Hanford Tanks status update

Ecology's report on Hanford tank waste retrieval and closure - Spring 2018

Tank closure involves an array of activities such as waste retrievals, soil contamination investigations, performance assessments, and permitting.

Progress of C-Farm SST Retrievals

Active retrieval of all single-shell tanks (SSTs) in Waste Management Area C (WMA C or C-Farm) is complete. Work is underway to complete all post retrieval sampling and end of retrieval data reports.

Retrievals are now completed for S-112 and all 16 C-Farm tanks. Less than 66,000 gallons of waste remains in the C-Farm SSTs, almost all of which is sludge. Final rinses with water after retrieval have removed much of dissolvable contaminants of concern from the sludge. Hose-in-hose transfer lines and ancillary equipment used for C-Farm retrievals are being removed to support preparation for future closure activities.

Now that C-Farm retrieval is complete, installation is underway for equipment including active ventilation for retrieving waste from the four AX-Farm tanks (498,000 gal total volume). The current plan is to then retrieve from the A-Farm tanks (900,000 gal total volume). Two of the six A-Farm SSTs (A-104 and A-105) are known leaking tanks that will provide special challenges for retrieval.

Gable Mt. north of the 200 Area holds importance for area tribes.

Interim Measures Project

There are two interim barriers at Hanford tank farms. They are at T and TY farms. They cover small sections of the farms with known leaking tanks. The T and TY barriers were 2-year demonstration projects, whose objective was to evaluate barriers' effectiveness in drying the vadose zone under the barriers. T barrier was the first one constructed, using a polyurea plastic as barrier material. TY barrier was constructed second, using modified asphalt.

While the asphalt TY barrier has held up very well, the yellow polyuria T barrier has not. However, both barriers continue to demonstrate drying of the vadose zone well past the intended 2-year demonstration period.

See Interim page 2

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SX Farm interim barrier

Two years ago Ecology approved construction of two small barriers covering portions of the SX farm. During the last year Ecology and DOE agreed that another section (termed an "SX barrier expansion") should be added in order to achieve barrier coverage over the whole farm. If possible, the three sections (i.e., the whole barrier) should be constructed at the same time. An evapotranspiration basin that will serve the SX barrier was built in 2017, and DOE plans to construct the barrier in 2018.

Modifications to M-45-56 to specify next interim barriers objectives and locations

Ecology and DOE are negotiating installation of more interim barriers to proactively minimize risks to human health and the environment from releases of contaminants from tank farms. There are about 160 tanks that still need retrieval. It will take many more years to retrieve all tanks, and tanks that are presently sound may deteriorate and leak their contents into the soil.

The objective of future interim barriers is to proactively minimize risks to human health and the environment. Future interim barriers will be installed over tank farms in the following order: TX, U, S, BY, A, AX, BX, B, T, TY. These farms have been prioritized planning those with the highest known inventories of technetium 99 (Tc99) and other contaminants that require water for travel in the vadose zone first, while also considering other risk factors.

Barriers are effective up to their depth of influence, which is a function of geology, weather, temperature, and chemical and physical properties of released waste materials, and other factors. For tanks that are currently sound but may start leaking due to aging, interim barriers would prevent rain or snowmelt intrusion from coming in contact with leaked contaminants. Barriers will prevent or slow down spreading in the vadose zone, and ultimately into the groundwater, of contaminants that are transported by water, Tc99 in particular.

