



Hanford Tanks

status update

Ecology's report on Hanford tank waste retrieval and closure - Fall 2019

Ecology's goal for cleaning up tank farms is to make sure that we close them as safely as practicable. In addition, while we are doing clean up and closure, we are taking some preventative measures to minimize any environmental effects from the waste that is already in the soil or waste that may escape a single-shell tank (SST) during retrieval.

To make closure decisions we need information about the soil contamination, possible remedies, and the effects of waste that remains in the soil and tanks after we finish cleaning up as much as possible. Closing the SST's gets very complicated with all of the regulations and work activities needed. This publication provides you with a summary of the work being done for the SST's and for the C-farm.



Figure A. Features seen on the interim barrier provide access to tanks and infrastructure beneath the barrier. These features are capped to prevent moisture from seeping through the barrier into the soil and water table below.

Interim barriers update

Installation of interim barriers over all un-retrieved tank farms is a high priority for Ecology due to the slow progress of single-shell tank retrievals at Hanford tank farms. The aging SSTs are likely to deteriorate before The U.S. Department of Energy (USDOE) is able to retrieve them. Interim barriers are needed to protect the soils and groundwater from becoming contaminated by likely future dangerous and radioactive waste leaks from aging tanks which may not be retrieved for many years to come.

USDOE has installed interim barriers over parts of T and TY Farms, and an interim barrier over the entire SX farm. The SX Interim Barrier was completed in 2019. It includes the runoff evapotranspiration retention basin seen in the photograph on Figure B. Ecology has approved design for construction of the barrier in the TX Farm, and USDOE has agreed to install an interim barrier over the U farm next.

Ecology is negotiating with USDOE for the installation of interim barriers over Hanford's remaining SSTs farms, in the following order: S, BY, A, AX, BX, B, T, TY. These farms were prioritized on a risk-basis according to the amount of technetium-99 (which is highly soluble and easily transported by water) and other contaminants in the tanks, while also considering other factors.

For more information:

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To request materials in a format for the visually impaired, visit <https://ecology.wa.gov/accessibility>, call Ecology at 360-407-6831, Relay Service 711, or TTY 877-833-6341.

Milestone M-45-93 Approved by Ecology, USDOE

Many of Hanford's SSTs were interim stabilized by removing pumpable liquids to standards specified in a consent decree. However, there is liquid still remaining in the 132 SSTs that at the time were unretrievable. Milestone M-45-93 was established to investigate the options to remove more liquids from the SSTs, by putting the remaining waste into a form that would prevent additional potential leaks.

The milestone requires that, "[USDOE] Submit for Ecology's review and approval, as a Primary Document, a report that includes the following: (1) a description and analysis of each alternative method and technology for removing drainable liquids from the SSTs; (2) a proposed selection of the preferred liquid removal method and technology for each SST identified in the SST Liquids Report; (3) a proposed sequence for removing drainable liquids from the SSTs identified in the SST Liquids Report." The milestone is due June 20, 2020.

Ecology's expectation for C-Farm closure actions identified in the Corrective Measures Study

The USDOE-preferred alternative for closure of C-Farm described in the Corrective Measures Study (CMS) consists of a set of small isolation and infiltration barriers placed over select parts of the farm.

Ecology approved the Remedial Facility Investigation (RFI) and CMS with the requirements that a barrier must completely cover the C-Farm. Ecology also acknowledged that groundwater remediation will be managed through the 200-BP-5 and 200-PO-1 CERCLA Groundwater Operable Units (OUs), with an expectation that remediation of groundwater should be coordinated with closure actions at C-Farm.

Integration of WMA-C closure with actions for groundwater OUs

The Tri-Party Agencies are pursuing an interim record of decision (IROD) for the 200-BP-5 and 200-PO-1 OUs to expedite remediation of known groundwater contaminant plumes. These are more efficiently remediated in the near-term and to support a RCRA corrective action decision for WMA-C and other areas at Hanford.

The 200-BP-5 AND 200-PO-1 Groundwater Operable Units Feasibility Study for Interim Action (DOE/RL-2018-30 Draft) includes fate and transport modeling which predicts that, without remedial action, it will take 15 years, for groundwater concentrations of Tc-99 present under C-Farm, to reach drinking water standards (DWS).

