PUREX STORAGE TUNNELS
ADDENDUM F
PREPAREDNESS AND PREVENTION

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
12/17/2018	8C.2018.5F
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ADDENDUM F
PREPAREDNESS AND PREVENTION

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ADDENDUM F
PREPAREDNESS AND PREVENTION

TABLE OF CONTENTS

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F. PREPAREDNESS AND PREVENTION

F.1 Preparedness and Prevention Requirements

This addendum discusses preparedness and prevention measures for the Plutonium Uranium Extraction Facility (PUREX) Storage Tunnels. The PUREX Storage Tunnels are permitted as miscellaneous units under Washington Administrative Code (WAC) 173-303-680 and comprise Closing Unit Group 25.

On May 9, 2017 workers discovered a portion of Tunnel Number 1 had collapsed, prompting an immediate response action to protect workers and the environment. A structural evaluation revealed the threat of further failure of Tunnel Number 1. An interim stabilization measure to fill Tunnel Number 1 with engineered grout was taken under Section J.4.5 of the PUREX Tunnels Contingency Plan and Permit Condition V.25.A.1 of the Hanford Facility RCRA Permit. Grouting in Tunnel Number 1 was completed in November 2017. Filling the tunnel void spaces with grout improved tunnel stability, provided additional radiological protection, and increased durability while not precluding final closure actions.

A structural evaluation also revealed the threat of future failure of Tunnel Number 2. To protect stored waste containers from potential damage caused by a tunnel failure event (e.g., puncture of a container by a falling structural member) and to prevent any associated release of dangerous waste constituents to the environment, an interim closure action to cover the stored waste and fill Tunnel Number 2 void spaces around the waste with engineered grout is being taken. Until grouting is completed, enhanced surveillance and monitoring measures have been implemented using video equipment to provide daily observation of the tunnel surface.

F.1.1 Equipment Requirements

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

F.1.1.1 Internal Communications

PUREX Storage Tunnel Number 1 is filled with grout and personnel entry is not possible. Because of the threat of structural failure, personnel entry into Tunnel Number 2 is prohibited. When grouting is completed in Tunnel Number 2, the tunnel will be filled and personnel entry will not be possible. No internal communications equipment is required.

F.1.1.2 External Communications

External communications equipment for summoning emergency assistance from the Hanford Fire Department and/or emergency response teams are provided by two-way portable radios or other devices during normal surveillance activities and during interim closure activities (grouting).

F.1.1.3 Emergency Equipment

Equipment included in the emergency plan for the PUREX Storage Tunnels is provided in Addendum J.

F.1.1.4 Water for Fire Control

The fire hazard associated with the operation of the PUREX Storage Tunnels was considered to be very low because of the minimal amount of combustibles stored within the tunnels and the lack of an ignition source. Filling the tunnels with grout during the response action for Tunnel Number 1 and interim closure for Tunnel Number 2 further isolates the waste from ignition sources and essentially eliminates the air supply required to sustain a fire inside the tunnels. During the grout curing period following placement, some heat of hydration is generated as a result of the curing process. However, because of the lack of available air, a fire inside the dangerous waste storage area would not be sustainable.

In the unlikely event it is determined there is a fire in the storage area of the tunnels, the contingency plan will be activated. Because of the potential of the mixed waste stored within the tunnels to leach, the use of water for fire control will be avoided if possible. Should the fire continue to propagate, heavy equipment and cranes will be called to the scene to cover burning segments of the tunnel Heavy equipment and cranes are readily available on the Hanford Facility at all times and generally are available for deployment to the scene of an emergency within 1 hour.

F.1.2 Aisle Space Requirement

Requirements for aisle space are not considered appropriate for the safe operation of the PUREX Storage Tunnels and were not included in design documents.

F.2 Preventive Procedures, Structures, and Equipment

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

F.2.1 Unloading Operations

Operation of the PUREX Storage Tunnels does not involve the loading or unloading of dangerous waste. No additional waste will be received into the tunnels. Therefore, the requirements of WAC 173-303-806(4)(a)(viii)(A) are not applicable to the PUREX Storage Tunnels.

F.2.2 Runoff/Run-On

The design of the PUREX Storage Tunnels included consideration and provisions for the control of runoff and run-on. Construction of both tunnels included the application of a moisture barrier before placement of the soil overburden. On Tunnel Number 1, 40.8-kilogram mineral surface roofing was applied to the external surfaces of the structural timbers (top and sides). The roofing material was nailed in place with an overlap of approximately 10 centimeters at all joints and seams. All interior and exterior steel surfaces of Tunnel Number 2 were coated with at least a 0.9-millimeter bituminous, solvent coal tar base, coating compound. The coating was applied using a two coat system, with each coat not less than 0.45 millimeters, ensuring a total dry film thickness of not less than 0.9 millimeter.

