Source: Department of Energy. | GAO-24-106716

Sludge Processing Facility Buildouts (SL-PFB) Accessible Version

PROJECT OVERVIEW

Location: Oak Ridge site; Oak Ridge, Tennessee

Status: Cancelled (November 2023)

Original critical decision (CD) 4 cost and schedule estimate:[1] $127-$171 million; 2030

CD-4 cost and schedule estimate as of April 2024: Not applicable

PROJECT SUMMARY

The SL-PFB project is to design and construct a treatment facility for solidifying about 2,000 cubic meters of transuranic waste—waste that contains elements heavier than uranium. This waste was generated from defense-related research and is in the form of sludge (solids) and supernate (liquids). The treatment process is expected to produce a form of low-level radioactive waste suitable for disposal at a low-level radioactive waste disposal facility.

As we previously reported, the SL-PFB project encountered delays during the project's design process.[2] Office in the Department of Energy's (DOE) Office of Environmental Management (EM) told us that the delays were due to a change to the contractor working on the design in 2015, and changes to the design based on recommendations from Savannah River National Laboratory in 2016. According to EM officials, the project halted further design work in 2017 after the DOE Project Management Risk Committee recommended that the project focus on technology maturation and testing efforts.

In November 2023, EM officials told us that EM was planning to finish the technology maturation and then cancel the project, as there was no funding available for the next stage of design and construction. One EM project official told us that, once funding is available, the project would be able to quickly restart, as mission need would remain the same. However, project officials also told us that they would have to conduct another analysis of alternatives, and therefore the technology used for the project might change.

[1]CD-4 indicates that a project is complete and, if applicable, ready to transition to operations.

[2]GAO, *Environmental Cleanup: Status of Major DOE Projects and Operations*, GAO-22-104662 (Washington, D.C.: May 4, 2022).

Waste Treatment and Immobilization Plant (WTP)

Source: Department of Energy. | GAO-24-106716

PROJECT OVERVIEW

Location: Hanford site; Richland, Washington

Status: CD-3—approve start of construction (approved April 2003)

Original CD-4 cost and schedule estimate: $5.8 billion; July 2011

CD-4 cost and schedule estimate as of April 2024: $18.5 billion; September 2027

PROJECT SUMMARY

The WTP is being constructed to treat and immobilize an estimated 54 million gallons of hazardous and radioactive waste stored in 177 aging underground tanks. The WTP includes three primary processing facilities: the Pretreatment Facility, the Low-Activity Waste Facility, and the High-Level Waste Facility. The Pretreatment Facility is intended to treat and separate the waste into low-activity waste and high-activity waste.[3] The Low-Activity Waste Facility and High-Level Waste Facility would then prepare the two waste types for final disposition.

The WTP has been under construction for over 20 years and has faced many challenges, including significant technical challenges with the Pretreatment Facility. Due to these challenges, DOE developed a strategy known as Direct-Feed Low-Activity Waste to bypass the Pretreatment Facility. In December 2016, Direct-Feed Low-Activity Waste was formally approved for full implementation. As of April 2024, the project had completed the heat up of a second melter and the next major milestone—the start of cold commissioning—was scheduled to begin in August 2024.

The completion of the High-Level Waste Facility and Pretreatment Facility will depend on future DOE priorities, agreements, and funding. In its fiscal year 2024 budget justification, DOE requested $600 million to ramp up design, procurement, and low-risk construction activities for the High-Level Waste Facility. According to DOE documentation, the department received a revised proposal for high-level waste treatment design in November 2023 that was significantly higher than the independent government estimate, resulting in the need for additional review time. As of March 2024, DOE planned to complete its review of the proposal in June 2024.

In April 2024, DOE, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology announced a proposed multi-part agreement that outlines a path forward for completing Hanford's tank waste cleanup. According to the proposal, DOE plans to pursue a direct-feed, high-level waste technology while keeping the Pretreatment Facility on hold indefinitely. The three parties have proposed to continue negotiating new milestones for treating the high-level waste, including milestones related to a reconfiguration of the High-Level Waste Facility.

[3]DOE uses the term low-activity waste for the portion of the waste with comparatively low levels of radioactivity.

X-326 Process Building Demolition (X-326)

Source: Department of Energy. | GAO-24-106716

PROJECT OVERVIEW

Location: Portsmouth site; Portsmouth, Ohio

Status: CD-3—approve start of demolition (approved February 2021)

Original CD-4 cost and schedule estimate: $160 million; October 2025

CD-4 cost and schedule estimate as of April 2024: $160 million; October 2025

PROJECT SUMMARY

This project involves the demolition of building X-326, a former uranium processing facility, at the Portsmouth site. The demolition project is the culmination of a multiyear process that includes deactivation of the facility—a two-story structure covering 56 acres under roof. The primary project scope is the controlled open-air demolition of the building, down to the ground-level concrete slab, and related site work.