This estimate did not include additional future impacts to groundwater from sources of Tc-99 remaining in the vadose zone soils. The preferred alternative identified in DOE/RL-2018-30 includes three new extraction wells (Figure C), located immediately downgradient from the C and A-AX Farms in order to contain contaminants in comingled groundwater plumes.



Triangles indicate three new injection wells downgradient of C-Farm.

Surface Barrier

The Record of Decision (ROD) for Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site (TC&WM EIS, DOE/EIS-0391) states the following:

- After waste is removed from the tanks, they will be grouted and contaminated soil may be removed.
- The SSTs will be closed as landfill closure under RCRA.
- The area will be covered with a RCRA Subtitle C barrier, modified to provide 500-year protection.
- Landfill closure will be followed by post-closure care.

The ROD requirement for a RCRA barrier is reflected in the [Draft Waste Incidental to Reprocessing Evaluation for Closure of Waste Management Area C at the Hanford Site, March 2018 \(WIR\)](#).

The actual design of the surface barrier for WMA-C does not exist yet, but the WIR includes a baseline design of a RCRA Subtitle C barrier, with a stipulation that it will be modified by the addition of ~15 ft of soil (Figure B).

The WIR uses expected performance of this design configuration in building the fate and transport model for C-Farm after closure. Prior to barrier construction, specific closure barrier designs will be evaluated and the most appropriate design will be selected for construction.

