.

Emergency and safety equipment and personal protective equipment are inspected weekly. This frequency ensures that this equipment always is functional and is available in adequate supply.

6.2.2 Specific Process Inspection Requirements [F-2d]

The following sections detail the inspections to be performed at the 325 HWTUs.

6.2.2.1 Container Inspection [F-2d(1)]

Dangerous and mixed waste containers stored in the 325 HWTUs are inspected daily where waste handling activities are performed for leakage, evidence of damage or deterioration, proper and legible labeling, and proper lid and bung closure. Any observations made during the inspections, including any repairs or remedial actions taken, are documented in the logbook with the date, time, and printed name and signature of the inspectors. This logbook is maintained in the 325 HWTUs for at least 5 years from the dates of the inspections. All areas subject to spills are inspected daily when in use. Structural integrity of the containment systems is checked weekly.

6.2.2.2 Tank System Inspection [F-2d(2)]

The Shielded Analytical Laboratory (SAL) tank located in Room 32 is used to store mixed waste generated as a result of waste treatment activities. The RLWS load out tank planned to be located in the 325 basement tank pit will be used to store mixed waste discharged to the RLWS from the SAL tank, the HWTU, and slab tanks in Room 40. Routine inspections of the SAL tank system and the RLWS load out tank system are conducted in accordance with WAC 173-303-640. Routine inspections of the RLWS load out tank system will also be conducted in accordance with WAC 173-303-640 once operations begin. Inspections involve a combination of visual, mechanical, and electronic means. Due to ALARA considerations, visual inspections of the tank system may be conducted by remotely operated cameras mounted in Room 32 and the tank pit. These visual inspections are limited to areas of the tank system that can be observed by the camera. A very small portion of an RLWS line associated with the SAL tank system is not directly visible via the camera system, but is inspected indirectly with the camera using a mirror, and during periodic entries into Room 32. A logbook or inspection sheet of all inspections is maintained in the operating record for at least 5 years from the date of the inspection.

Tank System External Corrosion and Releases.

Aboveground portions of the SAL tank and the RLWS load out tank system are inspected each operating day to detect corrosion or releases of waste.

Tank System Construction Material and Surrounding Area.

The SAL tank is double-walled and constructed of corrosion-resistant stainless steel, with a capacity of 1,218 liters. The secondary wall is a cylindrical stainless steel tank that provides secondary containment sufficient to contain 100 percent of the inner tank volume. The construction materials of the tank and the area immediately surrounding the externally accessible portion of the tank system, including the secondary and tertiary containment systems, are inspected during use to detect erosion or signs of releases of mixed waste (e.g., wet spots).

The RLWS tank will be single-walled and constructed of corrosion- resistant stainless steel with a capacity of approximately 11,355 liters. The tank pit will be lined with stainless steel providing secondary containment sufficient to contain a minimum of 100 percent of the tank volume. The stainless steel liner will be sealed to the pit wall, and the wall above the liner will be coated with a chemical-resistant material. The construction materials of the tank and the area immediately surrounding the tank system, including the secondary containment systems, will be inspected by remote cameras during use to detect erosion or signs of releases of mixed waste.

Any deteriorations or malfunctions observed during inspection of the tank systems will be corrected. As applicable, any release to the environment is reported within 24 hours to Ecology, as identified in WAC

173-303-640(7)(d)(ii); and to the National Response Center, as identified in 40 CFR 302 for any detected leaks.

Tank System Overfilling Control Equipment.

The tank controls for the SAL tank include two high-level alarm systems that respond to overfill conditions. The initial tank high-level alarm is activated by a conductivity probe, the second by a capacitance probe. The conductivity probe high-level alarm and associated functions can be tested electrically by depressing a button on the main control panel in Room 201. Activation of this alarm results in a visible red light and audible alarm on the main control panel in Room 201, an alarm condition on the annunciator panel on the second floor of the 325 Building, and closure of electric solenoid valves on all inlet water supply lines to the hot cell area and tank system. Activation of the capacitance probe alarm results in a red light and audible alarm.

The tank controls for the RLWS tank will include conductivity probes that measure the liquid level inside the tank. Liquid sensing cable will also be located in the lined tank pit to detect any liquid in the secondary containment.

Tank System Monitoring and Leak Detection Equipment.

The leak detection conductivity probe for the SAL tank is located between the primary and secondary shells of the double-walled tank. The leak detection probe signal activates if any liquids collect in the annulus between the two walls of the tank. The leak detection probe can be functionally tested electrically by depressing a test button on the main control panel in Room 201. Leaks in the RLWS tank will be detected by liquid sensing cable. Liquid sensing cable will be located in the stainless steel lined tank pit to detect any liquid in the secondary containment that may have leaked from the tank. There will also be a method to test the liquid sensing cable circuits from the control room.

6.2.3 Inspection Log [F-2b]

Copies of the completed inspection checklists are provided to operations personnel and maintained in the 325 HWTUs files. Any corrective actions noted or deterioration or malfunctions in equipment discovered by the inspector are delegated to responsible individuals in the operations group. Corrective actions identified must be completed within 2 weeks unless there is documentation and reason for further delay. Examples of problems that could be identified and the corresponding remedial action are listed in Table 6.1. Inspection reports and corrective action response documentation are retained at the 325 HWTUs for a minimum of 5 years.

6.3 PREPAREDNESS AND PREVENTION REQUIREMENTS [F-3]

The following section documents the preparedness and prevention measures taken at the 325 HWTUs.

6.3.1 Equipment Requirements [F-3a]

The following sections describe the internal and external communications and emergency equipment in use at the 325 HWTUs.

6.3.1.1 Internal Communications [F-3a(1)]

Internal communication systems are used to provide immediate emergency instruction to personnel in the 325 HWTUs. Internal communications address general emergencies that might occur in the 300 Area and the 325 Building, as well as specific emergencies that might occur. Personnel have access to these internal communication devices whenever waste is handled.

Because of the nature of activities that occur in the 300 Area, the potential exists for emergencies outside of the 325 HWTUs (e.g., criticality) that could impact operations and personnel. Fire alarm signals are located in each building throughout the 300 Area. The nearest emergency siren for "area evacuation" and "take cover" is located approximately 46 meters northwest of the 325 Building on top of the 326 Building and is audible in all parts of the 325 Building. Numerous criticality howlers (horns) are located throughout the 325 Building and are audible in all parts of the building.

Internal communications to provide emergency instruction in the event of an emergency in the 325 HWTUs and in the 325 Building are fire alarms, radiation alarms, differential pressure alarms (for the SAL), a differential pressure alarm in the glovebox in Room 528, leak detection alarms (for the SAL), a building-wide public address (PA) system, an intercom system (for the SAL), and telephones.

The fire alarms are used to provide notification for immediate evacuation of the 325 Building. The fire alarms are initiated on activation of the manual pull boxes, heat detectors, and the sprinkler system. Fire alarm pull boxes are located as indicated in Figures 6.1 and 6.2. Radiation and air monitoring systems with alarms are located in the 325 HWTUs. The PA system is used for building-wide broadcasting of verbal emergency instructions to 325 Building personnel. The telephone system is used to provide verbal emergency instructions to 325 HWTUs personnel. The telephones also can be used to verbally transmit emergency information to personnel outside of the 325 HWTUs and to request emergency services. A network of telephones is provided throughout the 325 Building. Locations of telephones within the 325 HWTUs are shown in Figures 6.1 through 6.3. In addition to the telephone communication system, personnel have access to hand-held radios. The radios are available from the Building Manager. All of the radios transmit at the same frequency and are capable of summoning the PNNL Single-Point Contact in case of an emergency (DOE/RL-93-75).

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There are two fire alarm pull boxes in the vicinity of the HWTU; one is located in the hall north of the entrance to Room 528, and one is in the hallway just east of the south entrance to Room 520. Rooms 520 and 528 are provided with smoke detectors that, upon activation, initiate the fire alarm system and close dampers between the two rooms and the corridor. Heat detectors are provided in the glovebox in Room 528. There are two fire alarm bells just outside the HWTU. These fire alarm bells are located north of the entrance to Room 528 in the hall and east of the south entrance to Room 520 in the hall.

Additionally, a fire alarm strobe is installed in Room. The locations of the fire pull boxes are shown in Figure 6.1.

An alpha radiation monitor, located near the glovebox in Room 528, is continually in use. When airborne contaminants or alpha radiation is detected, each of these monitors sounds a local alarm.

The glovebox in Room 528 is equipped with a differential air pressure alarm that monitors the glovebox for loss of negative pressure. If a loss occurs, a local alarm is sounded.

The PA system speakers are located in Rooms 520 and 528.

Shielded Analytical Laboratory

There are four fire alarm pull boxes provided in the SAL; three are in Room 201, and one is in Room 203. Additionally, a fire alarm pull box is located just outside of Room 32. Heat detectors are provided in the six large interconnected hot cells in the SAL. Several fire alarm bells are located throughout the 325 Building, including two fire alarm bells within the SAL (one each in Rooms 201 and 203). These alarms are audible at all locations within the SAL. The locations of the fire alarm bells are shown in Figure 6.2.

The SAL is equipped with a beta continuous air monitor, which sounds a local alarm if airborne beta contamination is detected outside of the hot cells. Additionally, the SAL is provided with an area radiation monitor. If the radiation level outside of the hot cells reaches a set point, a local alarm sounds to alert personnel.

The six interconnected hot cells in the SAL are equipped with a differential air pressure alarm that monitors the hot cells for loss of negative pressure. If a loss occurs, a local alarm is sounded.

A cable leak-detection system is installed in Room 200. The cable runs behind the back wall of all six hot cells. Liquid escaping from the hot cells on the rear face (Room 200) would contact the cable and automatically sound an alarm device in Room 201. This conductivity cable runs from the hot cells to the tertiary containment pan for the SAL tank in Room 32. Any release of the tank system contents to this pan, which contacts the cable, initiates the cable leak-detection alarm.

The SAL tank is equipped with a conductivity probe for leak detection within the annulus of this double-shelled tank. The tank also is equipped with a high-liquid-level alarm. In the event of an interstitial leak or overfilling, audible alarms sound at the SAL tank's main control panel in Room 201.

The PA system speakers are located in Rooms 200, 201, and 203. An intercommunication system supplies two-way voice communications among Rooms 32, 200, 201, and 201a.

6.3.1.2 External Communications [F-3a(2)]

As mentioned in Section 6.3.1.1, a fire alarm system and telephone network system are in place at the 325 HWTUs. Both systems can be used to summon emergency assistance. The fire alarm system summons direct response from the 300 Area Fire Station. The telephone system can be used to access the PNNL Single-Point Contact directly by dialing 375-2400 or by dialing the emergency number 911. For DOE-RL and other non-PNNL contractor personnel dialing 911 from onsite phones, the call goes directly to the Hanford Patrol, which in turn calls the PNNL Single-Point Contact. Locations of fire alarm pull boxes and telephones are given in Figures 6.1 through 6.3. Personnel on the premises have access to these external communication devices.

6.3.1.3 Emergency Equipment [F-3a(3)]

Emergency equipment available for trained 325 HWTUs personnel includes portable fire extinguishers, a fire suppression system, spill response equipment, and decontamination equipment.

With the exception of the hot cells, the entire building also is equipped with automatic sprinkler protection consisting of Schedule 40 steel pipe per ASTM A120 (ASTM 1991) and 150-pound malleable iron fittings per ANSI B16.3 (ANSI 1992). All components are UL-listed or FM-approved. The fire sprinkler system was designed and installed in accordance with NFPA 13 for "ordinary hazard" (NFPA 1996).

Absorbent pillows are capable of absorbing small quantities of spilled inorganic and organic liquids and can be used to contain temporarily any spills of these materials. Their rated absorption capacities range from 250 to 4,000 milliliters.

Mercury spill kits are capable of cleaning up to 25 milliliter of spilled mercury. Acid, caustic, and solvent spill kits contain the materials necessary to clean up small spills of acids, bases, and organic solvents. The absorbent kits in the SAL contain absorbent pads and other materials needed to temporarily contain and clean up small chemical spills.

The appropriate spill kits can be applied, respectively, to small acid and base spills for neutralization during cleanup efforts. The caustic neutralizer has similar capabilities for neutralizing small quantities of spilled bases. If needed, additional emergency equipment is provided by the Hanford Fire Department.

Hazardous Waste Treatment Unit

Two portable 4.5 kilogram ABC fire extinguishers are available adjacent to the HWTU as shown in Figure 6.1. The portable fire extinguishers are located in the hall between the entrances to Rooms 528 and 520 and in the hall south of the south entrance to Room 520.

