WASTE TREATMENT AND IMMOBILIZATION PLANT
CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

CHANGE CONTROL LOG

Change Control Logs ensure that changes to this unit are performed in a methodical, controlled, coordinated, and transparent manner. Each unit addendum will have its own change control log with a modification history table. The "**Modification Number**" represents Ecology's method for tracking the different versions of the permit. This log will serve as an up to date record of modifications and version history of the unit.

Modification History Table

Modification Date	Modification Number
09/05/2017	8C.2017.6F
08/2011	

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CHAPTER 6.0
PROCEDURES TO PREVENT HAZARDS

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CHAPTER 6.0
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TABLE OF CONTENTS

1 **ACRONYMS**

DST	Double-Shell Tank
EMF	Effluent Management Facility
FM	Factory Mutual
IHLW	Immobilized High-Level Waste
ILAW	Immobilized Low-Activity Waste
NFPA	National Fire Protection Association
TSD	Treatment, Storage, or Disposal
WTP	Waste Treatment and Immobilization Plant

2

6.0 INTRODUCTION

This chapter addresses hazard prevention at the Waste Treatment and Immobilization Plant (WTP). It covers the following topics: security; preparedness and prevention requirements; preventive procedures, structures, and equipment; and prevention of reaction of the ignitable, reactive, and incompatible waste at the WTP. ~~Information is presented in two formats: narrative and table. The Inspection Plan can be found in Appendix 6A.~~

6.1 Security

The entire Hanford Site is a controlled access area. For security, surveillance and access information for the Hanford Site, refer to the Hanford Site-wide Permit, Attachment 3. The remaining security is specific to the WTP site.

6.1.1 Security Procedures and Equipment

~~The entire Hanford Site is a controlled-access area. For surveillance information of the Hanford Site, refer to the Site-wide Permit.~~

The following sections describe the procedures and equipment used to prevent the unknowing entry, and to minimize the possibility for unauthorized entry into the WTP. Security methods include barriers, entry control through facility entrances and warning signs that support security and control access to the WTP.

6.1.2 Warning Signs

Warning signs, written in English, stating, "Danger – Unauthorized Personnel Keep Out," are provided in sufficient numbers ~~to be seen from areas that contain dangerous or mixed waste~~, are legible from a distance of at least 25 feet, and visible from any angle of approach to the active portions of WTP Washington Administrative Code (WAC) 173-303-310(2)(a). These warning signs will be posted at the following locations:

- ~~Around the perimeter of the active portion of the WTP facilities.~~
- On entrances ~~and exits~~ to enclosed buildings (i.e., Low Activity Waste [LAW]) where dangerous or mixed waste is actively managed.

~~Signs will be posted at the main site access entrance, instructing visitors to report to the WTP administration building to gain access to the WTP (Washington Administrative Code (WAC) 173-303-310(2)(a)).~~

Sign posting locations will be added to the WTP permit prior to managing any dangerous or mixed waste.

6.1.3 Surveillance and/or Barriers

~~The entire Hanford Site is a controlled-access area.~~ For continuous surveillance information of the Hanford Site, refer to the Hanford Site-wide Permit, Attachment 3. At the WTP facility, independent security contractors perform 24/7 guard coverage. The security force is responsible for controlling entry into the WTP facility via two access gates. In addition, the security force will perform random vehicle inspections, routine facility patrols and will be responsible for issuing visitor badges. Visitors must check in at the administration building located next to the main entry gate and will be escorted as required. Refer to Chapter 2.0 for information about the WTP fencing and control access gates.

The WTP facility uses two fences, one around the facility's perimeter and a second inner fence that controls access to dangerous waste management areas. In the Direct-Feed Low-Activity Waste (DFLAW) Configuration a controlled-access fence will encompass those facilities in operation (e.g., Analytical Laboratory [LAB], LAW and Effluent Management Facility [EMF]) which will be controlled-access area. The perimeter and inner fences are approximately 7-foot-high and made of chain link.

6.1.4 Waiver

No waivers of the security procedures and equipment requirements for the WTP are requested.

6.2 Preparedness and Prevention Requirements

This section describes the preparedness and prevention measures employed by the WTP to avoid or mitigate the possibility of a fire, explosion, or any unplanned sudden release of dangerous waste or dangerous waste constituents to air, soil, or surface water that could threaten human health or the environment. Further information on Emergency Preparedness and Prevention can be found in Chapter 7, "Building Emergency Plan."