The soil overburden covering the PUREX Storage Tunnels also is contoured to provide a side slope of 2 (horizontal) to 1 (vertical). This construction serves to divert any seasonal or unanticipated run-on away from the storage area of the PUREX Storage Tunnels. Equipment used to support grouting of Tunnel Number 2 is designed to ensure that run-on is diverted away from the tunnel storage area. Grouting is not expected to impact the exterior contouring of either tunnel; however, when grouting is completed, visual observations of the side slopes will be conducted to confirm the contours remain in a condition to ensure proper runoff and to divert run-on away from the tunnel storage area.

Run-on at the PUREX Storage Tunnels is controlled by the design features of the exterior of the tunnels that serve to divert run-on away from the interior of the tunnels. Additionally, all waste within the tunnels is stored well above the floor level on railcars. The potential for run-on contacting the waste is further reduced after grouting because the grout encapsulates the waste to present another physical barrier between the source of potential run-on (generally precipitation outside the tunnel) and the waste. The control of run-on combined with the storage of all waste above the floor elevation and grout encapsulation provides adequate assurance that runoff will not occur at the PUREX Storage Tunnels and the potential for release of dangerous waste as a result of run-on is negligible. Groundwater at the PUREX Storage Tunnels is approximately 400 feet (120 meters) below ground surface.

For potential situations where a natural catastrophic event occurs, inspections as required by the Contingency Plan will be conducted to ensure the contours remain in a condition that ensures proper runoff and continues to divert run-on away from the tunnel storage areas.

F.2.3 Water Supplies

Water was supplied to the PUREX Storage Tunnels from the PUREX Plant. This water was used for the sole purpose of filling the water-fillable doors should it have been determined necessary. There are no other sources or uses of water at the PUREX Storage Tunnels. The line that supplied water to the PUREX Storage Tunnels was blanked and emptied during deactivation activities. The doors will not be refilled.

F.2.4 Equipment and Power Failures

The procedures, structures, and equipment used to mitigate the effects of equipment failure and power outage are described in the following sections.

F.2.4.1 Mitigation of the Effects of Equipment Failure

Maintaining safe storage of materials in the PUREX Storage Tunnels is not contingent on continued operation of equipment. Waste in Tunnel Number 1 is encapsulated with grout and requires no operating equipment. When Tunnel Number 2 grouting is completed, waste will also be encapsulated with no operating equipment required. Prior to and during grouting operations, the only operating equipment associated with Tunnel Number 2 is for video surveillance and for grout injection. In-person observation of the tunnel surface can replace video surveillance until equipment can be repaired or replaced. If equipment used in the grouting process fails, grouting can be temporarily halted without impact to safe storage of waste until the equipment is repaired or replaced.

F.2.4.2 Mitigation of the Effects of Power Failure

Maintaining safe storage of materials in the PUREX Storage Tunnels is not contingent on continued supply of electrical power. Waste in Tunnel Number 1 is encapsulated with grout and safe storage requires no electrical power. When Tunnel Number 2 grouting is completed, waste will also be encapsulated with no electrical power required. Prior to and during grouting operations, the only powered equipment associated with Tunnel Number 2 is for video surveillance and for grout injection. Equipment is powered using portable generators and batteries. If necessary, in-person observation of the tunnel surface can replace video surveillance and grouting can be temporarily halted without impact to safe storage of waste until power can be restored.

F.2.5 Personnel Protection Equipment

PUREX Storage Tunnel Number 1 is filled with grout, and personnel entry is not possible. Because of the threat of structural failure, personnel entry into Tunnel Number 2 is prohibited. After grouting is completed in Tunnel Number 2, the tunnel will be filled and personnel entry will not be possible. As a result, no special protective clothing or respiratory protection is required to protect personnel from the stored waste.

During grouting operations, personnel protection equipment will be determined by work control documents. Personnel are trained and qualified in using protective equipment.

F.3 Prevention of Reaction of Ignitable, Reactive, and/or Incompatible Waste

There is no reactive or incompatible waste stored in the PUREX Storage Tunnels. The only ignitable waste stored within the tunnels is silver nitrate, an oxidizer. The silver nitrate is present within the silver reactors (deposited on unglazed ceramic packing) stored in Tunnel Number 2.

Although silver nitrate exhibits the characteristic of ignitability, it is contained within stainless steel vessels, stored on railcars above the floor level, and isolated from combustible materials and other dangerous waste. Grout fill added to Tunnel Number 2 will be compatible with the ignitable waste although it is unlikely to directly contact the waste because the silver nitrate is contained within stainless steel vessels. Additional measures to prevent reaction of the ignitable waste are not considered necessary before, during, or after grouting.

F.4 Control of Releases to the Atmosphere

Releases to the atmosphere are not a concern from Tunnel Number 1 because the waste is encapsulated by the grout fill. When Tunnel Number 2 is grouted, the waste will be similarly encapsulated. During grouting operations at Tunnel Number 2, air expelled from the tunnel will pass through high-efficiency particulate air (HEPA) filters as described in Chapter 11 to ensure that releases to the atmosphere are not a concern.