Additionally, for decontamination of high levels of radioactivity, an emergency shower is located in Room 601, which is in close proximity to the HWTU. For chemical contamination needs, another emergency shower is located in the hall between the entrances to Rooms 520 and 528 (Figure 6.2). An emergency eye wash is located in Rooms 520 and 528. Any contaminated water will be contained and cleaned up in accordance with the 325 HWTU contingency plan. Effluents are managed via the RPS or RLWS.

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Four 9.0 kilogram ABC portable fire extinguishers are located in the SAL. Two portable fire extinguishers are located in Room 201, and Rooms 200 and 203 each have one portable fire extinguisher. Additionally, ABC dry chemical fire extinguishers are provided for each of the six large interconnected hot cells in Room 201. These extinguishers are mounted on the outside of each cell with the distribution system within the cells. The cell manipulator arms are used to direct the discharge at a fire within the cell.

Two emergency eye wash/showers are located in Rooms 200 and 201 (Figure 6.2). Any contaminated water will be contained and cleaned up in accordance with the 325 HWTU's contingency plan.

6.3.1.4 Water for Fire Control [F-3a(4)]

Adequate water volume and pressure are supplied by the five water pipelines that service the 325 Building for fire protection. Each of these lines is 15.2 centimeters in diameter.

Three fire hydrants are located in immediate proximity to the 325 Building; one is approximately 30.4 meters east of the southeast corner of the 325 Building; one is approximately 21.3 meters directly north of the northwest corner of the 325 Building, and one is 33.5 meters west of the southwest corner of the 325 Building. In addition, the 300 Area Fire Station is located within 0.4 kilometer of the building.

6.3.2 Aisle Space Requirements [F-3b]

Aisle spacing is sufficient to allow the movement of personnel and fire protection equipment in and around the containers. This storage arrangement also meets the requirements of the National Fire Protection Association and the Life Safety Code (NFPA 1994) for the protection of personnel and the environment. A minimum 76.0-centimeter aisle space is maintained between rows of containers as required by WAC 173-303-630(5)(c).

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

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

6.4.1 Unloading Operations [F-4a]

Procedures have been developed to prevent hazards and to minimize the potential for breakage, punctures, or the accidental opening of containers during the transfer of waste to the 325 HWTUs. All waste is inspected before acceptance to ensure that the waste is in appropriate containers and that the containers are in good condition. Inspection of containers before acceptance minimizes the potential for spills during unloading operations. The potential for spills during waste handling also is minimized through the use of appropriate container-handling equipment; small waste items can be unloaded by hand.

The volumes of dangerous waste entering and exiting the SAL are in relatively small containers (Chapter 4.0) and, have double containment because of the packaging requirements for the radioactive materials. Any spill from such containers will be contained and not released to the environment.

6.4.2 Run-off [F-4b]

The HWTU and SAL were designed to eliminate the likelihood of waste migration via run-off. Because the 325 HWTUs are enclosed completely (i.e., complete roof and no open walls), run-off of precipitation is not a factor. The following paragraphs address additional design features provided to eliminate the likelihood of run-off.

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The concrete floor of the HWTU is provided with a chemical-resistant polypropylene coating. The coating covers the entire floor and extends approximately 10 centimeters up on each perimeter wall in each room. The rooms also are provided with floor drains and floor trenches at each entrance. The trenches and floor drains flow into the fire water containment tank located in the basement of the 325 Building. The management of any mixed waste that might accumulate in the tank as a result of a fire is discussed in Chapter 4.0.

<u>Shielded Analytical Laboratory</u>

The secondary containment in the SAL is divided into three systems based on three designated areas of the SAL. These areas are the six large, interconnected hot cells, the front side of the SAL, and the back side of the SAL.

The secondary containment system for the six large, interconnected hot cells involves the use of a pan-type container in which the primary liquid container is placed during an operation. This outer container contains any liquid spill or leak from the primary container during the operation. In addition, the base of the cell is constructed of stainless steel with a 15.2-centimeter-wide by 6.7-centimeter-deep trough that runs continuously along the front face of each of the 1.8-meter cells.

Typically, the use of the secondary containment system is enough to ensure that waste is safely contained. If there were to be a larger scale spill, however, the cell base and trough would collect any spilled waste within the cell. The spills are drained by gravity through drains in the bottom of the trough and stainless steel piping to the SAL tank.

Specially designed, shielded, 208-liter containers are used as the secondary containment system for the back side of the SAL. The back side of the SAL is used to store mainly solid mixed waste in cans, which are packed in the containers. Any liquids stored here, however, are placed in plastic, pan-type containers for secondary containment as previously described.

The secondary containment system for the front side of the SAL, which is only used minimally to store mixed waste, consists of the same practice of using the plastic, pan-type containers described previously.

The secondary containment system for the HWTU and SAL is described in detail in Chapter 4.0.

6.4.3 Water Supplies [F-4c]

The 325 Building is designed and operated to safely contain waste and to prevent any contamination of water supplies. The secondary containment systems, described in Chapter 4.0, prevent releases to the environment and infiltration of waste that could contaminate groundwater. The containment systems also prevent waste run-off that could contaminate surface water. The nearest water supply is the 300 Area water intake located on the Columbia River, which is less than 0.8 kilometers from the 325 HWTUs.

6.4.4 Equipment and Power Failure [F-4d]

The 325 Building is provided with an emergency power system that initiates upon failure of the primary power system, thereby minimizing the likelihood of the release of dangerous waste or mixed waste during a power failure or equipment failure. The 325 HWTUs have emergency lighting systems that operate automatically during power-failure incidents. For actions to be taken in the event of power failure to unit systems or equipment, refer to the contingency plan (Appendix 7A).

6.4.5 Personal Protection Equipment [F-4e]

Protective clothing and equipment are provided to employees during normal and emergency operations. Protection levels for emergency situations are determined in consultation with an industrial hygienist.

During routine operations, the maximum number of personnel working in the SAL is five. Personal protective equipment is required in the front portion of the SAL when working in the fume hood or handling chemicals on the bench top. For personnel working in the back portion of the SAL, the minimum protection requirement is full radiological protective clothing (coveralls, hood, inner and outer gloves, canvas boots, and boot covers). Protective clothing and equipment available at the SAL include, but are not limited to, the following:

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- safety glasses (Room 201)
- chemical protective suits (Rooms 200 and 201) (part of absorbent kits)
- goggles (Rooms 200 and 201) (part of absorbent kits)
- canner's gloves (Rooms 200 and 201) (part of absorbent kits).

Storage and treatment of dangerous waste can occur in Room 520 and 528 of the HWTU. Personal protective equipment is required for personnel working these areas of the HWTU. Protective clothing and equipment available at the HWTU include, but are not limited to, the following:

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- laboratory (325 Building – Mens/womens change room)
- shoe covers (325 Building – Mens/womens change room)
- surgeon gloves (Rooms 520 and 528)
- chemical-resistant gloves (Rooms 520 and 528)

- chemical-resistant aprons (Rooms 520 and 528)
- face shields (Rooms 520 and 528)
- hard hats (Room 528)
- safety glasses (Rooms 520 and 528).

Personal protective equipment is required for personnel conducting sampling activities associated with the RLWS tank. Sampling activities for the RLWS tank will be conducted in the tank control room. Protective clothing and equipment that will be available at the RLWS tank include, but are not limited to, the following:

<u>Radioactive Liquid Waste System Load Out Tank</u>

- laboratory coats (325 Building – Mens/womens change room)
- shoe covers (325 Building – Mens/womens change room)
- surgeon gloves (Control Room)
- chemical-resistant gloves (Control Room)
- chemical-resistant aprons (Control Room)
- face shields (Control Room)
- hard hats (Control Room)
- safety glasses (Control Room).

The protective equipment storage areas are well stocked at all times. This equipment is replaced periodically as it is used. The above inventory reflects each type of personal protective equipment that typically are present at the 325 HWTUs. Additional radiological and nonradiological personal protective equipment can be obtained, as needed, from storage locations and sources outside of the 325 HWTUs. These areas include the personal protective equipment storage area in the 700 hall men's and women's change rooms, Room 529, and the men's and women's change rooms in the south end (first floor) of the 325 Building. This personal protective equipment also can be obtained from onsite suppliers for the 325 HWTUs.

Respiratory protective equipment (air-purifying, full-face/negative- pressure respirators) that can be used by personnel is managed by the 325 Building Manager and must be checked out. This equipment is stored within the 325 Building. In addition, the 700 hall men's and women's change rooms normally contain a 1-week supply of coveralls, laboratory coats, hoods, skull caps, cloth shoe covers, rubber shoe covers, and gloves (canvas, surgeon's, and canner's).

6.5 PREVENTION OF REACTION OF IGNITABLE, REACTIVE, AND/OR INCOMPATIBLE WASTES [F-5]

The following sections describe prevention of reaction of ignitable, reactive, and incompatible waste.

6.5.1 Precautions to Prevent Ignition or Reaction of Ignitable or Reactive Waste [F-5a]

The 325 HWTUs are used to store a variety of ignitable waste. Precautions to prevent ignition of ignitable waste involve separation of waste from sources of ignition and use of procedures to minimize the potential for accidental ignition. There are no routine sources of ignition or open flame in the 325 HWTUs. Work with ignition or heat sources, if required, is limited and controlled in the following ways by management and is performed in compliance with internal health and safety procedures for elimination of ignition sources.

- Use of open-flame equipment when working with flammable liquids is prohibited.

- Smoking is prohibited around flammable liquids (no smoking is allowed in the 325 Building).

- Electrical equipment used in flammable or explosive atmospheres is required to comply with the National Electrical Code, NFPA 70.
- Use of equipment with automatic, adjustable temperature controls and high-temperature limit switches is required to prevent overheating.
- Placement of flammable liquids on hot surfaces is prohibited.
- All static electricity sources are required to be grounded in areas where ignitable vapors might be present.
- Bonding of conductive containers is required when transferring flammable liquids.
- Use of nonsparking tools is required in flammable waste storage areas.

All maintenance or modifications in the 325 HWTUs that require work with ignition sources must receive prior approval by a safety engineer. This approval is documented in the operating records for the 325 HWTUs. Smoking is not allowed in the 325 Building at any time, and the interior and exterior of the building are clearly posted with "No Smoking" signs. Waste storage areas are not heated by any radiant heat source. All tools used to open ignitable waste containers are constructed of nonsparking materials.

Ignitable waste storage areas are inspected annually by a fire safety engineer familiar with the Uniform Fire Code. This inspection is documented in the operating records for each of the 325 HWTUs. There also are storage restrictions at the 325 HWTUs for combustible waste as part of fire safety requirements. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 Building (ICBO 1991).

6.5.2 Precautions for Handling Ignitable or Reactive Waste and Mixing of Incompatible Wastes]F-5b]

As described in Section 6.5.1, ignitable waste is managed to protect the waste from sources of ignition or open flame. Ignitable waste containers are maintained in good condition and inspected weekly to minimize the potential for releases that could result in fire. Containers of ignitable waste are protected from high temperatures to prevent the potential for pressurization and buildup of ignitable vapors. Containers of ignitable waste are stored in flammable material storage cabinets within waste storage cells (Chapter 4.0). Limitations on sizes of containers and amount of storage in cabinets are discussed in Chapter 4.0.

Small quantities of reactive waste are accepted for storage in the 325 HWTUs. Information on all reactive and other waste accepted by the HWTU and SAL is documented on a waste tracking form, which is reviewed carefully by personnel before accepting the waste. This form contains information on the unique handling requirements of the waste. Any reactive waste requiring special handling and storage to prevent unwanted reactions is appropriately packaged before arriving at the 325 HWTUs. This packaging safeguards against reactions resulting from air or water contact, shock, and other causes. Reactive waste is handled and stored in a manner commensurate with the specific reaction hazards posed by the waste. This includes segregating the waste from other waste and reagent chemicals with which the waste potentially could react.

Because a wide variety of waste can be accepted at the 325 HWTUs, the potential exists for storage of incompatible waste. Mixing of incompatible waste is prevented through waste segregation and storage procedures. Chemical waste stored in the 325 HWTUs is separated by compatibility and hazard class and stored in separate storage areas. Separate storage shelves and cabinets are used within the storage areas

(Chapter 4.0) to provide further waste segregation. Before accepting unfamiliar waste from generating units, waste management staff determine the Reactivity Group Number per A Method for Determining the Compatibility of Hazardous Wastes (EPA 1980) for each waste so that waste can be stored with compatible materials. The following general guidance is used to segregate and separate chemicals:

- Store acids on a low storage shelf or in acid storage cabinets
- Separate acids from bases and alkaline metals such as potassium or sodium
- Separate oxidizing acids from organic acids and flammable or combustible materials
- Store bases away from acids and store solutions of inorganic hydroxides in polyethylene containers
- Store oxidizers away from flammable or combustible materials and reducing agents such as zinc, alkaline metals, and formic acid
- Store peroxide-forming chemicals in air-tight containers in a dark, cool, and dry place (inside of cabinets)
- Store flammable materials in approved containers or cabinets
- Separate flammable materials from oxidizing acids and oxidizers and keep them away from sources of ignition
- Clearly mark cabinets to identify the hazards associated with their contents.