6.2.1 Equipment Requirements

The following sections describe internal and external communications, and emergency equipment required and located at WTP.

6.2.1.1 Internal Communications

The onsite communication system at the WTP provides immediate emergency information to facility personnel, and includes public address and alarm systems. The public address system provides for verbal instruction and communication to WTP personnel. The internal communication system also notifies personnel of the following local or plant-wide alarm-activated emergency situations: building evacuations, fire or explosion, radioactive discharges, and high airborne contamination. The ~~Contingency~~ Building Emergency Plan found in Chapter 7.0 provides additional information on the response activities.

6.2.1.2 External Communications

The WTP is equipped with devices for summoning emergency assistance from the Hanford Fire Department, the Hanford Hazardous Materials Response Team, or local emergency response teams, as necessary. External communication is via a telephone communication system. Telephones are available for staff use at numerous locations throughout the facility. ~~Under no circumstances will only one staff member be at the WTP site.~~ In addition, the current Hanford communication system is utilized as described in the *Hanford Emergency Management Plan* (DOE/RL-94-02), Section 5.2.

6.2.1.3 Emergency Equipment

Portable fire extinguishers, fire control equipment, spill control equipment, and decontamination equipment are available to personnel at the WTP. A list of emergency and decontamination equipment is provided in the ~~Contingency~~ "Building Emergency Plan," Chapter 7.0.

6.2.1.4 Water for Fire Control

The primary water supply for fire protection is provided from the 200 East Area raw water distribution system. The fire water supply system comprises two water storage tanks designed to National Fire Protection Association (NFPA) 22, *Standard for Water Tanks for Private Fire Protection* (NFPA 1998); and Factory Mutual (FM) Data Sheet 3-2, *Water Tanks for Fire Protection* (FM 2001a). Each water storage tank is capable of supplying fire-water for a minimum of two hours at the maximum anticipated demand.

The pumping system is being designed to NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection* (NFPA 1999a), and Factory Mutual Data Sheet 3-7N, *Stationary Pumps for Fire Protection* (FM 2001b). A fire pump is installed and connected to each water storage tank. Each pump is capable of providing the maximum system demand and is connected to the underground distribution system in a manner that prevents single failure from disabling both water supplies.

The underground distribution piping and valving is designed and installed according to NFPA 24, *Standard for Installation of Private Fire Service Mains and Their Appurtenances* (NFPA 1995); and Factory Mutual Data Sheet 3-10, *Installation and Maintenance of Private Fire Service Mains and Their Appurtenances* (FM 2000).

The distribution system in the various buildings and structures are being designed following the various appropriate codes and standards that apply to their specific occupancy. The standards include NFPA 13, *Standard for the Installation of Sprinkler Systems* (NFPA 1999b); NFPA 14, *Standard for the Installation of Standpipe, private Hydrant, and Hose Systems* (NFPA 2000); NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection* (NFPA 1996); and the appropriate Factory Mutual standards, as required.

6.3 Aisle Space Requirement

Aisle spacing will be maintained throughout the facility buildings to allow access of personnel and equipment responding to fires, spills, or other emergencies.

Evaluation of the 30 in. aisle spacing requirement by the United States Department of Energy, WTP, United States Environmental Protection Agency, and Department of Ecology (Ecology) for Immobilized Low-Activity Waste (ILAW) and Immobilized High-Level Waste (IHLW) containers/canisters concluded that aisle spacing in the range of 4 to 16 in. was adequate based on personnel safety and the immobilization of the waste.

Additional information about the ILAW and IHLW containers/canisters is located in ~~Appendix~~ Chapter 6A, Section 6A.4.1. Secondary wastes stored in container storage areas will meet the 30-inch minimum aisle space requirement.

6.4 Preventive Procedures, Structures, and Equipment

The following sections describe preventive procedures, structures, and equipment. Refer to Chapter 4.0 for additional information on feed transfer piping and tank overfill protection structures, equipment, and instrumentation.

