ECA Update

5/16/2022

GAO report: Over $310 billion to go - highlighting major EM projects and operations

Cleanup to be completed around 2081

ECA Staff

On May 4, the Government Accountability Office (GAO) released an eye-opening report quoting over **$310 billion** as the total cost of completing cleanup at the Department of Energy (DOE) Office of Environmental Management's (EM) major sites. Of this total, $180.5 billion is expected for cleanup completion at the Hanford Site alone. The report reminds us of the challenges ahead and how much work still needs to be completed at the sites in the near term and long-term.

The report only covers known cleanup issues and does not address or identify areas/sites that EM is still characterizing, nor does it address the unknown of waste disposal. There is currently no plan for a permanent repository at Yucca Mountain or for interim storage of Defense high-level waste in EM's estimates. Many of the largest sites cannot be cleaned up without a disposition pathway for high-level waste, indicating that the total cleanup figure and the estimated time frames will likely be even higher. The report also highlights that the current completion schedule for all EM work will last until 2081 – nearly 60 years from now – assuming that the funding is available.

The GAO report, titled "Environmental Cleanup: Status of Major DOE Projects and Operations," reviews and summarizes the status and performance of EM's largest projects and operations.

Eleven EM Sites Have an Ongoing Operations Activity with a Lifecycle Cost of at Least $1 Billion

According to EM officials, as of September 2021, EM was managing 76 operations activities at its then-16 sites. GAO found that there are 11 EM sites that have an ongoing operations activity with a life-cycle cost of at least $1 billion each, and selected for detailed review the operations activity with the highest life-cycle cost at each of these 11 sites. The currently known life-cycle costs for these 11 operations activities range from **$1 billion** (Moab) to **$180.5 billion** (Hanford), according to EM officials.

EM currently manages DOE's radioactive and hazardous waste cleanup program across 15 active sites, but the report uses data reflecting 16 sites including Brookhaven National Laboratory, where work was completed earlier this year.

EM divides its cleanup work into capital asset projects – which have a defined start and end point and can include the construction of new facilities for treating and disposing of waste – and operations activities, which include reoccurring facility or environmental operations, as well as activities that are project-like, with defined start and end dates.

GAO found that most projects were expected to be completed within initial cost and schedule estimates. However, officials at several projects that experienced cost overruns and schedule delays cited staffing shortages as a contributing factor. In addition, the life-cycle estimates for cleanup operations were frequently out of date, and DOE was in the process of implementing a new policy to require annual updated estimates.

The report also provides information on each EM site and summaries of the selected EM projects and operations activities at the sites on which the report was based.

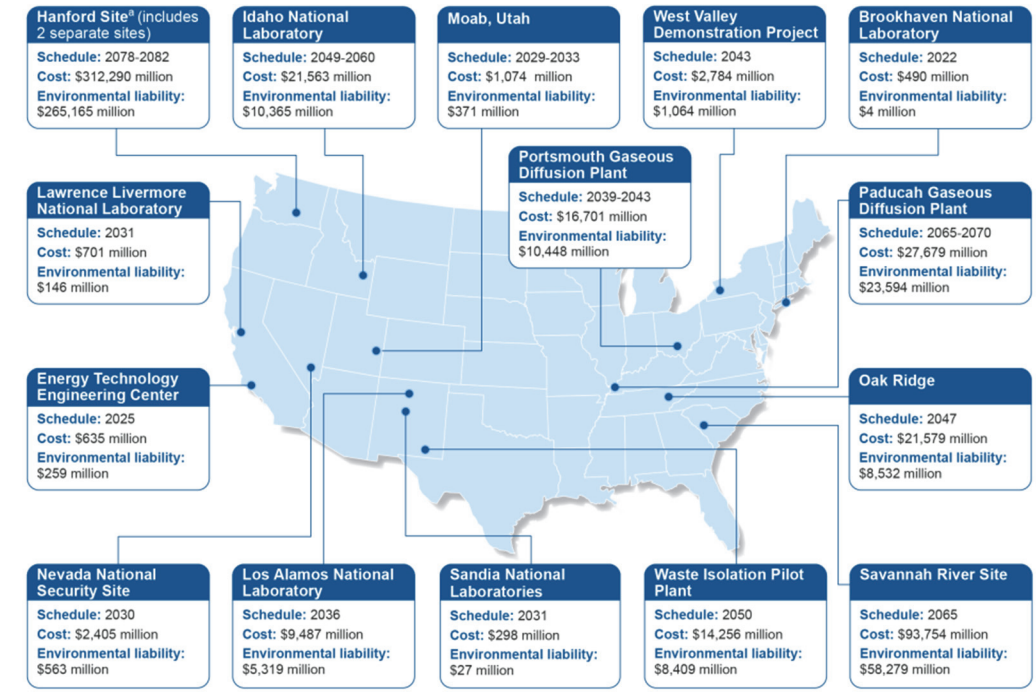
Table 2: Office of Environmental Management (EM) Nuclear Cleanup Sites with an Operations Activity with an Estimated Cost over $1 Billion