The potential for waste ignition or reaction at the 325 HWTUs also is minimized through storage restrictions on hazardous materials quantities. The storage restrictions defined in the Uniform Building Code for Class B Occupancy apply to the 325 HWTUs (ICBO 1991). The weekly inspection of the 325 HWTUs includes checking to see if waste inventories are below these limits. These inspections are documented in the operating records that (includes the weekly inspection forms) for each of the 325 HWTUs.

In the unlikely event the fire sprinkler system in Rooms 520 and 528 is activated, the resulting run-off will be contained in the fire water collection tank located in the basement of the 325 Building. This tank is described in detail in Chapter 4.0, Section 4.1.4.1.

6.5.3 Management of Incompatible Wastes in Tank Systems [F-5b(1)

Waste discharged to the SAL tank from the hot cells typically consists of the same type of waste managed in the hot cells. Prior to discharge to the SAL tank, waste may be analyzed for pH, anions, metals, radionuclides, and total organic carbon to determine if the waste meets the waste acceptance criteria for the radioactive liquid waste system (RLWS). Sampling and analysis would be used if sufficient process knowledge is not available to characterize the waste for RLWS waste acceptance criteria purposes. The waste is treated in the SAL tank, if necessary.

Process knowledge will be used when possible for transfers to the RLWS tank from the SAL tank, HWTU, and Room 40. The waste in the RLWS tank will be sampled and treated for pH and chlorine as needed to protect the integrity of the tank. Sampling will be performed before each batch of waste is transferred from the RLWS tank to the DSTs.

6.5.4 Management of Incompatible Wastes in Containers or Tanks [F-5b(2)]

Incompatible waste and other materials are handled as described in Section 6.5.2 and in accordance with established operating methods. Storage restrictions that ensure proper separation of containers of incompatible material in the 325 HWTUs are described in Section 6.5.2.

Ignitable or reactive waste is not placed in the tank systems unless the waste has been treated, rendered, or mixed so that the waste no longer meets the definition of ignitable or reactive waste under WAC 173-303-090 (Chapter 3.0).

The SAL tank and the RLWS tank are located well within all NFPA, state, and local code buffer zone requirements for tanks. The buffer zone around the tanks meets all applicable NFPA, state, and local codes.

Drawings of the 325 HWTUs are available to ensure that ignitable and/or reactive waste is located at least 15 meters from the unit's property line.

Figure 6-1. Locations of Emergency Equipment at the Hazardous Waste Treatment Units

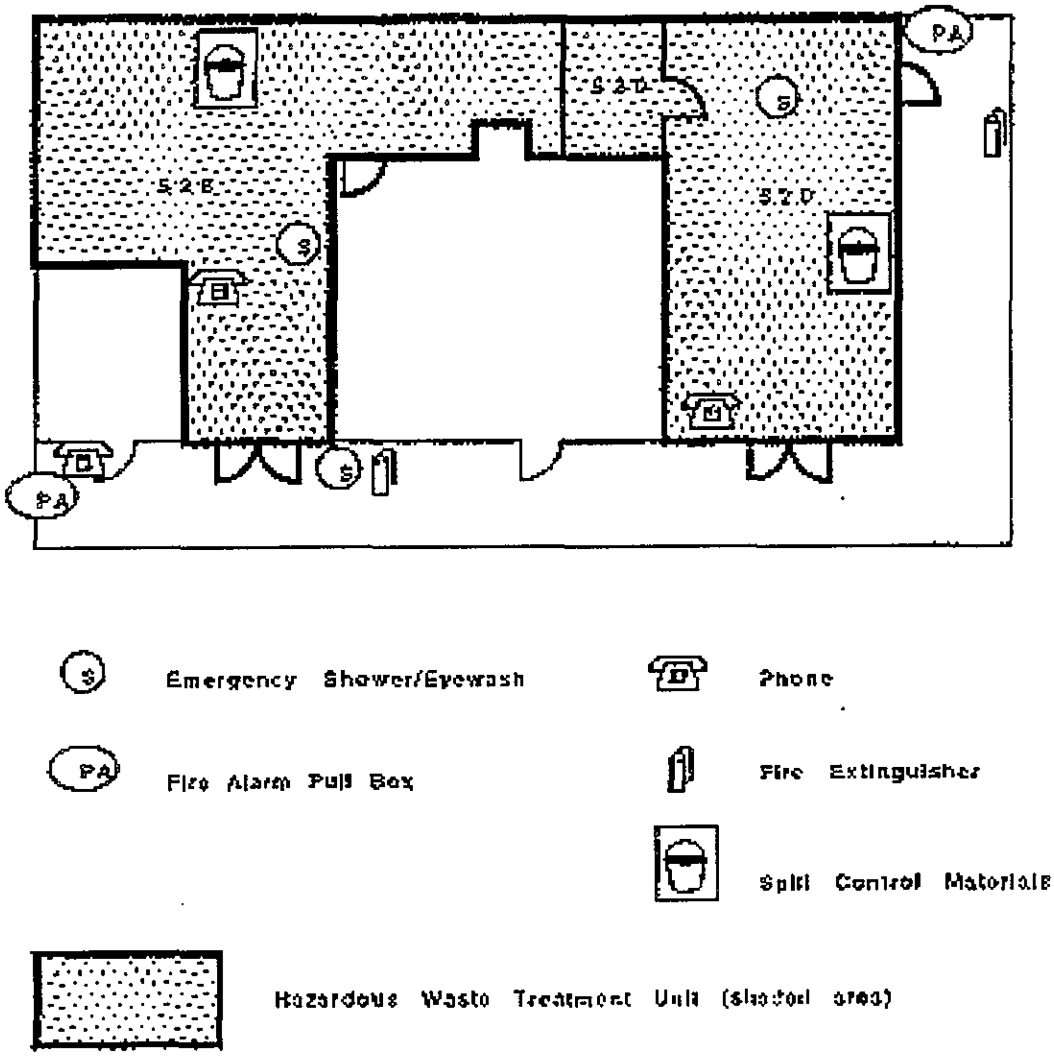
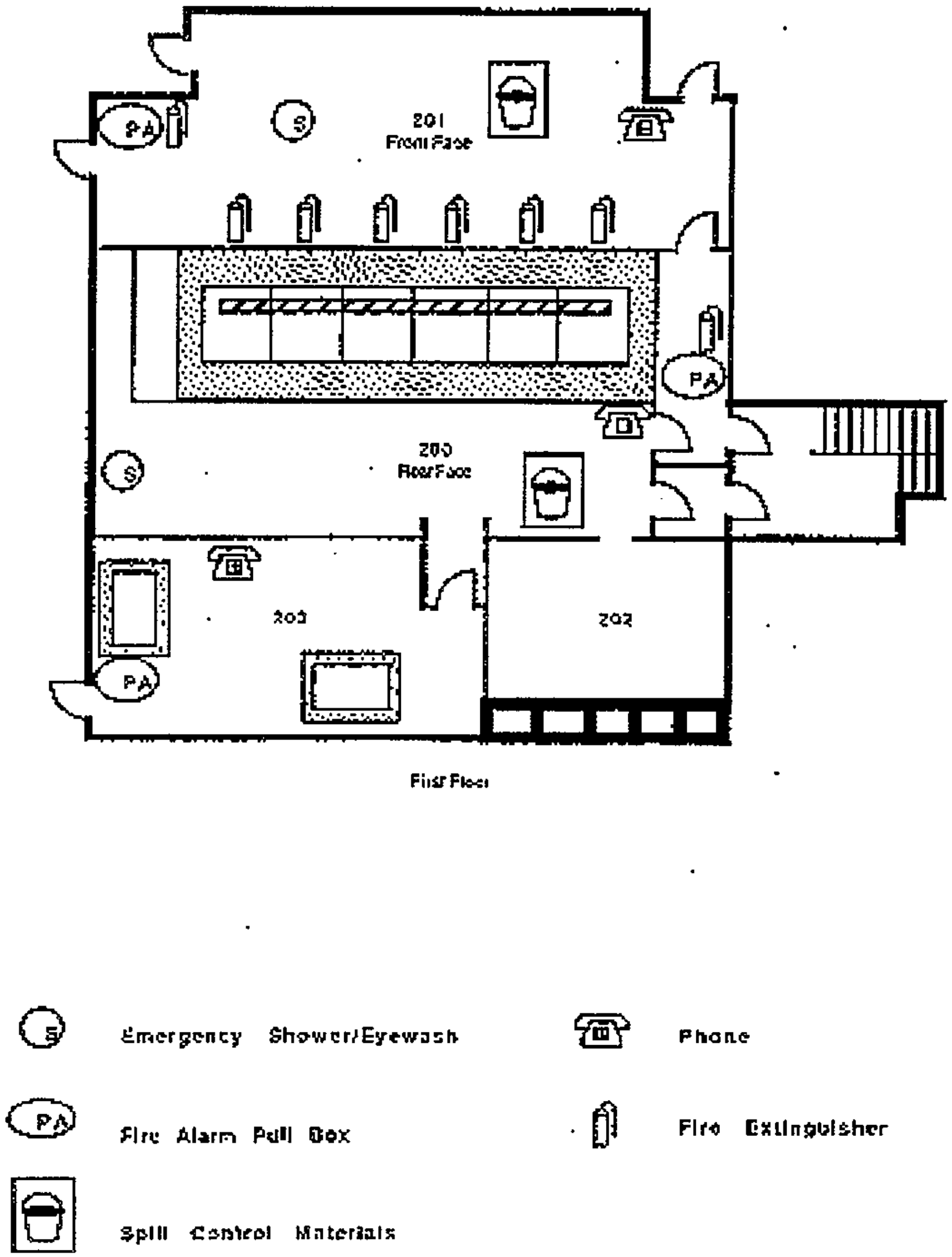


Figure 6-2. Locations of Emergency Equipment at the Shielded Analytical Laboratory (First Floor)



1 **Figure 6-3. Locations of Emergency Equipment at the Shielded Analytical Laboratory (Basement)**

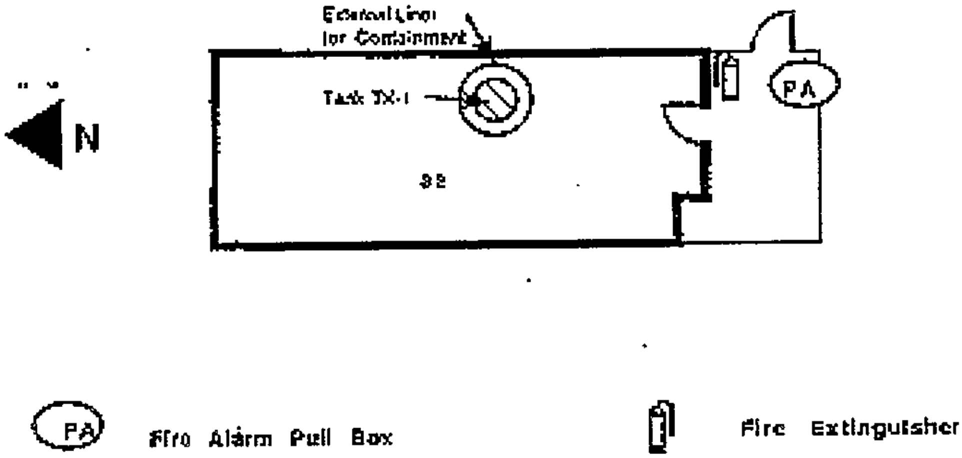


Table 6-1. Remedial Actions for Major Problems

1	Major Problems	Remedial Actions
2	Containment system failures	
3	Cracks in floor of container storage area	Remove containers from area and cease use until cracks are repaired.
4	Cracks in floor of SAL cell liner	Remove containers from area and cease use until cracks are repaired or provide secondary containment for existing containers that hold liquid waste.
5	Leaking container in container storage area	Transfer waste to another container. Clean up spill.
6	Leaking tank or ancillary equipment	For minor leaks or drips, conduct inspection of affected equipment every 12 hours. For major leaks, immediately remove all waste from tank system. Prevent addition of waste to tank system until repaired. Notify Building Emergency Director. Initiate contingency plan if appropriate.
7	Spills	
8	Minor spills in container storage area	Clean up spill according to guidance in the building emergency procedure.
9	Major spills in container storage areas	Notify Building Emergency Director. Initiate contingency plan if appropriate.