6.4.1 Unloading/Loading Operations

Waste feed to be treated at the WTP is received from the Double-Shell Tank (DST) System staging tank through underground waste transfer lines. These waste feed transfer lines are equipped with secondary containment; leak detection; and cathodic protection, as required. During DFLAW configuration, the waste transfer lines have been designed to be isolated from the soil environment; thus, not requiring cathodic protection. The WTP will not receive waste for treatment in containers.

The filled ILAW and IHLW containers and canisters are loaded for transport using special shielding and heavy lifting equipment. The immobilized waste presents no hazards from spills, leaks, run-off, or chemical exposures to personnel from the dangerous waste constituents because the waste is solid (contains no free liquids) and the containers are permanently sealed.

Containers of secondary waste bound for transport to another treatment, storage, and disposal facility (TSD) will be packaged according to the federal, state, and local regulations, as detailed in Chapter 4.0, "Process Information."

6.4.2 Runoff

Waste stored and treated inside the LAW & High Level Waste (HLW) facilities and Pretreatment Plant cannot come into contact with precipitation and therefore, cannot contaminate runoff from WTP structures, nor can precipitation enter secondary containment for the process and storage areas within the plants. Additionally, the process vessels located outside are surrounded by a concrete berm lined with a protective coating for secondary containment. The concrete berm ~~will be~~is designed to hold 100% of the capacity of the largest tank within the berm; ~~in addition to~~and are~~,~~ capable of containing the volume of a

25-year, 24-hour rainfall event, as required under WAC 173-303-640(4)(e)(i)(B)~~determined by a 25-year storm~~. Spills, leaks, or precipitation in the berm will be collected in a sump located within the bermed area and analyzed. Based on the analysis results, the waste may be containerized and managed as secondary waste or pumped back into the associated process.

6.4.3 Contamination of Water Supplies

The active portions of the facility are being designed with robust structural features such as thick, reinforced concrete floors and walls; secondary containment (lined with stainless steel or other protective coating); and off-gas treatment systems. The structural features alone are designed to prevent waste feed from contacting the environment. Operation of the WTP is also intended to prevent a release of waste to the environment. The WTP design, construction, and operation prevents waste feed and secondary waste from contaminating groundwater and drinking water supplies (see Chapter 4.0 for structural design information).

Raw and potable water is supplied to the WTP via separate underground lines from the 200 East Area water treatment and distribution system. Backflow preventers or interconnection breaks ensure that in the event water is contaminated at the WTP, the water cannot flow back into the water systems' sources. There will be no connections between potable water and raw water systems, or between the potable water system and piping that will contain mixed waste.

6.4.4 Equipment and Power Failures

Should there be a partial or total loss of electrical power to the WTP, automatic measures ensure the plant is in a safe operational configuration. Safe operational configuration is defined as a shutdown to minimal operations that prevents releases and prevents unnecessary damage to the equipment.

The emergency power system consists of ~~two~~ one diesel turbine driven automatically controlled emergency generator~~s~~ and one standby diesel engine generator. The emergency and standby generators are connected to three separate 4.16kV emergency switchgears. The ~~two~~ emergency turbine generator~~s~~ support~~s~~ safety class systems in the Pretreatment and HLW facilities. The standby diesel generator supports the non-safety systems in the LAW Facility. In the DFLAW configuration, emergency power will be reliant on uninterruptible power supply systems.

Upon loss of power the emergency diesel turbine generator~~s~~ automatically start~~s~~. The emergency diesel turbine generator~~s~~ ~~are~~ is capable of starting, accelerating, and being loaded with the design load in a specified time limit. The standby diesel generator is started manually or automatically in the event of a prolonged loss of offsite power. The emergency power system is connected to essential loads in order to ensure only a short-term power interruption for those loads designated as essential. Critical indications and controls are backed up by uninterruptible power supplies and batteries.

Egress lighting consists of self-contained fixtures with battery packs and charging systems. These lighting systems are located in stairways, exit routes, and fire alarm stations and activate automatically upon loss of normal power to the fixture. A selected part of the normal lighting operates as essential lighting, and provides a minimum level of illumination throughout the plant to aid in restoring the plant to normal operation. Essential lighting is powered by the emergency power system and is available whenever power supplies are interrupted.

