

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
10/23/2025	24590-WTP-PCN-ENV-25-001 (8C.2025.Q4)
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CHAPTER 6.0
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ACRONYMS

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

2

1 **6.0 INTRODUCTION**

2 This chapter addresses hazard prevention at the Waste Treatment and Immobilization Plant (WTP). It
3 covers the following topics: security; preparedness and prevention requirements; preventive procedures,
4 structures, and equipment; and prevention of reaction of the ignitable, reactive, and incompatible waste at
5 the WTP.

6 **6.1 Security**

7 The entire Hanford Site is a controlled access area. For security, surveillance and access information for
8 the Hanford Site, refer to Permit Attachment 3, "Security." The remaining security is specific to the WTP
9 site.

10 **6.1.1 Security Procedures and Equipment**

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

14 **6.1.2 Warning Signs**

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

- 19 • On entrances to enclosed buildings (i.e., Low-Activity Waste [LAW]) where dangerous or mixed
20 waste is actively managed.

21 Sign posting locations will be added to the WTP permit prior to managing any dangerous or mixed waste.
22 Sign posting locations for Direct Feed Low Activity Waste (DFLAW) facilities are shown in Figures 6-1,
23 6-2 and 6-3.

24 **6.1.3 Surveillance and/or Barriers**

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

32 The WTP facility uses two fences, one around the facility's perimeter and a second inner fence that
33 divides the site between High-Level Waste (HLW) and DFLAW. In the DFLAW, area access will be
34 controlled to those facilities in operation (e.g., Analytical Laboratory [LAB], LAW and Effluent
35 Management Facility [EMF]) by badge readers, locked doors or locked gates. The perimeter and inner
36 fences are approximately 7-foot-high and made of chain link.

37 **6.1.4 Waiver**

38 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 *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. 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 *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).

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

7 **6.3 Aisle Space Requirement**

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

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

15 Additional information about the ILAW and IHLW containers/canisters is located in Chapter 6A,
16 Section 6A.2.1.1 and 6A.2.1.2. Secondary wastes stored in container storage areas will meet the 30-inch
17 minimum aisle space requirement.

18 **6.4 Preventive Procedures, Structures, and Equipment**

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

22 **6.4.1 Unloading/Loading Operations**

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

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

32 Containers of secondary waste bound for transport to another Treatment, Storage, and Disposal (TSD)
33 Facility will be packaged according to the federal, state, and local regulations, as detailed in Chapter 4.0,
34 "Process Information."

35 **6.4.2 Runoff**

36 Waste stored and treated inside the LAW and HLW facilities and Pretreatment Plant cannot come into
37 contact with precipitation and therefore, cannot contaminate runoff from WTP structures, nor can
38 precipitation enter secondary containment for the process and storage areas within the plants.
39 Additionally, the process vessels located outside are surrounded by a concrete berm lined with a
40 protective coating for secondary containment. The concrete berm is designed to hold 100% of the
41 capacity of the largest tank within the berm; and are capable of containing the volume of a 25-year,
42 24-hour rainfall event, as required under WAC 173-303-640(4)(e)(i)(B). Spills, leaks, or precipitation in
43 the berm will be collected in a sump located within the bermed area and analyzed. Based on the analysis
44 results, the waste may be containerized and managed as secondary waste or pumped back into the
45 associated process.

6.4.3 Contamination of Water Supplies

The active portions of the facility are 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 one diesel turbine driven automatically controlled emergency generator and one standby diesel engine generator. The emergency and standby generators are connected to three separate 4.16kV emergency switchgears. The emergency turbine generator supports 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 automatically starts. The emergency diesel turbine generator 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:

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

8 Before the start of an operation that might expose employees to the risk of injury or illness, a review of
9 the operation is performed to ensure the appropriate protective gear is selected. Personnel are instructed to
10 wear personal protective equipment in accordance with training, posting, and instructions. The inspection
11 schedule for personal protective equipment is found in Table 6A-1; however, the specific items listed as
12 personal protective equipment is in the *Building Emergency Plan* (Chapter 7.0).