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7.0 CONTINGENCY PLAN [G] 7-1

TABLE

TABLE 7-1. HANFORD FACILITY DOCUMENTS CONTAINING CONTINGENCY PLAN REQUIREMENTS OF WAC 173-303-350(3) T7-1

APPENDIX 7A

TABLE 7-1. HANFORD FACILITY DOCUMENTS CONTAINING CONTINGENCY PLAN REQUIREMENTS OF WAC 173-303-350(3) .... APP 7A-1

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7.0 CONTINGENCY PLAN [G]

The WAC 173-303 requirements for contingency plans are satisfied in the following documents: Portions of the *Hanford Emergency Response Plan* [Attachment 4 of the HF RCRA Permit (DW Portion)] and portions of the *Building Emergency Procedure, Radiochemical Processing Laboratory (325 Building)* (Appendix 7A).

The cited contingency plan documents also serve to satisfy a broad range of other requirements (e.g., Occupational Safety and Health Administration standards and U.S. Department of Energy Orders). Therefore, revisions made to portions of the contingency plan documents that are not governed by the requirements of WAC 173-303 will not be considered as a modification subject to review or approval by Ecology. Table 7-1 identifies which portions of the Building Emergency Procedure are written to meet WAC 173-303 contingency plan requirements.

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Table 7-1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3)

(Sheet 1 of 2)		
Requirement	Attachment 4 of the HF RCRA Permit (DW Portion)	Building Emergency Plan
-350(3)(a) – A description of the actions which facility personnel must take to comply with this section and WAC 173-303-360.	X[1] Section 1.3.2	X[1] Part I, Section 3.4; Part V, Section 5
-350(3)(b) – A description of the actions which shall be taken in the event that a dangerous waste shipment, which is damaged or otherwise presents a hazard to the public health and the environment, arrives at the facility, and is not acceptable to the owner or operator, but cannot be transported pursuant to the requirements of WAC 173-303-370(5), Manifest system, reasons for not accepting dangerous waste shipments.	X[1] Section 1.3.2	X[1,2,3] Part I, Section 3.4; Part V, Section 5.8
-350(3)(c) - A description of the arrangements agreed to by local police departments, fire departments, hospitals, contractors, and state and local emergency response teams to coordinate emergency services as required in WAC 173-303-340(4).	X Table 3-1	
-350(3)(d) - A current list of names, addresses, and phone numbers (office and home) of all persons qualified to act as the emergency coordinator required under WAC 173-303-360(1). Where more than one person is listed, one must be named as primary emergency coordinator, and others must be listed in the order in which they will assume responsibility as alternates. For new facilities only, this list may be provided to the department at the time of facility certification (as required by WAC 173-303-810 (14)(a)(i)), rather than as part of the permit application.		X[4] Part I, sections 3.2 and 3.3
-350(3)(e) - A list of all emergency equipment at the facility (such as fire extinguishing systems, spill control equipment, communications and alarm systems, and decontamination equipment), where this equipment is required. This list must be kept up to date. In addition, the plan must include the location and a physical description of each item on the list, and a brief outline of its capabilities.	X Hanford Fire Department: Appendix C	X Part I, Section 3.7
-350(3)(f) - An evacuation plan for facility personnel where there is a possibility that evacuation could be necessary. This plan must describe the signal(s) to be used to begin evacuation, evacuation routes, and alternate evacuation routes.	X[5] Figure 5-2	X[3,6] Part I, Section 3.1

Table 7.1. Hanford Facility Documents Containing Contingency Plan Requirements of WAC 173-303-350(3). (Sheet 2 of 2)

NOTES

[1] The Hanford Emergency Response Plan contains descriptions of actions relating to the Hanford Site Emergency Preparedness System. No additional description of actions is required if emergency planning activities are addressed. If other credible scenarios exist or if emergency procedures at the unit are different, the language contained in the Building Emergency Procedure will be used during an event by the Building Emergency Director.

[2] This requirement only applies to TSD units which receive shipment of dangerous or mixed waste defined as off-site shipments in accordance with WAC 173-303.

[3] Some of this unit-specific information is contained in other parts of DOE/RL 92-35, Rev. 1 (Attachment 36 to the HF DW Permit.)

[4] Emergency Coordinator names and home telephone numbers are maintained separately from any contingency plan document, on file in accordance with Hanford Facility RCRA Permit, DW Portion, General Condition II.A.4. and is updated, at a minimum, monthly.

[5] The Hanford Facility (sitewide) signals are provided in this document. No unit/building signal information is required unless unique devices are used at the unit/building.

[6] An evacuation route for the TSD unit must be provided. Evacuation routes for occupied buildings surrounding the TSD unit are provided through information boards posted within buildings.

14.0 CONTENTS

14.0 CONTENTS i

14.0 CERTIFICATION [K] 1

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14.0 CERTIFICATION [K]

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

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

for

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

5/22/98
Date

FOR

Co-Operator
William J. Madia, Director
Pacific Northwest National Laboratory

5-20-98
Date

* This certification addresses modifications to Chapter 7.0 and Appendix 7A (Building Emergency Plan) for the 325 Hazardous Waste Treatment Units identified as Revision 2.

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APPENDIX 3A

WASTE ANALYSIS PLAN

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GLOSSARY

ACRONYMS AND INITIALISMS

325 HWTUs	325 Hazardous Waste Treatment Units consists of the HWTU, SAL, and RLWS tank system subunits)
AA	atomic absorption
API	American Petroleum Institute
ASTM	American Society for Testing and Materials
BED	Building Emergency Director
CDRR	Chemical Disposal/Recycle Request
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
EPA	U.S. Environmental Protection Agency
GC/MS	gas chromatography/mass spectroscopy
HWTU	Hazardous Waste Treatment Unit
ICP	inductively coupled plasma
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)
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

ABBREVIATIONS

Ecology	Washington State Department of Ecology
g	gram
gal	gallon
h	hour
in.	inch
kg	kilogram
psf	pounds per square foot

TERMS

NOTE: Terms in *ITALICS* are defined in this glossary. Terms in underline indicate the source of the definition.

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* (EPA 1994, page 1-11 and 1-12). *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
See *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*?) (WG 1996).

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 (Ecology 1997). Information must also be provided to demonstrate that the waste meets the operational parameters of the disposal facility, such as liner compatibility information (WG 1996).

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) (WG 1996).

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 (WG 1996).

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* (WG 1996).

Container Failure
A waste container for which a *manifest discrepancy* has been identified (WG 1996).

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 (WG 1996).

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 and WG 1996).

Customer
The *generator* or *TSD unit* who ships waste to another *TSD unit*, the current custodian of the waste (WG 1996).

Designation
The process of determining if a solid waste is a mixed waste, resulting in the assignment of proper federal and state waste codes (WG 1996).

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) (WG 1996).

Effective Date of Regulation
The date when mixed waste became subject to regulation in Washington State (August 19, 1987) (DOE-RL 1996; Ecology 1996; and EPA 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) (Ecology 1995a, comment 181 and 182).

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 Attachment 2 of the Hanford Facility RCRA permit (Ecology 1995b, page 10 of 91).

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 (WG 1996).

General Waste Stream
Waste from a single *customer* and Waste-Management Group. (See Attachment C for a discussion of "General Waste Streams") (WG 1996).

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
See *Facility.*

Inconsistencies
Any other discrepancies which are not *manifest discrepancies* (WG 1996).

Independent Authorized Agent
A group or organization that is functionally independent from the waste-generating function (WG 1996).

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* (WG 1996). State-only dangerous wastes are not subject to the federal *LDR* requirements (Ecology 1994a).

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* (Ecology 1994a).

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 (EPA 1994, page F-1).

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* (WG 1996).

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 (EPA 1994, page 1-11). *Process knowledge* for dangerous waste may also include information obtained from surrogate material (NRC/EPA 1992, Section II(b) Characteristic Wastes).

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 (EPA 1994, page 2-33).

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* (WG 1996).

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* (WG 1996).

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 (WG 1996).

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* (WG 1996).

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) (Ecology 1995b, page 11 of 91). This also includes a discrepancy in the number of inner containers in a labpack (WG 1996).

Storage Unit
A *TSD unit* on the *Hanford Facility* permitted to store dangerous waste (WG 1996).

Treatment Unit
A *TSD unit* on the *Hanford Facility* permitted to treat dangerous waste (WG 1996).

TSD Unit
See *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 Permit Application Form 3 (Ecology 1995b, page 11 of 91).

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 (which may include radiological methods), and/or chemical *screening/fingerprint analysis* (WG 1996).

Waste-Acceptance Criteria
The minimum requirements imposed by a *TSD unit* to ensure that a dangerous waste is managed properly (WG 1996).

Waste Analysis
See *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) (WG 1996).

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 (Ecology 1994b, page 2). 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 (WG 1996).

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

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

325 HAZARDOUS WASTE TREATMENT UNITS WASTE ANALYSIS PLAN

1.0 UNIT DESCRIPTION

The 325 Hazardous Waste Treatment Units (325 HWTUs) are part of the Unit-Specific Portion of the Hanford Facility Dangerous Waste Permit Application, which reflects the organization of the Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit, WA7890008967.

The 325 HWTUs consist of three units, all within the 325 Building, located in the 300 Area on the Hanford Facility (Figure 1.1). Chapter 2 of the 325 HWTUs Part B Permit Application 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, 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 enclosures with remote manipulators. The Shielded Analytical Laboratory (SAL) is located in Rooms 32, 200, 201, 202, and 203. The Hazardous Waste Treatment Unit (HWTU) is located in Rooms 520, and 528. Figures 1.2 through 1.5 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.

1.1 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 of the 325 HWTUs Part B Permit Application, containers are managed in accordance with Washington Administrative Code (WAC) 173-303-630; the SAL tank is managed and operated in accordance with WAC 173-303-640.

Figure 1-1. Drawings of the TSD Units

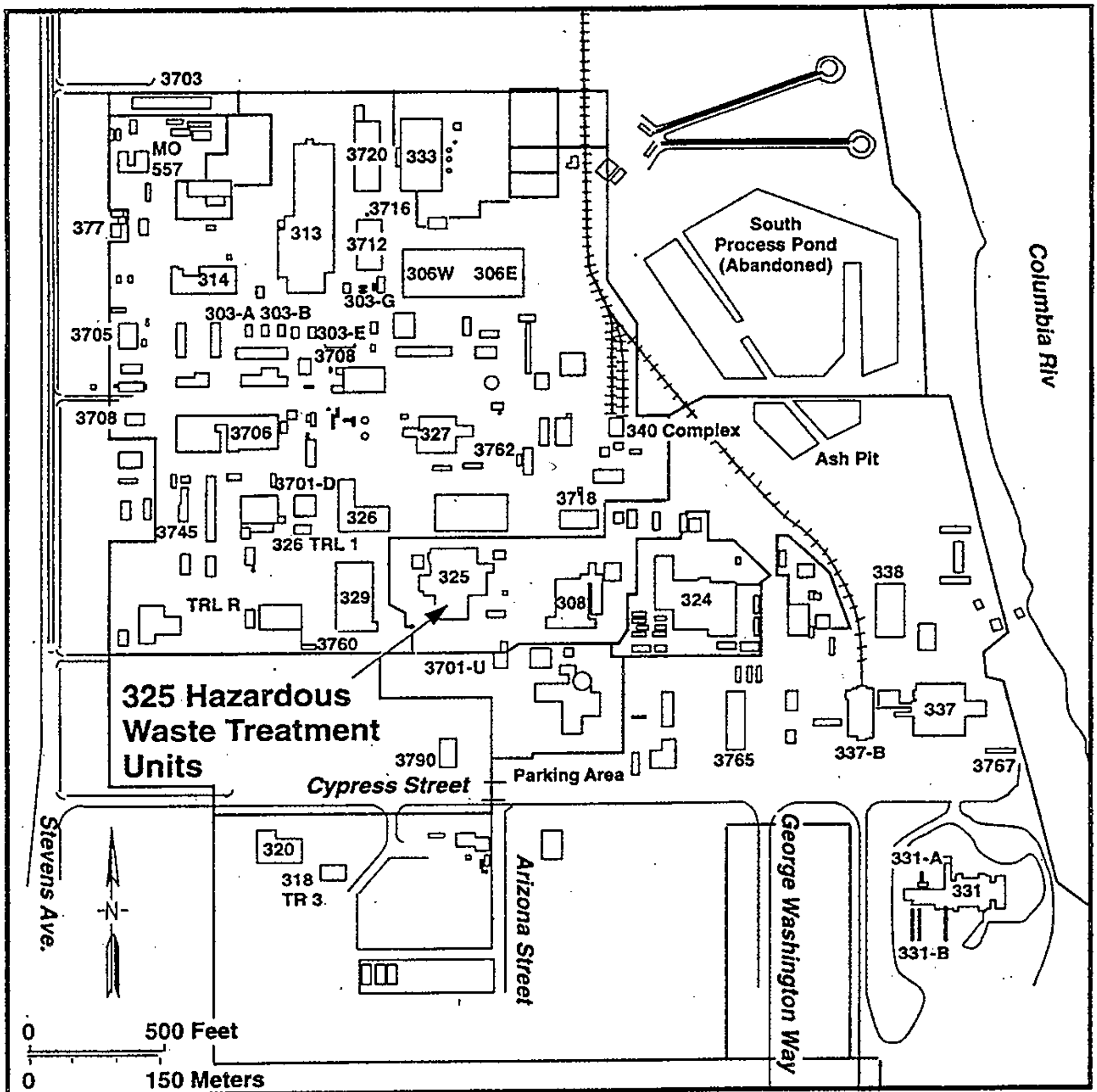

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Figure 1-2. Drawings of the TSD Units