Aerial view of SX farms and evaporation basin

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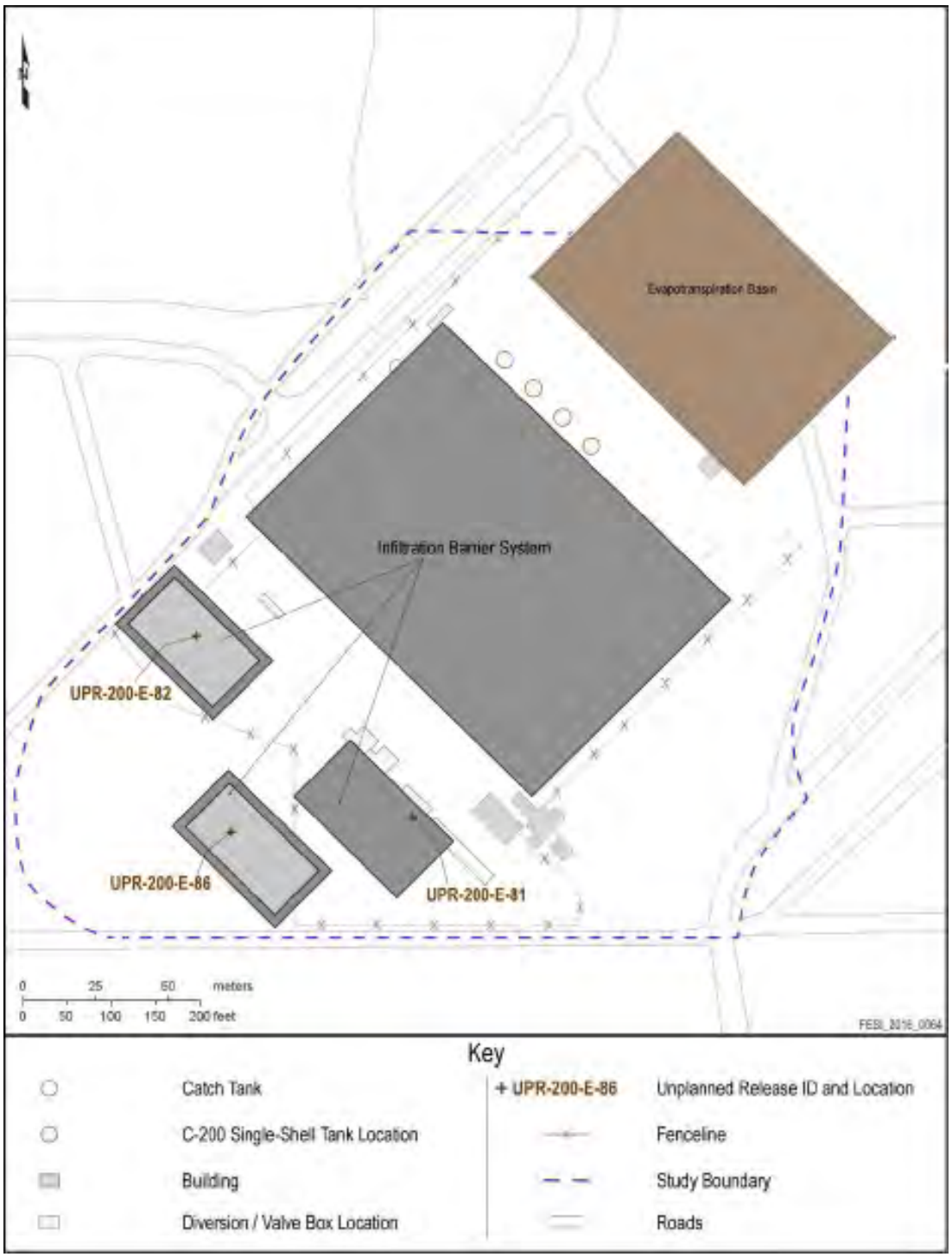
Corrective Measures Study (CMS) for WMA C

Ecology is reviewing RPP-RPT-59379, Waste Management Area C Phase 2 Corrective Measures Study Report. In the CMS DOE evaluated options for corrective measures for shallow vadose zone soils only. They did not evaluate corrective measures for waste remaining in the SSTs and ancillary equipment, and did not evaluate corrective measures for groundwater contaminated by WMA C.

For closure of WMA C DOE prefers a remedial alternative that consists of the following set of small isolation and infiltration barriers placed over select parts of the farm, see Figure 3-10.

Figure 3-10 from the CMS



1. Concrete isolation barriers over unplanned release areas, UPR-82 and UPR-86, where shallow soil contamination levels exceed direct contact human health and ecological risk thresholds.

2. Modified-asphalt infiltration barriers over the 100-series SSTs and UPR-81, and around the isolation barriers constructed at UPR-82 and UPR-86. Infiltration barriers would slow the migration of contaminants to the groundwater. The infiltration barriers would not reduce the anticipated peak impacts to groundwater, but there would be a reduction in contaminant flux over the long term.

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RCRA Facility Investigation (RFI) for WMA C (C-Farm)

Ecology is reviewing RPP-RPT-58339, Phase 2 RCRA Facility Investigation Report for Waste Management Area C.

The RFI addresses only soils. The remedy for groundwater under C-Farm is being addressed in DOE/RL-2009-127, Draft A, Remedial Investigation Report for the 200-BP-5 Groundwater Operable Unit. Ecology's position is that the RFI Report for WMA C should include a comprehensive conceptual site model and a summary of WMA C impacts on groundwater.

Performance Assessment (PA)

DOE transmitted the TPA Appendix I PA (IPA) for review by Ecology in October 2016. Ecology provided comments to USDOE on July 7, 2017, for all of these documents, and comment resolution process is in progress.

DOE expects to have the IPA available to the public in 2018.

Practicability Demonstration

Ecology is reviewing DOE/ORP-2014-02, Clean Closure Practicability Demonstration for the Single-Shell Tanks. Based on this document, USDOE has determined that SSTs will be landfill-closed. Ecology will make a landfill closure determination through the permit process, which includes public comment.

C-Farm has 12 large SSTs and four smaller tanks. It was the first tank farm built at Hanford.