13 **6.4.6 Prevent Releases to the Atmosphere**

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

17 **6.5 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste**

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

24 Tanks

25 Dangerous waste codes assigned to the waste in the DST System Dangerous Waste Part A Permit
26 Application (DOE-RL 1996) apply to the waste feed the WTP receives. The waste feed includes the waste
27 codes for ignitability (D001) and reactivity (D003), but the waste is not expected to exhibit the
28 characteristics listed in WAC 173-303-090, *Dangerous waste characteristics* for these two waste codes.
29 Prior to receiving waste from the tank farms, waste must meet the criteria in the Waste Analysis Plan
30 (Chapter 3A or 3C).

31 Containers

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

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

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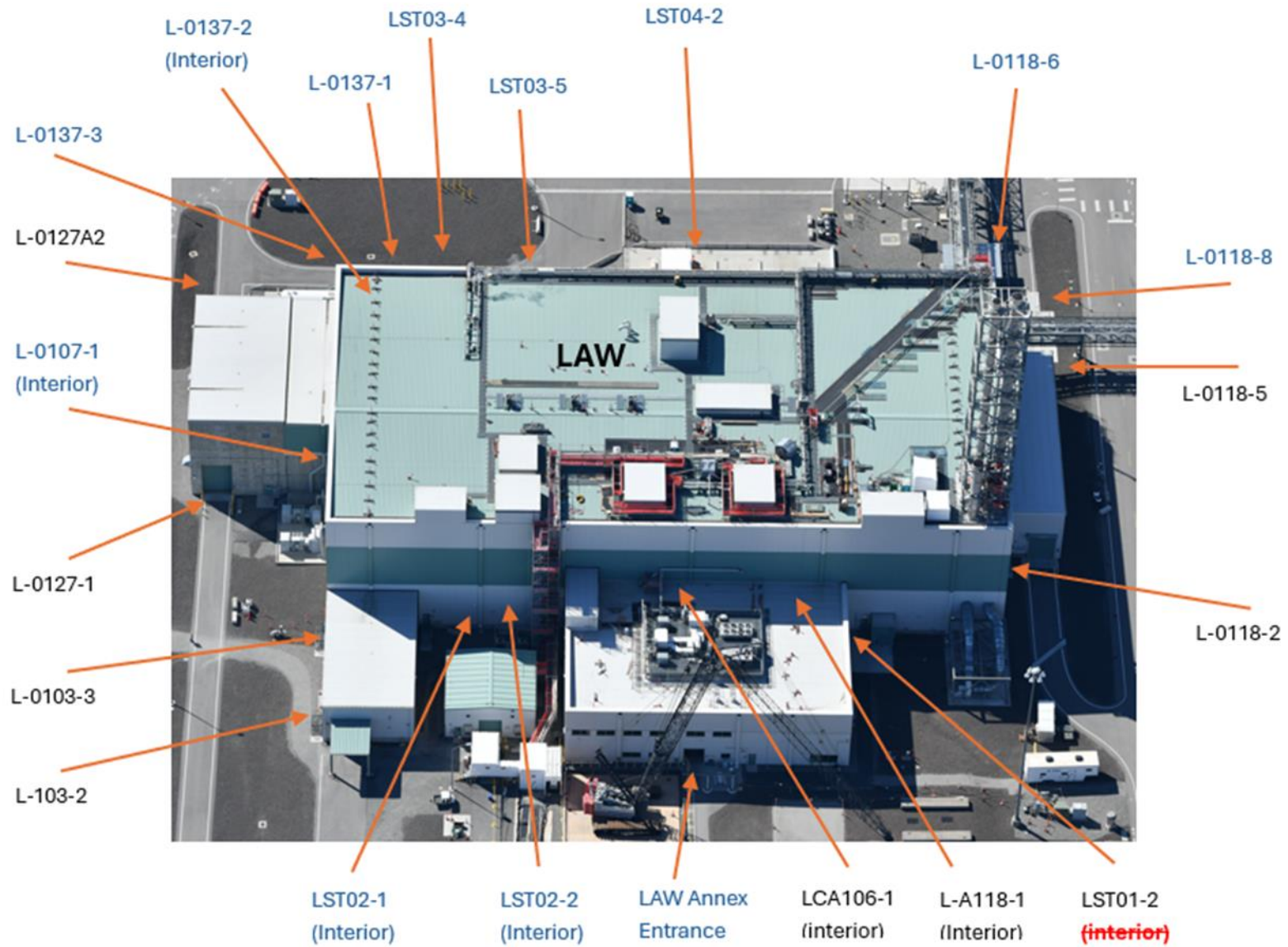