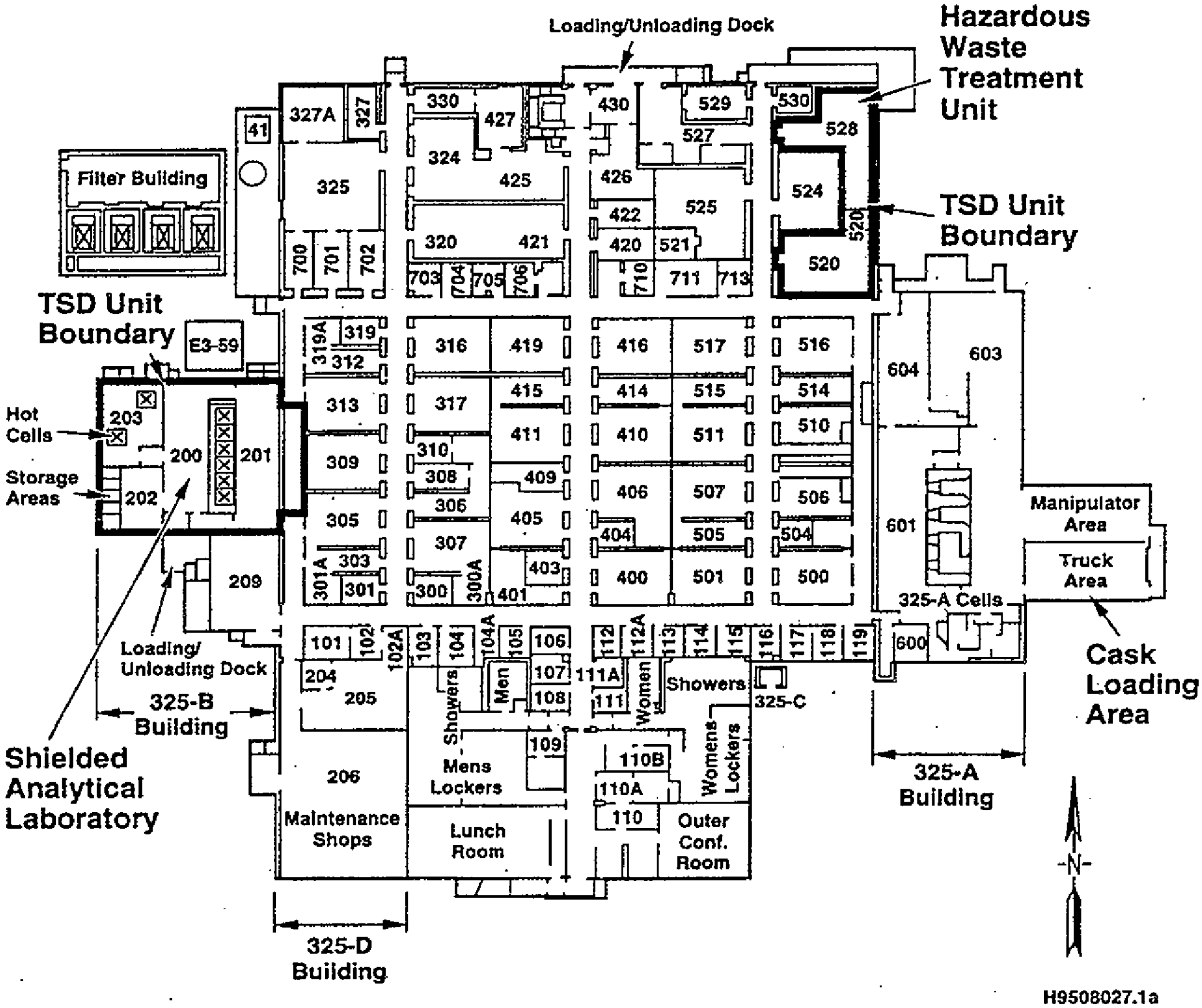


Figure 1-3. Floor Plan of SAL

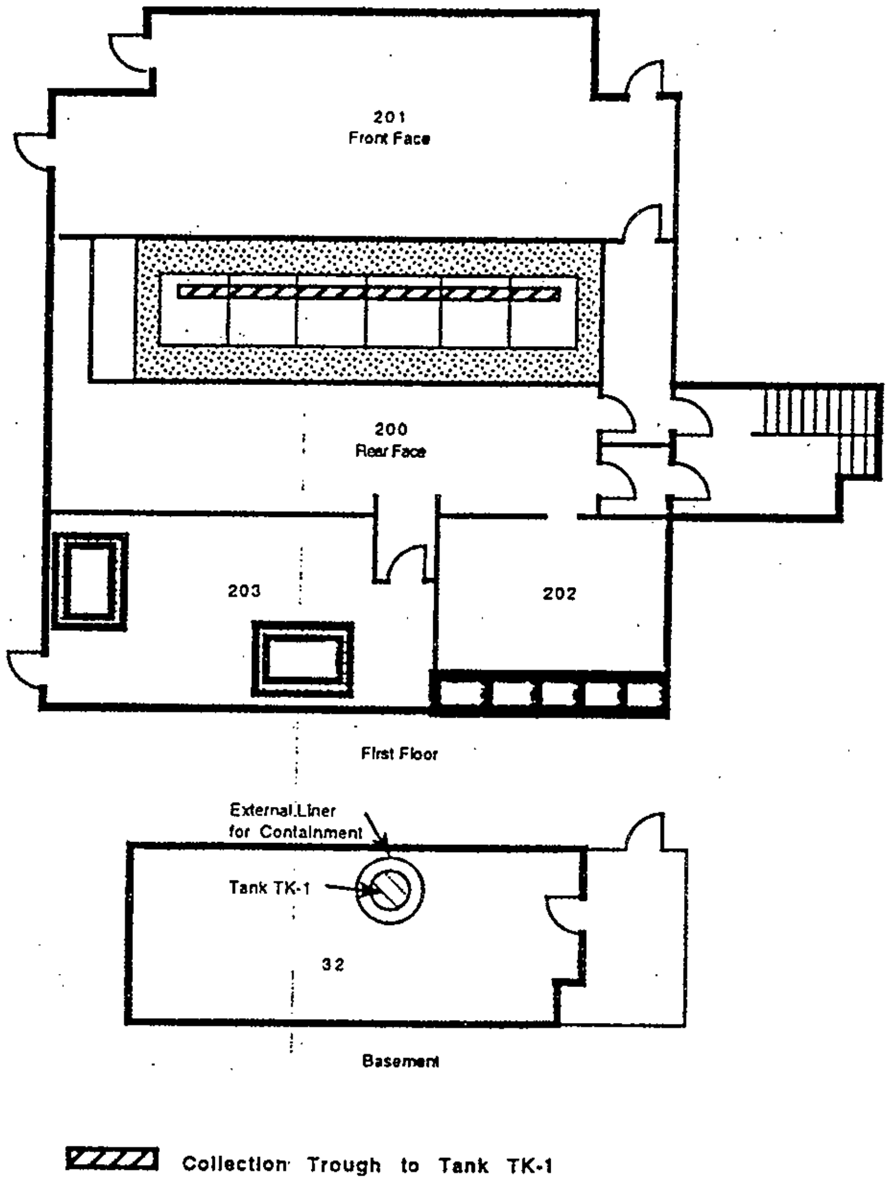
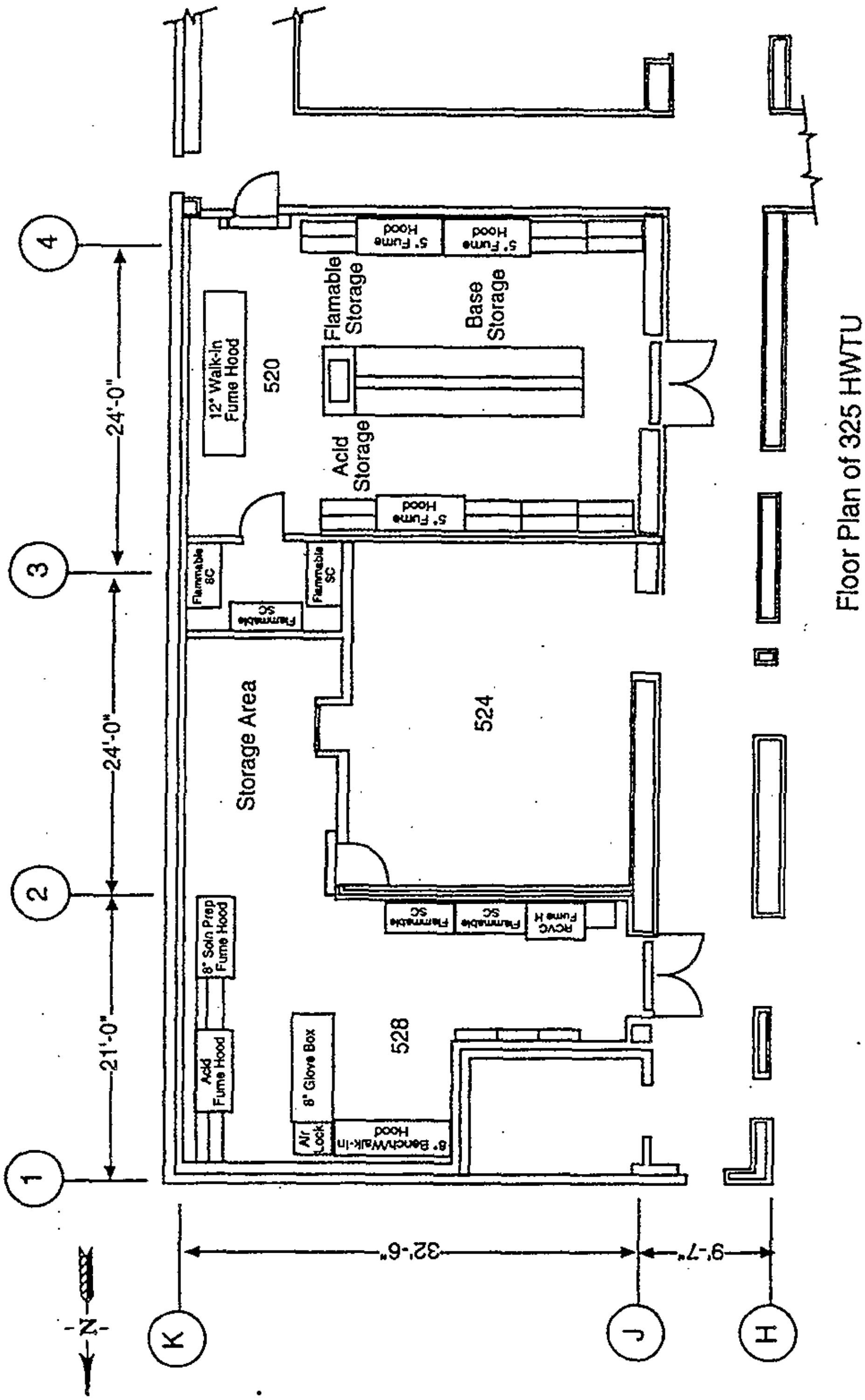
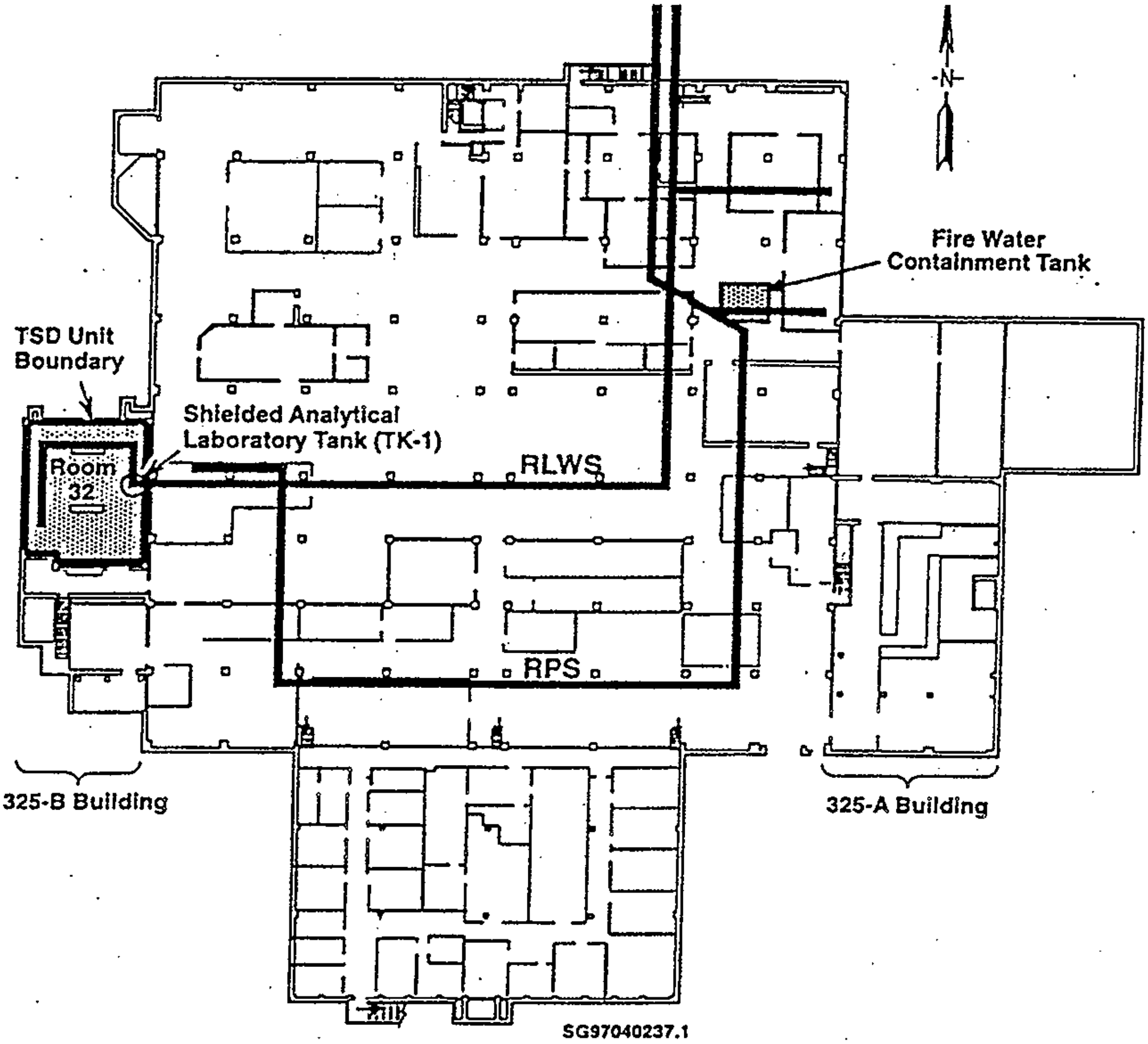