Selected instrumentation and controls are unaffected by a loss of offsite power, since many of these instruments and controls are powered by uninterruptible power supply systems. The uninterruptible power supply systems are battery backed, and the battery chargers are connected to the emergency power supply. Emergency lighting, such as in the central control room, is connected to an uninterruptible power supply system. Radiation monitoring using continuous air monitors and area radiation monitors are also powered by these systems and continue operating during power failure.

6.4.5 Personal Protection Equipment

Facility design, operating practices, and administrative controls are the primary means of preventing personnel exposure to dangerous and mixed waste. The following practices, structures, and equipment are intended to minimize personnel exposure to chemicals, radioactive contamination, and radiation exposure:

- Remote operation and viewing.
- Active ventilation that moves air from uncontaminated zones to progressively more contaminated zones.
- Waste cutoff systems that automatically keep operations in a safe condition.
- Secondary containment for liquids.
- Offices, control rooms, change rooms, and lunchrooms that are situated to minimize casual exposure of personnel.

Before the start of an operation that might expose employees to the risk of injury or illness, a review of the operation is performed to ensure the appropriate protective gear is selected. Personnel are instructed to wear personal protective equipment in accordance with training, posting, and instructions. The inspection schedule for personal protective equipment is found in Table 6A-1; however, the specific items listed as personal protective equipment is in the ~~Contingency~~ "Building Emergency Plan," Chapter 7.0~~, Table 7.5-4 and not duplicated here~~.

6.4.6 Prevent Releases to the Atmosphere

The WTP off-gas treatment systems are the primary means of preventing contaminated releases to the atmosphere. The procedures, structures, and equipment used in these systems are described in Chapter 4.0.

6.5 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste

While operating in the DFLAW configuration, WTP will not accept and/or treat mixed waste that carries the D001 (ignitable) waste code and/or the D003 (reactive) waste code. While operating in the baseline configuration, WTP may accept mixed waste that carries the D001 (ignitable) waste code and/or the D003 (reactive) waste code. Once waste has been received, process knowledge will be used to remove the D001 and D003 waste codes. Waste initially characterized as reactive and/or ignitable will only be stored in dangerous waste management units designed for these waste codes.

~~The following analyses, at a minimum, will be conducted for each new DFLAW feed campaign in accordance with the methods prescribed in WAC 173-303-110: ammonia, pH, metals, organic acids, mercury, cyanide, volatiles, semi-volatiles, PCBs/pesticides, anions, total organic carbon, and compatibility (American Society for Testing and Materials Method D5058-90). Additionally, an evaluation of the LAW feed will have been performed to ensure that it does not carry waste codes D001 (ignitability) and D003 (reactivity) when transferred to the LAW Facility.~~

Tanks

Dangerous waste codes assigned to the waste in the DST System Dangerous Waste Part A Permit Application (DOE-RL 1996) apply to the waste feed the WTP receives. The waste feed includes the waste codes for ignitability (D001) and reactivity (D003), but the waste is not expected to exhibit the characteristics listed in WAC 173-303-090, *Dangerous waste characteristics* for these two waste codes. ~~Based on past process knowledge that includes the age, temperature, history, and chemical composition of the waste feed stored in the DST system, the waste codes D001 and D003 will be removed by the WTP.~~ Prior to receiving waste from the tank farms, waste must meet the criteria in the Waste Analysis Plan (Chapter~~Appendix~~ 3A or 3C).

Containers

Small amounts of ignitable (D001) and reactive (D003) waste may be generated as secondary waste during maintenance and laboratory operations. Secondary waste streams that designate as ignitable and/or reactive are managed in accordance with administrative procedures. Storage of ignitable wastes are protected from sources of ignition or reaction. When ignitable waste is being handled, smoking and open flames are prohibited from the vicinity of the ignitable waste. Smoking is prohibited within the WTP process buildings and areas where dangerous waste is managed. In addition, "No Smoking" signs are placed wherever a hazard exists from ignitable or reactive waste.

Large quantities of potentially incompatible waste are not expected to be generated through maintenance and laboratory operations. Administrative barriers will be put in place to prevent storage of incompatible waste within proximity to each other. For example, acids and bases are stored on separate portable secondary containment; oxidizers are ~~stored in areas~~ separated from combustible materials; and corrosive ~~chemicals are~~waste is stored ~~on a~~in separate secondary containment. In addition, storage areas are clearly marked with signs indicating appropriate waste type.