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Notice

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History Sheet

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Contents

Notice..... ii

History Sheet iii

Acronyms and Abbreviationsv

1 Introduction1

2 Applicable Documents.....1

3 Description1

3.1 Elevation 77 Ft 2

Acronyms and Abbreviations

AEA	Atomic Energy Act of 1954
CNP	cesium nitric acid recovery process
DOE	US Department of Energy
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
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 77 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. This mixed waste feed is 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 containment of dangerous waste releases and discharge of fire protection equipment in *Flooding Volume for 28 Ft Level in PT Facility* (24590-PTF-PER-M-03-001).

The flood scenario at 56 ft elevation addressed containment of dangerous waste releases and discharge of fire protection equipment in *Flooding Volume for 56 Ft Level in PT Facility (24590-PTF-PER-M-04-001)*.

This document addresses areas at the 77 ft elevation for secondary containment.

3.1 Elevation 77 Ft

3.1.1 Rooms P-0402, P-0407, P-0410, P-0411, P-0415, P-0415A, P-0422A, P-0423, P-0425, P-0426, P-0430, and P-0431A

There are no regulated tanks or vessels located on the 77 ft elevation in this facility.

Rooms P-0402, P-0422A, P-0423, P-0425, and P-0426 are located in the south side of the PT facility and contain regulated bulges and various items of regulated system ancillary equipment.

Room P-0407 is located in the west side of the PT facility and contains various items of regulated system ancillary equipment.

Rooms P-0410, P-0411, P-0415, and P-0415A are located in the north side of the PT facility and contain regulated bulges and various items of regulated system ancillary equipment.

Room P-0430 is located in the north side of the PT facility and contains regulated miscellaneous units for the cesium nitric acid recovery system. The cesium evaporator primary condenser (CNP-HX-00002), the cesium evaporator inter-condenser (CNP-HX-00003), the cesium evaporator after-condenser (CNP-HX-00004), and various items of regulated system ancillary equipment are located in this cell. All three of the heat exchangers are free flowing units designed not to retain dangerous waste.

Room P-0431A is located in the interior of the PT facility and contains various items of regulated system ancillary equipment.

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 dangerous waste or other liquids (such as firewater) from flowing into C2 areas.

The flood volume for these regulated areas is based principally on the discharge of the fire protection sprinkler system. Minimal contribution from leakage of ancillary equipment and miscellaneous treatment units is considered because these plant items are designed not to retain dangerous waste, and because the floor drains direct potential leakage to PWD-VSL-00046. 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.