Figure 1-4. Drawings of the TSD Units

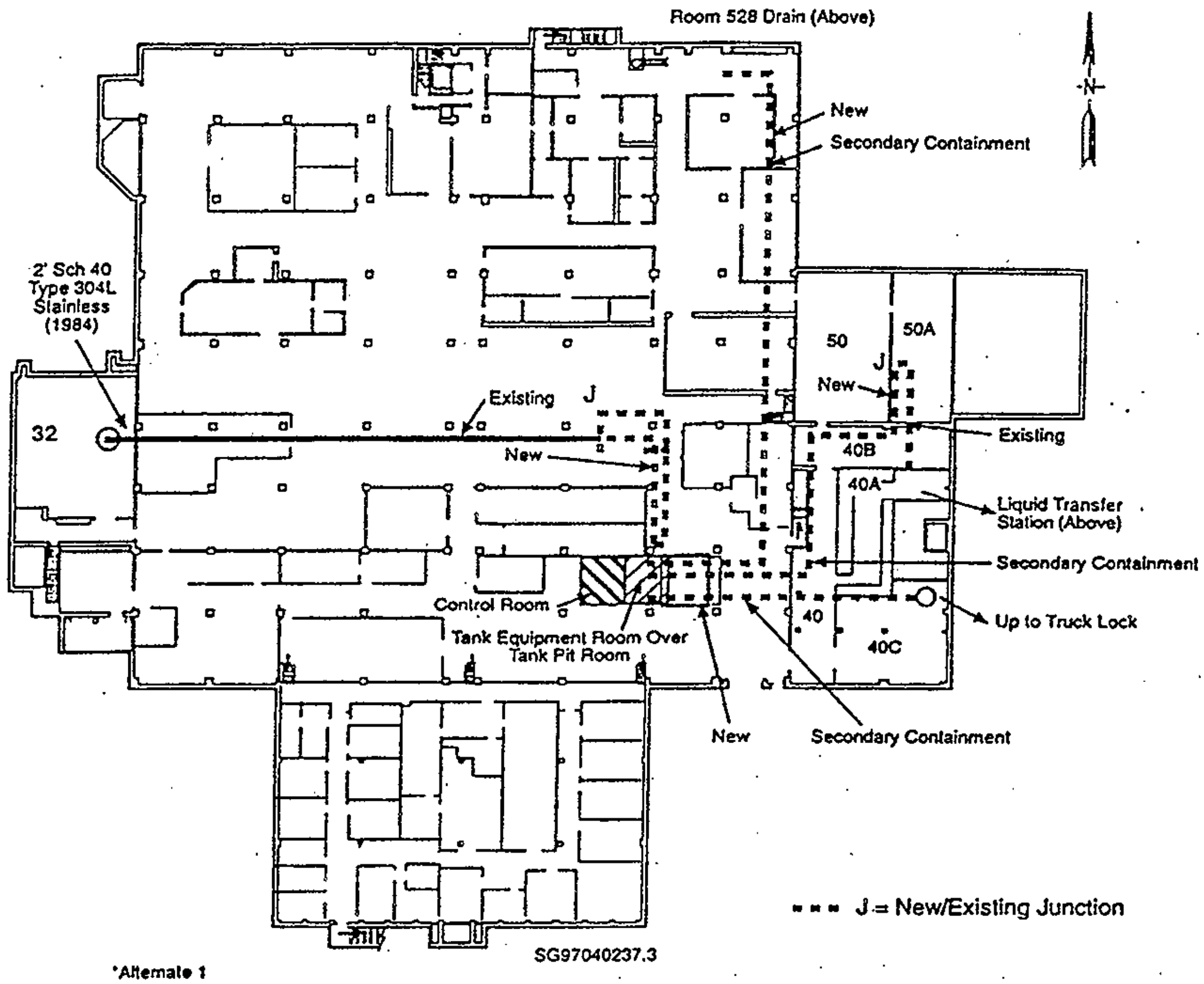


1 **Figure 1-5. Location of 325 HWTUs: Basement Areas**



1

Figure 1-6. 325 RLWS Modifications



Basement Plan

At the SAL, dangerous waste liquid is stored in a tank in Room 32. This dangerous waste, along with contributions from the HWTU, currently is discharged to the 340 Building via the RLWS. Because of the scheduled deactivation of the 340 Building, a modification to the existing 325 RLWS system is required. As part of this modification, dangerous waste will be collected, stored, and possibly treated in a tank before being transported to the double-shell tank system. This modified system will be referred to as the ?RLWS load-out tank system.? Waste from the RLWS load-out tank system will be transferred to the truck lock where the waste will be transported to the double-shell tank via a shielded-cask trailer system. Two stretches of piping from the existing RLWS system that are associated with the HWTU will not be used in the modified system. As discussed in Chapter 11 of the 325 HWTUs Part B Permit Application, these lines will be capped in place and closed during final closure activities of the RLWS load-out tank system.

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 the current version of the 325 Hazardous Waste Treatment Units Part A Permit Application, Form 3.

Specific waste-treatment processes are found in the list of treatments attached to the Part A, Form 3, found in Chapter 1 of the 325 HWTUs Part B Permit Application. Part A, Form 3 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 are 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. Storage of dangerous waste in the HWTU is governed by the Uniform Building Code restrictions (ICBO 1991).

325 HWTUs staff move 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 do not perform the operations, covered by a procedure, until they are formally trained on the procedure. All 325 HWTU staff are 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 325 HWTUs have two drainage systems to handle liquid waste, the RPS and the RLWS. These two systems serve several laboratory and research areas in the 325 Building and are part of the larger liquid-waste systems that serve the entire 300 Area and are not part of the regulated TSD unit.

The RPS system is not part of the regulated unit but serves the entire 325 Building, including the 325 HWTUs. It is included here for informational purposes only.

The RPS system is connected to drains in both the SAL and HWTU subunits. The RPS is used for disposal of wastewater that has been handled in radiation areas (including the SAL and HWTU areas) but is not expected to be radioactively contaminated. The RPS is not used for the disposal of dangerous waste. Unless diverted as stated in the next paragraph, the RPS effluent flows to the 300 Area Treated Effluent Disposal Facility via the process sewer lines.

RPS effluents are routed through a diversion station in the basement common area of the 325 Building. The diversion station is equipped with a radioactivity monitor, which diverts the RPS flow to the RLWS if radioactivity is detected in the RPS flow. A secondary diversion-monitoring system backs up the building system. If a diversion occurs, an alarm sounds to notify appropriate staff.

One laboratory fume-hood sink in HWTU Room 528 is also connected to the RLWS. The radioactive liquid waste flows directly into the RLWS leaving the 325 Building. The radioactive liquid waste exits the 325 Building at two points to join the 300 Area RLWS outside the building and is routed to the 340 Building. From the 340 Building, accumulated waste from the entire 300 Area is transferred to railroad tank cars and eventually is transferred for storage to the Double-Shell Tanks System on the Hanford Facility.

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 landfilling. 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.

1.2 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 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).

1.2.1 Listed Waste from Specific and Nonspecific

Waste from specific and nonspecific sources consists of listed waste identified in WAC 173-303-9904. The Part A permit application, Form 3 (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. 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) typically is not generated at PNNL. Small quantities of K-listed waste, however, have been generated from treatability studies and sample-characterization activities at PNNL in the past; the residues from these tests could be treated at the 325 HWTUs (if covered on the Part A).

The F-listed waste is designated on the basis of the process knowledge (e.g., information from container labels, MSDS, or process information). Sampling might be performed if additional information is needed to document the composition and characteristics of the waste. The generating unit 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 generating the waste. The F001- and F002-listed waste types are designated as dangerous waste if the waste contains less than 1 percent halogenated hydrocarbons. The F001- and F002-listed waste types containing 1 percent or greater halogenated hydrocarbons are designated as extremely hazardous waste.

The K-listed waste on the Part A permit application, Form 3, 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.

1.2.2 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 (e.g., 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.

1.2.3 Discarded Commercial Chemical Products

Discarded chemical products consist of those products listed in WAC 173-303-081. The Part A permit application, Form 3, 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. The Part A application, Form 3, lists all of the wastes, 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 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 LDR regulations under 40 CFR 268 and WAC 173-303-140, including disposal prohibitions and treatment standards.

1.2.4 Waste from Chemicals Synthesized or Created in Research Activities Using Radioactive Isotopes

Dangerous waste from research activities using radioactive isotopes is designated as dangerous waste and typically is generated in small quantities ranging from a few grams to a few liters. These waste types consist primarily of radiologically contaminated chemicals, such as organics. 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, then 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. The Part A permit application, Form 3, includes all categories of toxic and persistent 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 Part A permit application, Form 3, includes the characteristic dangerous-waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and TCLP toxic because of metals or organics content).

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

1.2.5 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 the Part A permit application, Form 3, 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. As 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.

2.0 DESCRIPTION OF CONFIRMATION PROCESS

325 HWTUs staff require 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 2.1.

2.1 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.

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.

