Document title: **Flooding Volume for 56 Ft Level in PT Facility**

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History Sheet

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Contents

Acronyms and Abbreviations

AEA	Atomic Energy Act of 1954
CNP	cesium nitric acid recovery process
DOE	US Department of Energy
FEP	feed evaporation process
FRP	feed receipt process
HLP	HLW lag storage and feed blending process
HLW	high-level waste
LAW	low-activity waste
PT	pretreatment
PWD	plant wash and disposal
TLP	treated LAW evaporation process
WAC	Washington Administrative Code

1 Introduction

The Washington Administrative Code, WAC 173-303-640(4)(e), addresses tank systems containing dangerous waste. This code requires that secondary containment systems be designed to contain 100 % of the capacity of the largest tank within its boundary. Also included in this report is the containment of the fire water discharge, where applicable, within the boundary of the secondary containment.

This report specifically addresses flooding scenarios to be contained within the pretreatment (PT) facility for 56 ft elevation and establishes the minimum requirements for secondary containment.

2 Applicable Documents

WAC 173-303, *Dangerous Waste Regulations*, Washington Administrative Code

3 Description

The PT facility receives low-activity waste (LAW) feed and high-level waste (HLW) feed from the Double-Shell Tank System. LAW feed and HLW feed are pumped through double-walled underground transfer lines to the PT facility.

The purpose of the PT facility is to pretreat the waste received from the Double-Shell Tank System and to transfer it to the LAW and the HLW vitrification facilities. Within the LAW and HLW vitrification facilities, the waste is formed into glass logs suitable for long-term disposal.

Within the PT facility, the LAW feed is transferred to the waste feed receipt process (FRP) vessels (FRP-VSL-00002A/B/C/D), while the HLW feed is sent to the HLW feed receipt vessel (HLP-VSL-00022). These wastes are temporarily stored in the vessels before being pumped and treated by the PT processing equipment.

These vessels are located in black cells and are not accessible. The black cells are arranged in a "U" shape around a central hot cell in the PT facility, where major processing equipment is located.

The hot cell is remotely maintainable with the use of a crane system. Below the center of the hot cell are 2 adjacent rooms in the deep pit at the -45 ft elevation. This is the low point for the PT facility. Within these rooms are the plant wash and disposal (PWD) ultimate overflow vessel (PWD-VSL-00033) and the HLW effluent transfer vessel (PWD-VSL-00043).

The FRP vessels are the largest in the PT facility. The flood scenario at 0 ft elevation addressed a postulated failure of 1 FRP vessel and the movement of its fluid from a black cell to the hot cell, and then to the -45 ft elevation pit in *Flooding Volume for PT Facility* (24590-PTF-PER-M-02-005). The flooding scenario also addressed the fire water pit at the -19 ft elevation.

The flood scenario at 28 ft elevation addressed discharge of fire protection equipment in *Flooding Volume for 28 Ft Level in PT Facility* (24590-PTF-PER-M-001).

This document addresses areas at the 56 ft elevation for secondary containment.

3.1 Elevation 56 Ft

3.1.1 Rooms P-0301, P-0302, P-0303, P-0303B, P-0304, P-0307, P-0311, P-0317, P-0320, P-0324, P-0325, P-0326, P-0332B, P-0335, and P-0336

There are no regulated tanks or vessels located on the 56 ft elevation in this facility.

Rooms P-0301, P-0302, P-0303, and P-0336 are located in the south side of the PT facility and contain regulated bulges and various items of regulated system ancillary equipment.

Rooms P-0303B and P-0307 are located in the west side of the PT facility and contain regulated bulges and various items of regulated system ancillary equipment.

Room P-0304 is located in the south side of the PT facility and contains regulated miscellaneous units for the waste feed evaporation system. The waste feed evaporator primary condensers (FEP-COND-00001A, FEP-COND-00001B), waste feed evaporator intercondensers (FEP-COND-00002A, FEP-COND-00002B), waste feed evaporator aftercondensers (FEP-COND-00003A, FEP-COND-00003B), and various items of regulated system ancillary equipment are located in this cell.

Room P-0311 is located in the north side of the PT facility and contains regulated bulges and various items of regulated system ancillary equipment.

Rooms P-0317 and P-0324 are located on top of the hot cell and contain regulated bulges and various items of regulated system ancillary equipment.

Room P-0320 is located in the north side of the PT facility and contains a regulated miscellaneous unit for the cesium nitric acid recovery system. The cesium evaporator nitric acid rectifier (CNP-DISTC-00001) and various items of regulated system ancillary equipment are located in this cell.

Room P-0325 is located in the north side of the PT facility and contains regulated miscellaneous units for the treated LAW evaporation system. The treated LAW evaporator primary condenser (TLP-COND-00001), treated LAW evaporator intercondenser (TLP-COND-00002), treated LAW evaporator aftercondenser (TLP-COND-00003), and various items of regulated system ancillary equipment are located in this cell.

Floor drains are provided to direct any potential leakage or spillage from the ancillary equipment in the above regulated areas to the C3 floor drain collection vessel (PWD-VSL-00046). A curb has been provided at the walls between the dangerous waste regulated and non-regulated areas to prevent waste migration from regulated areas to C2 areas. Entries to containment areas have drainage trenches immediately in front of them to prevent firewater or other material from flowing into C2 areas.

The flood volume for these regulated areas is based principally on the discharge of the fire protection sprinkler system with only minimal contribution from leakage of ancillary equipment and miscellaneous treatment units. Therefore, no formal calculation for flood height is provided in this document. The floor drains and curbs are sized for 20 minutes of fire sprinkler water. The floor and curbing for the regulated areas are lined with a special protective coating to a minimum height of 3 inches.

Room P-0326 is located on top of the hot cell and contains a regulated miscellaneous unit for the pretreatment vessel vent process system. The after cooler (PVP-CLR-00001) is located in this cell. This

unit normally operates with a dry process stream and has localized containment to confine any potential leakage or spillage.

Room P-0332B is located in the east side of the PT facility and contains various items of regulated system ancillary equipment. A C5 floor drain is provided to direct any potential leakage or spillage from the ancillary equipment to the ultimate overflow vessel (PWD-VSL-00033).

Room P-0335, the filter cave room, is an inaccessible C5 area located on the south side of the PT facility and contains regulated miscellaneous units for the pretreatment vessel vent process system and the pulse jet ventilation system. The high efficiency mist eliminators (PVP-HEME-00001A, PVP-HEME-00001B, and PVP-HEME-00001C) and the demisters (PJV-DMST-0002A, PJV-DMST-0002B, and PJV-DMST-0002C) are located within this cell. These units are contained within separate concrete bermed areas lined with stainless steel. Each bermed area has a C5 floor drain to direct any potential leakage or spillage from the ancillary equipment to the ultimate overflow vessel (PWD-VSL-00033). Each drain is equipped with leak detection instrumentation.