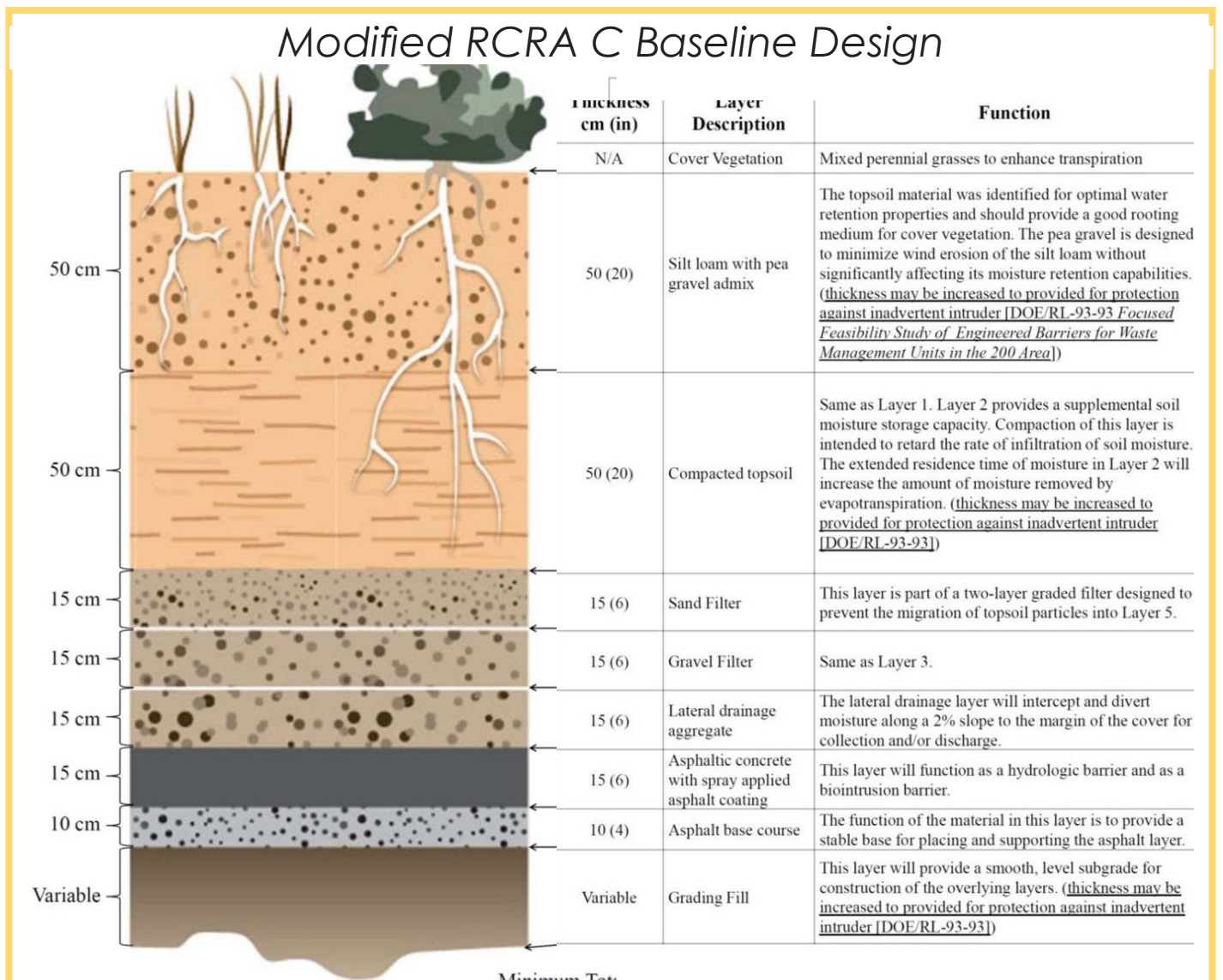


Figure B. Modified RCRA C Baseline Design (ref: WIR Figure 2-27)

Waste Management Area C (C-Farm) status update

Ecology is in the process of developing a permit modification to Rev. 8C of the Sitewide Permit to incorporate the Waste Management Area (WMA)-C Closure Plan. The public will have a chance to comment on the proposed closure activities through the public comment process, before it is approved.

This permit mod will include RCRA requirements for landfill closure of C-Farm. It has specific requirements for individual tanks and structures in the farm – for example, grouting to prevent subsidence after a barrier is placed over the farm.

Ecology and USDOE are negotiating enforceable TPA milestones for retrieving waste from the catch tanks and a vault in C-Farm, and non-enforceable target milestones for initiation of post-retrieval closure actions for the area.

Citing concerns about soil contamination, Ecology denied USDOE's request for a regulatory waiver of the Appendix H residual criteria for single shell tank C-106. We will reconsider USDOE's request once the Nuclear Regulatory Commission's (NRC) review of the WMA-C performance assessment (PA), expanded to include consideration and analysis of allowable waste residuals in the soil column, is complete. Ecology is not requiring USDOE to perform additional retrieval for C-106 at this time, pending resolution of the ongoing dispute.



An elk grazing on the Hanford site.

Retrieval underway in A-AX Farms

Now that C-Farm retrieval is complete, retrieval work is shifting to A-AX Farms, which includes six A tanks and four AX tanks. While essentially all of the waste in the C-Farm SSTs was sludge, nearly eighty percent of the waste in the A-farm and ninety-five percent in AX-farm is saltcake. Hot water dissolution will be the first technology used for removing the saltcake. The initial retrieval rates for saltcake in AX-102 have been very promising.

However, the A/AX tanks also present new challenges. Both A and AX SSTs have an array of airlift circulators that were used to help mix and cool the tank waste. These airlift circulators create obstructions for the retrieval equipment. In addition, the radiation levels in the A and AX tanks are much higher than in the C-farm tanks, and may degrade the in-tank equipment more quickly. While sludge volumes in the tanks are much lower than the saltcake volumes, the sludge is at the bottom of the tanks and may be difficult to break up and move to the center pump. In addition, A-104 and A-105 both have confirmed liner leaks and special care will need to be taken to minimize the risk of a leak during retrievals.

Retrieval of AX-102 waste which is being transferred to Double Shell Tank (DST) AZ-102 started in early September. Once the AX-102 retrieval is completed, active retrieval will begin on AX-104, followed by the AX-101 and AX-103. Characterization of the vadose zone associated with A-104 and A-105 is underway.

Due to potential safety concerns, retrieval of AX-102 waste which is being transferred to Double Shell Tank (DST) AZ-102 started over Labor Day weekend when fewer personnel were on site. Once the AX-102 retrieval is completed, active retrieval will begin on AX-104, followed by the AX-101 and AX-103. Characterization of the vadose zone associated with A-104 and A-105 is underway.