2.1.1 Technical Review Process Overview

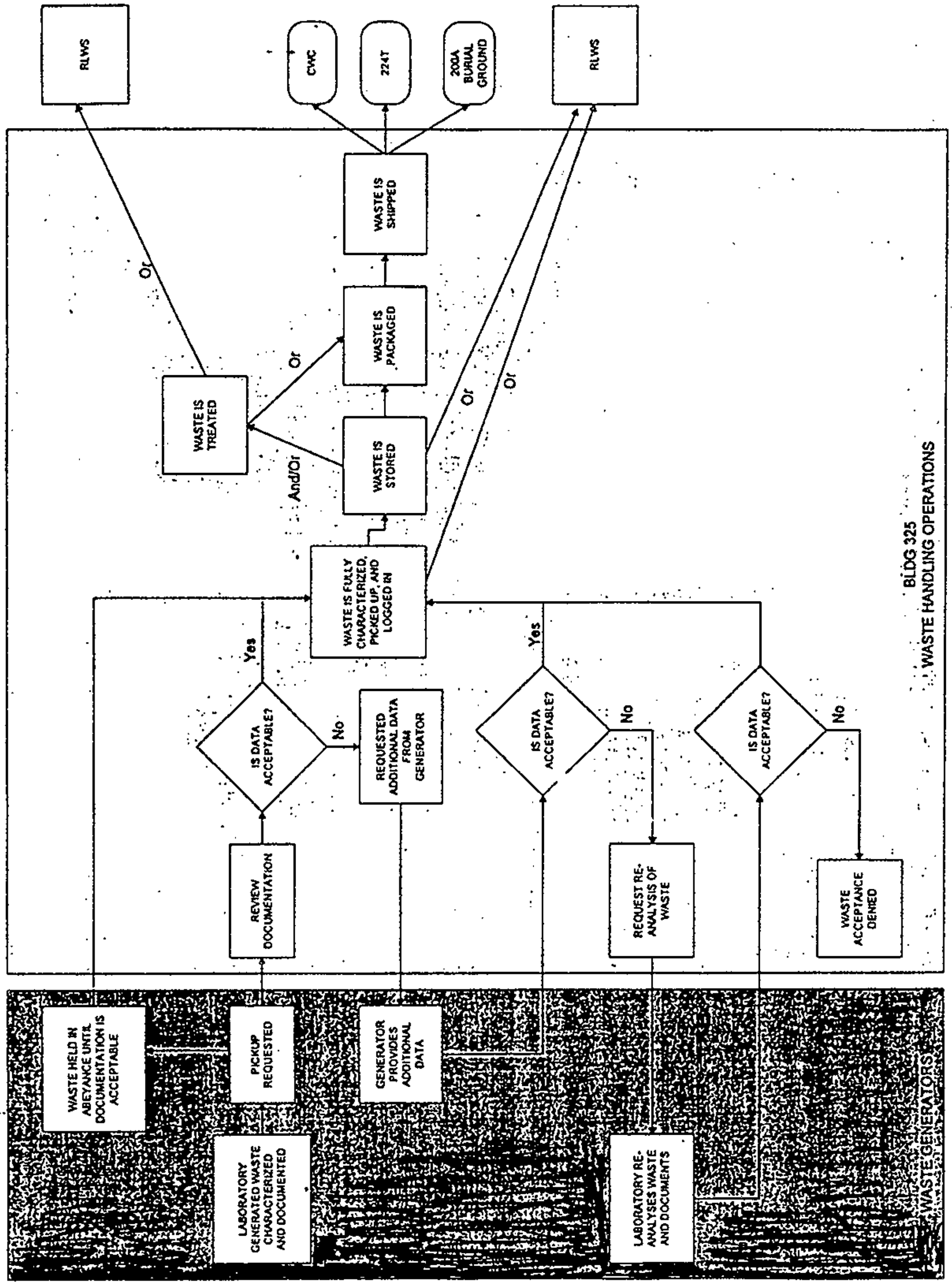
This program, administered by the 325 HWTUs personnel, is designed to obtain the waste information required pursuant to 40 CFR 264.13 and WAC 173-303-300. The review is conducted by qualified 325 HWTUs personnel using procedural guidelines and professional judgment. The reviewer(s), at their discretion, 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. Examples of forms before movement of the waste to the 325 HWTUs are:

- Chemical Disposal/Recycle Request
- Radioactive Liquid Waste Transfer Request
- Waste Designation Form
- Waste Inventory Sheet
- Analytical Report, if available
- Waste Treatment Information Review Sheet
- Hazardous Waste Record
- Chain of Custody.

Examples of these forms are included at the end of this section. Any revision or update to these forms will be available at the 325 HWTUs for review or inspection.

Figure 2-1. Flow Chart of the Confirmation Process



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 (e.g., LDR).

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.

2.1.2 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.

2.2 Verification

Where potential deficiencies exist in the information provided or where additional waste constituents might be expected to be present that do not appear on the waste-tracking form, the generator is contacted by 325 HWTUs personnel for resolution. Upon approval, the 325 HWTUs personnel review the form to determine the following information:

- 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 2.1.

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 dangerous 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% of current waste receipts).
- Wastes which cannot be verified at the 325 HWTUs must be verified at the generating unit (e.g., large components, containers which cannot be opened, are greater than 20 mrem/hr, contain greater than 100 nCi/g of transuranic radionuclides, or will not fit into the NDE unit). Physical screening at the customer location consists of observing packaging of the waste.

If no location can be found to do the physical screening, then no screening is required.

- 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.

1 **Table 2-1. Summary of Test Parameters, Rationales, and Methods**

Waste-management unit type	Waste parameter	Media type	Rationale for selection
Containers	PH	L, SI	Identify waste that might compromise containers. RLWS waste-acceptance criteria for liquids.
	Flash point	L	Identify appropriate storage conditions (i.e., compatible waste storage). RLWS waste-acceptance criteria for liquids.
	Total and amenable cyanide or sulfide	L, SI, So	Identify potential reactivity and appropriate storage conditions.
	Halogenated hydrocarbon content	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Polycyclic aromatic hydrocarbon content	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Free liquids	SI	Identify/verify land-disposal restrictions for liquid waste.
	PCBs	L, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
	Reactivity	L, SI, So	Identify potential reactivity and appropriate storage conditions.
	Halides	L	RLWS waste-acceptance criteria.
	TCLP constituents	L, SI, So	Identify constituents for compliance with Hanford Facility RCRA Permit.
Tanks	PH	L, SI	Identify waste that might compromise tank-system integrity. RLWS waste-acceptance criteria for liquids.
	Flash point	L	Identify appropriate storage conditions (i.e., compatible waste storage). RLWS waste-acceptance criteria for liquids.
	Total and amenable cyanide or sulfide	L, SI, So	Identify potential reactivity.
	Reactivity	L	Identify potential reactivity.
	Halides	L	RLWS waste-acceptance criteria.
	TCLP constituents	L	Identify constituents for compliance with Hanford Facility RCRA Permit.

L = liquid

PCB = polychlorinated biphenyls

RLWS = radioactive liquid waste system

SI = sludge

So = solid

TCLP = toxicity characteristic leaching procedure

1

Figure 2-2. Chemical Disposal/Recycle Request Form

Battelle
Pacific Northwest Laboratories

CHEMICAL DISPOSAL/RECYCLE REQUEST

Page 1 of ______

Received/Approved ______
Request No. ______
Picked Up/Labeled ______
Entered ______

Send Completed Form to:

- 300 Area Nonradioactive Materials: TJ Murphy, 372-2745, P8-45
- 3000 Area Nonradioactive Materials: EL Grohe, 375-6309, K3-69
- Radioactive Mixed Waste: MJ Riess, 372-3517, P7-68

☐ 1030 ☐ 1031 | Org. Code: | Work Package No.:

Level 3 Manager Signature/Date:

Technical Contact/Phone No. (if other than Requester)

☐ <90 Day Accumulation ☐ Satellite Accumulation | Accumulation Date for <90 Day Waste (<30 Days for PCB's)

Requested by (printed or typed name): | Telephone No.: | Requester Signature/Date (indicating accuracy of information to the best of my knowledge)

Location of Waste: (Area/Bldg/Rm) | Requester MSIN: | ☐ Nonradioactive Material (complete and submit a CWC form for nonrad material); ☐ Radioactive Material (include Curies Quantities Below)

SHADED AREA FOR WM USE ONLY | Complete ALL Applicable Information: Detailed Instructions on Reverse, Continuation Sheets Available | SHADED AREA FOR WM USE ONLY

Container ID WM No.	Container Quant.	Container Size	Container Type (a)	Kilograms of Material per Container	Material Description or Trade Name (b)	Chemical Component (use proper chemical name include isotopes and curies for RMW) (c)	Wt. % (d)	Physical State S/L/M/G (e)	Status (f)	Hazards	WM Waste Codes
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc
										PG I II III D E	O I Loc

1

Figure 2-3. Waste Inventory Sheet

WASTE INVENTORY SHEET

Verify integrity of container ____________________
Signature

Page ___ of ___

Bldg. # | Room # | WTN: | Container type: | WSRd No. | Internal Packaging: | Compactible? Yes ___ No ___

Initls	Date	Physical/Chemical Description	Volume	Weight	Radionuclide	Curies	Weight
		Page Totals					
		Total All Pages					

I believe that the submitted information is true, accurate and complete and that unless designated a mixed waste, this package does not contain hazardous or dangerous waste constituents as defined in WAC 173-303, RCRA or TSCA.

____
Signature of Person Sealing Container

Print Name: ____________________ Phone #: ____________________ Date: ________

Radiation Survey Information on Container

Max Contact: [ ] <0.5 mrem/hr or ____ mrem/hr
at 3": [ ] 0.6 mrem/hr or ____ mR/hr

Smearable Contamination:
[ ] <2200 d/m/100 cm² BETA-GAMMA
[ ] <220 d/m/100 cm² ALPHA

Other: ____________________

Surveyed by: ____________________
Date: ____________________

VOLUME % COMPOSITION

____ % Paper
____ % Rags
____ % Wood
____ % Rubber
____ % Plastic
____ % ________ (Specify)
____ % Metal
____ % Concrete
____ % Glass
____ % Absorbent
____ % Animal
____ % Kotex

1

Figure 2-4. Radioactive Liquid Waste Transfer Request Form

RADIOACTIVE LIQUID WASTE TRANSFER REQUEST

RLWS Transfer No:

Generator Name | Generating Facility | Phone No.

Waste volume = ________ liters Flush volume = ________ liters Total transfer volume = ________ liters

This is a: ☐ One-Time Transfer Request ☐ Multiple Transfer Request

Disposal Method: ☐ RLWS Drain ☐ Deliver to 340 Facility

WASTE CHARACTERIZATION INFORMATION

Dose Rate:
(indicate units and distance)

Radiological Characterization
List all radionuclides and activity levels (indicate units):

Waste Composition		RLWS Limits
pH:		pH ≥ 13
Total Halides (F+Cl+Br+I) (moles/l):		≤ 0.01 M
% Total Organic Carbon:		TOC ≤ 1%
Maximum Particle Size (microns):		≤ 100 μm
Are solidifying substances present?		Not Allowed
Are separable organics present?		Not Allowed
Fissile Content (grams/gallon):		≤ 0.01 g/gal
Does waste contain radioiodine?		Not Allowed

Waste Description:

Identify all applicable waste codes:

☐ D002	☐ D004	☐ D005	☐ D006	☐ D007	☐ D008	☐ D009
☐ D010	☐ D011	☐ D018	☐ D019	☐ D022	☐ D028	☐ D029
☐ D030	☐ D033	☐ D034	☐ D035	☐ D038	☐ D039	☐ D040
☐ D041	☐ D043	☐ F001	☐ F002	☐ F003	☐ F004	☐ F005
☐ WT01	☐ WT02	☐ WP01	☐ WP02	☐ WP03	INDICATE: ☐ DW or ☐ EHW	

(If your waste has codes which are not on this list, the 340 Facility may be unable to properly manage it. Contact 340 Facility Management at 376-5657 for assistance.)

<90-Day Accumulation Start Date:

Does this waste contain a reportable quantity (RQ) 40 CFR 302.4? ________
If "YES" then identify the hazardous substance(s) and the corresponding RQ value(s).

Is this waste a hazardous waste subject to the land disposal restrictions of 40 CFR 268? ________
If waste is land disposal restricted then provide applicable LDR information to the 340 Facility.

GENERATOR CERTIFICATION

This is to certify that, to the best of my knowledge and ability, the waste described on this form is properly designated and completely described in accordance with the applicable requirements. I understand there are significant penalties, including fines and imprisonment, for falsifying such information.