The controlled demolition of building X-326 began in May 2021. Activities for this project include adhesive fixative application for contamination control, transite siding removal, facility and equipment demolition to the concrete slab, and size reduction of demolition debris to meet requirements of the On-Site Waste Disposal Facility.[4]

As of April 2024, according to DOE documentation, the project is on track to finish ahead of its planned completion date of October 2025. According to the 2023 project peer review, structural demolition of the building was complete as of June 2023, and the remaining tasks—such as size reduction and loadout of the demolition debris—were 50 to 88 percent complete.

[4]Adhesive fixative is a substance that immobilizes potential loose contamination that could be disturbed during demolition. Transite is siding that typically contains asbestos and therefore requires special removal and disposal processes.

Source: Department of Energy. | GAO-24-106716

Safety Significant Confinement Ventilation System (SSCVS)

PROJECT OVERVIEW

Location: Waste Isolation Pilot Plant (WIPP); Carlsbad, New Mexico

Status: CD-3—approve start of construction (approved May 2018)

Original CD-4 cost and schedule estimate: $288 million; November 2022

CD-4 cost and schedule estimate as of April 2024: $494 million; June 2026

PROJECT SUMMARY

The SSCVS project is to design and construct a new ventilation system for WIPP—an underground repository for defense transuranic waste—including air filters and fans, ductwork and dampers, diesel generators, exhaust stack, exhaust filter buildings, filter banks, and site support utilities. The new ventilation system is intended to provide the capability for conducting simultaneous underground activities, such as mining and waste emplacement, to increase operational efficiency.

On August 31, 2020, the subcontractor constructing the SSCVS was terminated due to poor performance. According to EM officials, the subcontractor had submitted an unusual number of requests to change the design of the project, which the WIPP primary contractor approved. These changes resulted in both cost increases and schedule delays. In May 2020, the U.S. Army Corps of Engineers conducted a review of the project at EM's request and determined that the original facility design was adequate, and that many of the subcontractor's requested design changes were not needed. A new subcontractor was identified in October 2020 to complete the project.

EM brought in a new primary contractor for WIPP in February 2023. According to DOE documentation, the contractor submitted a revised plan for the project in November 2023 proposing a $46.1 million increase in the performance measurement baseline cost for SSCVS. EM approved the proposal in February 2024.

Source: Idaho Environmental Coalition. | GAO-24-106716

Integrated Waste Treatment Unit (IWTU)

PROJECT OVERVIEW

Location: Idaho site; Idaho Falls, Idaho

Status: Operating (as of April 2023)

Original CD-4 cost and schedule estimate: $461.6 million; July 2010

Actual cost and schedule to begin operations: $1.4 billion; April 2023

PROJECT SUMMARY

EM initiated design and construction of the IWTU in 2005 to treat sodium-bearing waste, a liquid waste that contains large quantities of sodium and other nitrates. After starting construction in 2007, EM decided to modify the facility to also be able to later treat calcine waste, a highly radioactive dried waste.

EM expended $571 million from December 2006 through April 2012 to develop and construct the IWTU, at which point the agency declared construction complete and transitioned the IWTU into operations. However, during system testing of the facility in June 2012, the IWTU experienced a malfunction that damaged equipment and revealed problems with the facility's design and inadequate oversight, according to DOE and contractor reports. In 2016, a new contractor took over work on the IWTU and implemented a phased approach called the IWTU Resolution of Technical Issues Project.

According to Idaho site officials, from late April 2012 until the beginning of operations in April 2023, EM spent an additional $808 million to get the facility working to treat sodium-bearing waste as planned. Further, because EM missed legal deadlines related to the IWTU, DOE was prohibited from shipping spent nuclear fuel to the Idaho National Laboratory and was required to pay the state of Idaho financial penalties that, according to Idaho site officials, totaled $12.1 million.[5] In addition, we reported in 2019 that EM was suspending further development of its plans to treat calcine waste for land disposal.[6]

The IWTU began operating in April 2023 and has continued to experience issues. For example, the facility was shut down in September 2023 to replace media in its granular activated carbon beds that remove mercury from the gas by-product of the waste treatment process. DOE officials estimated in December 2023 that the facility would restart operations in January 2024. However, when attempting to restart in March 2024, crews identified abnormal conditions, causing DOE to suspend start-up activities. As of June 2024, the facility was still shut down.

As of March 2024, the IWTU had treated about 68,000 gallons of sodium-bearing waste, out of a total of about 900,000 gallons. EM officials estimate it will take 5 to 7 years to complete IWTU's waste treatment mission.

[5]According to Idaho site officials, as of December 2023, $5 million of the penalties had been resolved by DOE completing supplemental environmental projects in lieu of payment.

[6]In December 2023, Idaho site officials told us that DOE was restarting work to treat calcine waste. In May 2024, an official in EM's Office of Project Management told us that it was possible the future analysis of alternatives for treating calcine waste would include options that would fit in a modified IWTU facility, but this has not been formally decided.