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SST Tier 1, 2, and 3 Closure Plans

Closure plans for the single-shell tanks are defined in Tri-Party Agreement Appendix I. Tier 1 Closure Plan for the SST System is a "Framework Plan" that explains how USDOE intends to meet regulatory requirements pertaining to closure of all tank farms (WAC 173-303-610). Tier 2 Closure Plans will be developed for each of the WMAs to document how closure requirements specific to each WMA will be met. Tier 3 Closure Plans, or "Component Closure Activity Plans," will be developed for ancillary equipment or other components at each WMA. These closure plans will be part of the Hanford Sitewide Permit.

Ecology is reviewing: RPP-RPT-58858, *Tier 1 Closure Plan Single-Shell Tank System;* RPP-RPT-59389, *Tier 2 Resource Conservation and Recovery Act (RCRA) Closure Action Plan for Waste Management Area C; and* RPP-RPT-59390, *Tier 3 Resource Conservation and Recovery Act (RCRA) Component Closure Action Plan for 241-C-200 Series Tanks.*

242-A Evaporator

The 242-A Evaporator concentrates the waste in the double-shell tanks (DSTs) to reduce the waste volume. Operation of the 242-A Evaporator is essential to make space available for retrieval of waste from SSTs.

The most recent evaporator campaign (EC) EC-07 was completed in August 2017. It resulted in a net waste volume reduction of 315,000 gallons (after equipment and line flushes and water additions). Altogether about 2.7 million gallons of DST space has been recovered since the restart in 2014. The campaigns completed since the restart are summarized below. Two campaigns are planned for FY 2018.

An integrity assessment of 242-A Evaporator by an independent qualified registered professional engineer (IQRPE) was recently completed, and the report is under review. The purpose of the integrity assessment is to determine if the system is not leaking and is fit for use.

Evaporator Campaigns	Net Waste Volume Reduction (gal)
13-01 (September 2014)	701,000
EC-01 (May 2015)	381,000
EC-02 (July 2015)	384,000
EC-03 (September 2015)	375,000
EC-04 (April 2016)	258,000
EC-05 (April 2016)	46,000
EC-06 (July 2017)	210,000
EC-07 (August 2017)	315 000
TOTAL	**2,670,000**
EC-08 (expected in Apr 2018)	Est. 130,000
EC-09 (expected in June 2018)	Est. 130,000

Workers preparing equipment in the tank farms.

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Double-Shell Tanks (DSTs)

There are 28 double-shell tanks at the Hanford Site.

The following DST activities were completed in FY 2017:

- Enhanced annulus video inspections for tanks AN-102, AN-107, AP-101, AP-107, AW-105, AY-101, AZ-101, and AZ-102 found no problems.
- Ultrasonic testing inspections of the primary tank wall and secondary tank bottom for tanks AN-106, AY-101, and AZ-101 found no problems.
- Contamination in the annulus of AZ-101 was encountered during the ultrasonic inspection. The source was determined to be failure of one of three process waste lines which enter the tank from the side. Contamination had migrated out of the primary tank either due to overfilling or other process activities.
- Enhanced annulus visual inspections and ultrasonic testing inspections of tanks SY-101, SY-102, and SY-103 found no problems.

Work Planned in FY 2018 and beyond includes:

- Enhanced annulus video inspections in FY 2018 for tanks AP-102, AP-103, AP-104, AP-105, AP-106, AP-108, AW-101, AW-102, and AW-104.
- Ultrasonic testing inspections in FY 2018 for tanks AY-101, AZ-101, and AP-107
- Thinning of the outer tank bottom in the visible portion of the annulus of AP-102 was previously identified as a concern. Corrosion of the underside of the outer tank bottom via the leak detection pit is the probable cause. Additional ultrasonic testing inspection is planned of all four quadrants of the outer tank bottom in FY 2019.
- Modifications are planned to the DSTs to support Direct Feed Low Activity Waste (DFLAW) vitrification. Tank waste supernatant will be treated using ion exchange to remove Cesium-137 prior to DFLAW vitrification. The scope of the DST modifications is being defined.

Photo of DSTs under construction, mid 1970s

AY-102 Recovery Project

Tank AY-102 was the first of the 28 DSTs constructed at the Hanford Site. In 2012, waste was observed to have leaked from the primary (inner) tank to the secondary (outer) tank; the space between both tanks is known as the annulus. The AY-102 Recovery Project was established to retrieve waste from AY-102 and transfer it to sound DSTs. Pumping of waste from AY-102 started on March 3, 2016, by pumping liquid supernatant to AW-105, followed by sludge retrieval to AP-102.

Retrieval to the limits of the selected technology was completed in February 2017. About 14,000 gallons of waste remains in the primary tank and less than 4,000 gallons is in the annulus. No waste is believed to have leaked to the environment.

Work is underway to develop a closure plan for AY-102.

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