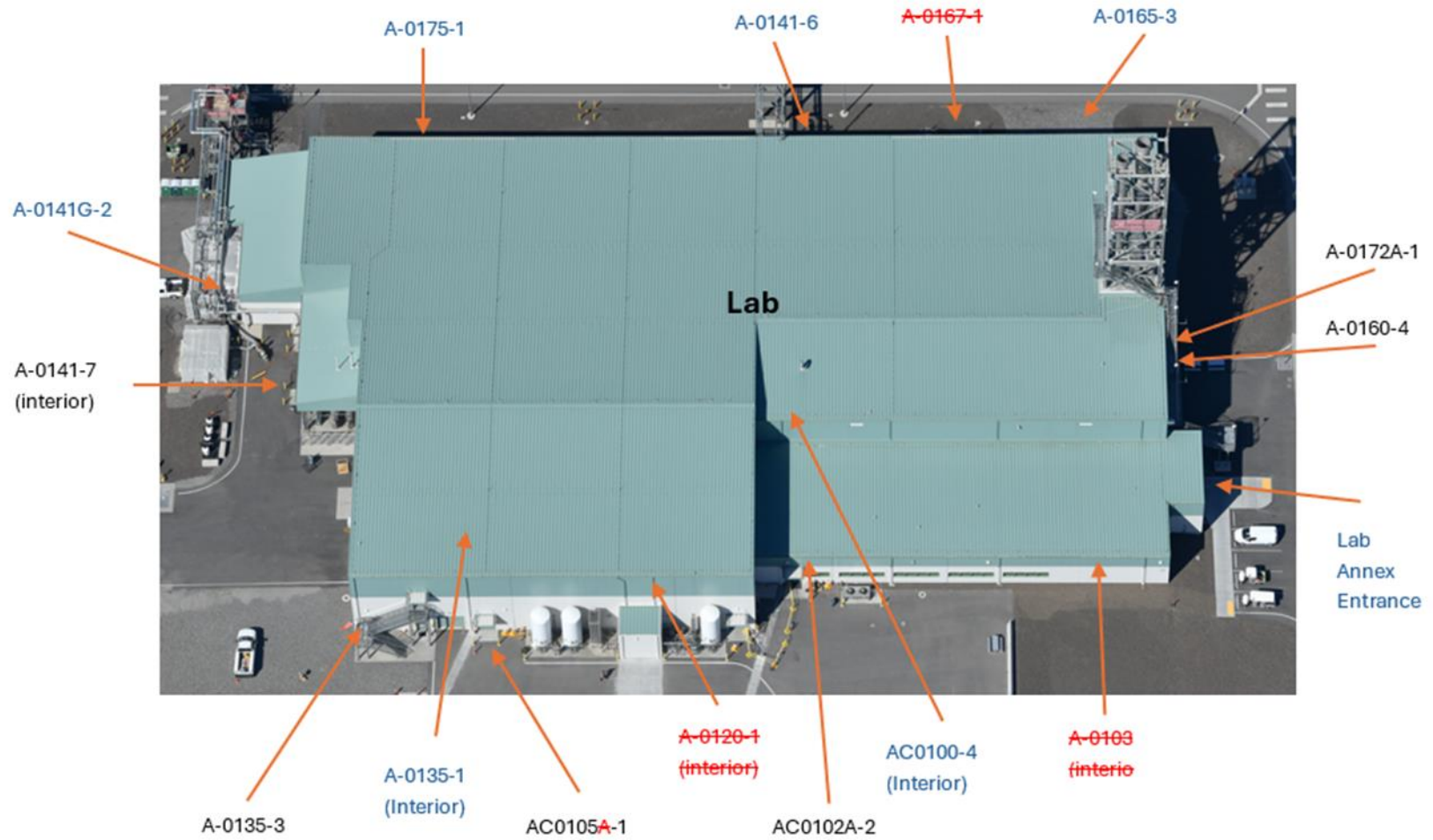
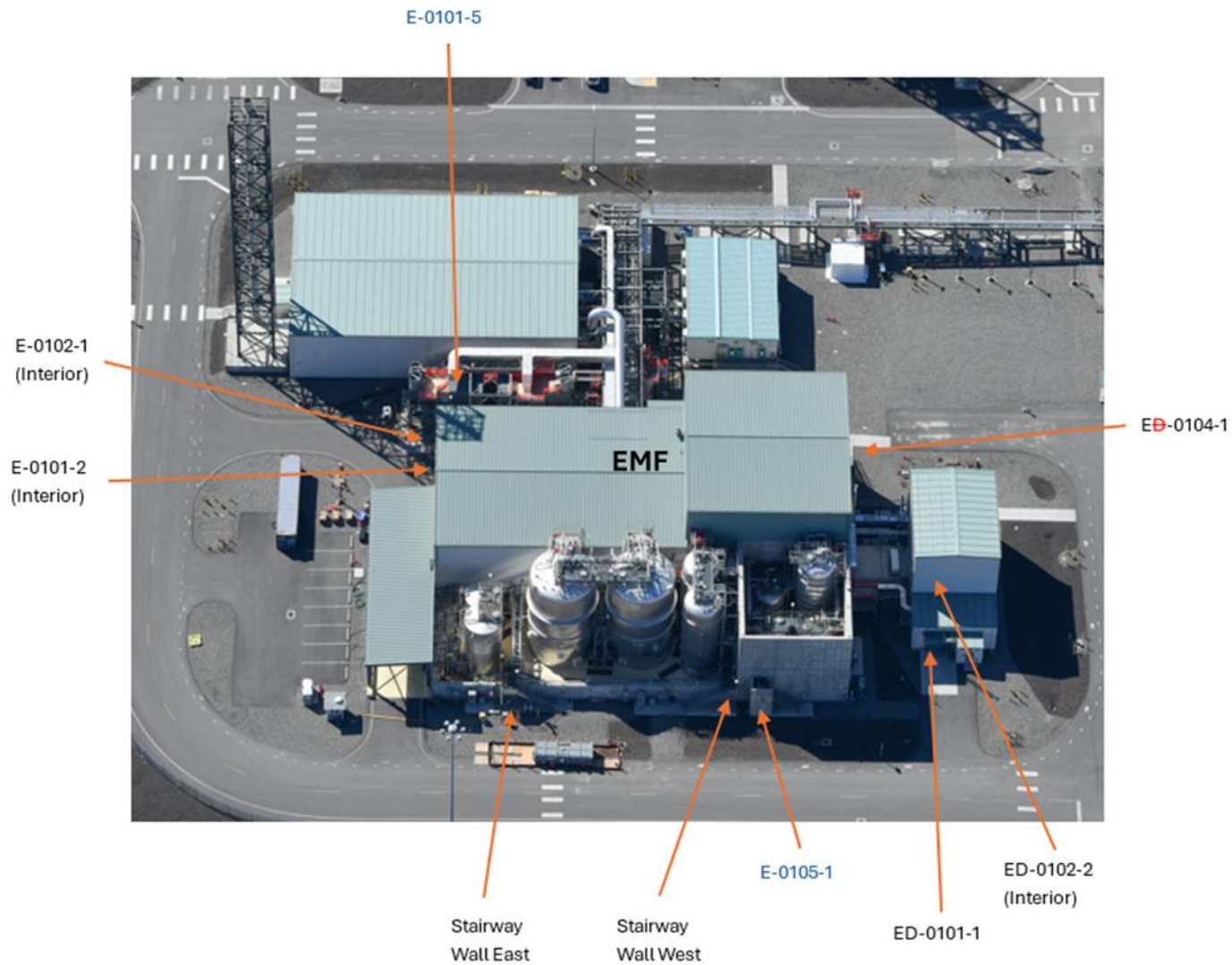


Figure 6-1 Low-Activity Waste Building Warning Sign Posting Locations



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Figure 6-2 Analytical Laboratory Building Warning Sign Posting Locations



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Figure 6-3 Effluent Management Facility Building Warning Sign Posting Locations

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