Certifier's Name | Signature | Date

RLWS TRANSFER APPROVAL

Special Instructions:

340 Facility Review/Approval:

Cognizant Engineer | Date | Environmental Compliance Officer | Date

Send completed forms to: 300 LEF Process Engineering
MSIN L6-04

PNNL Building Manager________________

Revision 3
11/12/95

1

Figure 2-5. Waste Designation Form

CDRR#: ______________________ Date: ______________________

Item #: ______________________ pH: ______________________

Composition: a) formula b) chemical name c) CAS# d) designation info. e) Wt%

____

____

____

____

____

____

____

____

____

____

____

____

____

WASTE DESIGNATION:

Discarded Chemical Product? (WAC 173-303-081) _____Yes _____No
designation: __________

Dangerous Waste Source? (WAC 173-303-082) _____Yes _____No
designation: __________

Ignitable? (WAC 173-303-090(5)) _____Yes _____No D001: ______
_____Flammable (Flashpoint < 140F) F=9/5(C)+32
_____Combustible (Flashpoint < 100-200F)
_____Oxidizer (> = 10% oxidizer)

Corrosive Liquid? (WAC 173-303-090(6)) _____Yes _____No D002: ______
(pH $\leq$2 or $\geq$12.5..or.. corrodes steel @rate .25"/yr.)

Corrosive Solid? _____Yes _____No WSC2: ______
(pH $\leq$2 or $\geq$12.5)

Reactive? (WAC 173-303-090(7)) _____Yes _____No D003: ______
(cyanides, sulfides, DWW, explosives, $\geq$ 70% H_2SO_4 or HNO_3)

TCLP? (WAC 173-303-090(8)) _____Yes _____No
designation: __________

Toxic? (WAC 173-303-100) E.C.: __________ _____WT01(1.0EC) _____WT02 ($\geq$0.001EC)
_____EHW _____DW

Persistent? (WAC 173-303-100) _____Yes _____No
_____WP01 (HH$\geq$1%) EHW
_____WP02 (HH$\geq$.01%) DW
_____WP03 (PAH$\geq$1%) EHW

____

Waste Codes: ______________________ DW _____ EHW _____

Designator: ______________________ Labels Req'd: Hazardous Waste ______________________

____

1 **Figure 2-6. Waste Treatment Information Review Sheet**

WASTE TREATMENT INFORMATION REVIEW SHEET

HWTU REFERENCE #:______________________ Date:____________

GENERATOR NAME:______________________________________
FACILITY ADDRESS:______________________ PHONE #:____________

CONTACT NAME:______________________ TITLE:____________

Compatibility Class______________________

WHO Technical Review:______________________ Signature____________

APPROVED OR DENIED - REASONS:______________ All Correspondence To:

SPECIAL HWTU INSTRUCTIONS:______________ cc:____________

________ No sample necessary for waste stream verification.

WASTE TREATMENT SUMMARY

Treatment Procedure Number(s) ______________________

Location of Treatment Documentation: HWTU Logbook___, Page Number ___; HWTU File Number ___;

HWTU Computer database ____________

Approved for treatment______________ Approved for storage/packaging______________

Waste Treatment Code Assigned ______________________

Is this a RCRA/Ecology coded waste which has a specified treatment technology to be performed?

____NO ____YES: Specify______________________

Specify treatment in detail: ______________________

Treatment will (destroy/lessen ______________(constituent) and will be verified by______________________(test; specify which; or operator knowledge).

Final disposition of waste treatment residue______________________

HWTU Signature ______________________

Page 1 of 1 HWTU/WTIRS (3/94)

1 **Figure 2-7. Chain-of-Custody Form**

Page 1 of _____

Chain of Custody Number: ________________

BATTELLE, PACIFIC NORTHWEST LABORATORIES

Project No.: ________________

Originating Technical Group: ________________

General Sample
Description: ____

Test Instruction or ASR No. (as applicable):
____

Analysis Requested and/or Technical Group:
____

Prep Method Description: ____

SAMPLE NUMBER	SAMPLE DESCRIPTION	COMMENTS

Sender: ________________________
(signature/date)

Receiver: ________________________
(signature/date)

Original - File

Figure 2-8. Hazardous Waste Record (front)

Hazardous Waste Record

Record Number: ______________________

RMI Number: ______________________

Customer Id: ______________________

Waste Description: ______________________

Waste Chemical Composition			
Chemical Name	Vol %	Chemical Name	Vol %

Before Treatment		After Treatment		After Treatment	
Container Number		Container Number		Container Number	
Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:	Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:	Container Type	Metal Can Poly Bottle Glass Jar Metal Drum Other:
Container Wt. (Tare)	Kg	Container Wt. (Tare)	Kg	Container Wt. (Tare)	Kg
Container Wt.(Gross)	Kg	Container Wt. (Gross)	Kg	Container Wt.(Gross)	Kg
WASTE pH		WASTE pH		WASTE pH	
Physical Form	S L G M	Physical Form	S L G M	Physical Form	S L G M
WASTE Weight	Kg	WASTE Weight	Kg	WASTE Weight	Kg
WASTE Volume	Liters	WASTE Volume	Liters	WASTE Volume	Liters
WASTE Density	Kg/Liter	WASTE Density	Kg/Liter	WASTE Density	Kg/Liter
Waste Designation-Before Treatment		Waste Designation-After Treatment		Waste Designation-After Treatment	
I O	DW EHW	I O	DW EHW	I O	DW EHW
Enter All Applicable Waste Codes		Enter All Applicable Waste Codes		Enter All Applicable Waste Codes	

Figure 2-9. Hazardous Waste Record (back)

PROCESS CODES:		HANDLING CODES:		
PIS = Placed in Storage	CIS = Consolidated in Storage	S01 = Container	T24 = Chemical Reduction	T40 = Filtration
MIS = Moved in Storage	SIS = Split in Storage	S02 = Tank	T30 = Ion Exchange	T42 = Other (specify)
TRE = Treated	DIS = Transferred	T22 = Chemical Oxidation	T33 = Neutralization	T50 = Blending
		T23 = Chemical Precipitation	T38 = Detonating	T52 = Evaporation
		XFR = Transferred (specify location)	Refer to WAC 173-303 for other applicable codes	

Container Number	Process	Date	Handling Code	Location	Comments

ATTACHMENTS:

[ ] RLWS	[ ] Storage	[ ] Disposal	Other Attachments
[ ] CORR #	[ ] CORR #	[ ] Manifest #	[ ] Analytical Data
[ ] Waste Designation Form	[ ] Waste Designation Form	[ ] SWSDR	Project #
[ ] RLWS Request #	[ ]	[ ] RSR	[ ]
[ ]	[ ]	[ ]	[ ]
[ ]	[ ]	[ ]	[ ]

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3.0 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 wastes 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% 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.

3.1 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).

3.2 Criteria and Rationale for Parameter Selection

Waste-testing parameters and the rationale for these parameters are summarized in Table 2.1. 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 (see Section 4.5), 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 analytical screening parameters that could be used for waste received at the 325 HWTUs are as follows.

- Physical description — 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.

- pH screen — used to identify the pH and corrosive nature of an aqueous or solid waste, to aid in establishing compatibility strategies, and to indicate if the waste is acceptable for treatment and/or storage in the 325 HWTUs.

- Cyanide screen — 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*.

- Ignitability screen — used to identify waste that must be managed and protected from sources of ignition or open flame.

4.0 SELECTING SAMPLING PROCEDURES

Because of physical variations of the waste that could be received at 325 HWTUs, sampling methodologies differ among the waste streams. The specific sampling methods and equipment used will vary with the chemical and physical nature of the waste material and the sampling circumstances. In all instances, the sampling methods adhere to guidance provided in SW-846 and other pertinent references published and accepted by the EPA. 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 4.1.

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 4.2. In all instances, sampling methods will conform to the representative sample methods referenced in WAC 173-303-110(2), i.e., American Society for Testing and Materials (ASTM) standards for solids and SW-846 for liquids.

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. Sampling methodologies are included in Table 4.2.

Table 4-1. Sample-Container Compatibility

Sample	Container		
	Plastic	Glass	Metal
Acids (except hydrofluoric acid)	*	*	
Hydrofluoric acid	*		
Alkali	*	*	
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.

Table 4-2. 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 conform to 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 4.1 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), reactivity, radiochemical parameters.
- 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. Radioactive dose rate permitting, 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 ~~duct~~ tape and are custody-sealed along the front and back edges of the lids. Samples are transported to offsite laboratories within 24 hours of collection. Samples are transported to offsite laboratories by overnight courier to ensure delivery within 24 hours of sample collection. 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.

4.1 Sample Custody

The generators or 325 HWTUs personnel are responsible for initiating and following chain-of-custody procedures. 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.

4.2 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.

4.3 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.

4.4 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.

4.4.1 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:

- Reactivity – HAZCAT oxidizer, cyanide, and sulfide tests. These tests will **not** be performed on materials known to be organic peroxides, ethers, and/or water-reactive compounds.
- Flashpoint/explosivity — by HAZCAT flammability Procedure B, explosive-atmosphere meter, or a closed-cup flashpoint-measurement instrument.
- pH - by pH meter or pH paper (SW-846 9041). This test will not be performed on non-aqueous materials (i.e., organic solvents).
- Halogenated organic compounds - by organic-vapor analyzer with a flame ionization detector, Chlor-D-Tect kits, or the HAZCAT fluoride, chloride, bromide, and iodide tests.
- Volatile organic compounds - by gas chromatograph/mass spectrometer or gas chromatograph (GC) with a photo- or flame-ionization detector.

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 redesignate 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.

4.5 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 land-disposal restrictions (LDRs). Information presented below describes how generators and 325 HWTUs personnel characterize, document, and certify waste subject to LDR requirements.

4.5.1 Waste Characterization

Before being received at 325 HWTUs, the RCRA waste characteristics, the level of toxicity characteristics, and the presence of listed waste 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.

4.5.2 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.

4.5.3 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 CDRR 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.

4.5.4 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 require 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.

4.6 Waste Analysis for Spills and Unknowns

In the event of a spill or release of DW 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 CDRR number.

3. The hard copy of the CDRR 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 the *325 HWTUs Contingency Plan.*

4. Respond to the spill in accordance with the requirements of the 325 Building Emergency Plan. The *325 HWTUs Contingency Plan* is implemented if there is a threat to human health or the environment.

5. A new CDRR will be filled out using the information from the original CDRR 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 the *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 *325 HWTUs Contingency Plan* to 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 CDRR for the waste cleanup will be filled out. The waste will then be designated and characterized.

5.0 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.

5.1 Testing and Analytical Methods

325 HWTUs customers will need to conduct analyses to provide information to fill out CDRRs, 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 either disposal via the RLWS, treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of the offsite TSD facility. Examples of the Waste-Treatment Verification form and the RLWS Disposal Log are included at the end of this section for informational purposes only. Any revision or update of these forms will be available at the 325 HWTUs for review and inspection. 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 radioactive nature of the samples handled.

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

5.2 Quality Assurance and Quality Control

Pacific Northwest National Laboratory 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 Laboratory's 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 up-to-date 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., Part A listing, restricted from storage at 325 HWTUs).

5.3 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 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.

5.4 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- application 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.

5.5 Data Collection/Sampling Objectives

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.

5.6 Analytical Objectives

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

5.7 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% of the total number of field samples taken. The 5% 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.

5.8 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% 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% 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.

5.8.1 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.

5.8.2 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, non-conformances, and corrective actions maintained by PNNL or other Hanford Facility contractors.

5.9 Record-Keeping

Records associated with the waste-analysis plan and waste-verification program are maintained by the waste-management organization. A copy of the CDRR 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.

Figure 5-1. RLWS Disposal Log

ITEM	Date Received	Generator Name	Org. Code	Lab No.	Principle Radionuclides	Hazards	Chemical Constituents	Neutralizing Agent	Amount	Final pH	Final Volume	Flush Volume	Init.	RLWS Approval No.

Figure 5-2. HWTU Waste Treatment Verification Form

HWTU REFERENCE #: ______________________ Date: ________________

GENERATOR NAME: ____

FACILITY ADDRESS: ______________________ PHONE #: ________________

CONTACT NAME: ______________________ TITLE: ________________

Constituents of Concern	Concentration to be Achieved	Actual Concentration After Treatment

Check One:

____ Waste meets all treatment standards

____ Waste requires further treatment

____ Waste treated to no residue

HWTU Signature ____

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6.0 SELECTING WASTE RE-EVALUATION FREQUENCIES

Essentially all of the waste received at the 325 HWTUs is characterized before acceptance.

Some analysis will be needed to verify that waste streams received by the 325 HWTUs conform to the information on the CDRR and or the waste analysis sheet supplied by the generator. If discrepancies are found between information on the CDRR, 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 redesignating 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 dangerous 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% 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, are greater than 20 mrem/h, contain greater than 10 nCi/gram of transuranic radionuclides, 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.

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7.0 SPECIAL PROCEDURAL REQUIREMENTS

7.1 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 3 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 (Hanford Facility Permit Condition II.Q1). 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.

7.2 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.

7.3 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.

7.4 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 Appendix 7A of the 325 HWTUs Part B Permit Application.

7.5 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 4.1 are recommended.

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