EM Site	Name of Operations Activity	Life-cycle cost estimate as of December 2021 (in billions of dollars)
Hanford Site: Office of River Protection	Radioactive Liquid Tank Waste Stabilization and Disposition	180.5
Hanford Site: Richland Operations Office	Hanford Central Plateau	22.9
Idaho National Laboratory	Idaho Nuclear Technology and Engineering Center Infrastructure	2.2
Los Alamos National Laboratory	Los Alamos Soil and Water Remediation	3.8
Moab Site	Moab Uranium Mill Tailings Project	0.93
Oak Ridge Reservation	Nuclear Facility Deactivation and Decommissioning-Y-12	3.08
Paducah Site	Paducah Gaseous Diffusion Plant Deactivation and Decommissioning	35
Portsmouth Site	Nuclear Facility Deactivation and Decommissioning	12.2
Savannah River Site	Radioactive Liquid Waste Stabilization and Disposition	43.3
Waste Isolation Pilot Plant	Waste Disposal Facility Operations	2.94
West Valley Site	West Valley Nuclear Facility Deactivation and Decommissioning	2.8

EM's Active Cleanup Sites

EM has estimated the life-cycle cost and schedule for completing the cleanup work at each of its 15 active cleanup sites, which, according to EM officials, includes the estimated cost of future cleanup and costs already incurred. EM also annually updates the estimated cost for future cleanup as part of calculating DOE's environmental liability.

The image below shows the cleanup costs and activities at EM's active cleanup sites (and Brookhaven National Laboratory).



Sources: GAO analysis of Department of Energy information; Map Resources (map). | GAO-22-104662

EM's 15 Active Capital Asset Projects

According to EM data, as of December 2020, EM was actively managing 23 capital asset projects. Of these 23 projects, 15 had reached at least the critical decision 1 milestone (approved alternative selection and cost range) and had an estimated total project cost of $100 million or greater, with total project costs ranging from $127 million to $16.8 billion. Most of these 15 projects involved ongoing cleanup work in one of three areas: treatment and disposal of radioactive liquid waste, demolition of excess facilities, or waste disposal.

Table 1: Office of Environmental Management (EM) Capital Asset Projects with Estimated Costs of at Least $100 million, by EM Site

EM site	Capital asset projects	Project cost estimate as of December 2021 (costs in millions of dollars)
Hanford Site: Office of River Protection	Waste Treatment and Immobilization Plant(WTP)/WTP LBL Direct-Feed Low-Activity Waste	16,813[a]
Hanford Site: Office of River Protection	Tank-Side Cesium Removal System	164
Hanford Site: Richland Operations Office	Plutonium Finishing Plant	209
Oak Ridge Reservation	Sludge Processing Facility Buildouts	127-171[b]
Oak Ridge Reservation	On-Site Waste Disposal Facility	175-375[b]
Oak Ridge Reservation	Outfall 200 Mercury Treatment Facility	224
Portsmouth Site	X-326 Process Building Demolition Project	160
Portsmouth Site	On-Site Waste Disposal Facility (CAP-1)	275
Portsmouth Site	On-Site Waste Disposal Facility (CAP-2)	373
Savannah River Site	Saltstone Disposal Unit 7	127
Savannah River Site	Saltstone Disposal Units 8 and 9	280
Savannah River Site	Saltstone Disposal Units 10 through 12	496
Waste Isolation Pilot Plant	Safety Significant Confinement Ventilation System	288
Waste Isolation Pilot Plant	Utility Shaft	197
West Valley Site	Main Plant Processing Building	206

Most Capital Asset Projects are Performing within Baseline Estimates, but EM Faces Challenges Measuring Operations Activities' Performance

Based on the review of EM's 15 largest capital asset projects and 11 selected operations activities, GAO made the following observations:

Observation 1: *Nine of EM's largest capital asset projects were completed or are expected to be completed within their initial baseline cost and schedule estimates.*

Of the 15 EM capital asset projects reviewed, 13 had progressed far enough to have established cost and schedule baselines, and nine are expected to be completed within those baselines. However, the other four are expected to exceed estimates.

Of the four projects that are not expected to be completed within their baselines, the Waste Treatment and Immobilization Plant (WTP) project and the Plutonium Finishing Plant project have completed the baseline change proposal process, and EM has approved updated cost and schedule estimates for these two projects.

EM officials stated that two projects at the Waste Isolation Pilot Plant (WIPP) —the Safety Significant Confinement Ventilation System (SSCVS) and the Utility Shaft—will not be completed within their baselines, and baseline change proposals are under review for both projects.

Table 3: Performance of 13 Office of Environmental Management's Capital Asset Project's Performance against Cost and Schedule Baselines

Site	Project Title	Completed or expected to be completed within original baselines
Hanford Site: Office of River Protection	Waste Treatment and Immobilization Plant/WTP LBL Direct-Feed Low-Activity Waste	No
Hanford Site: Office of River Protection	Tank-Side Cesium Removal System	Yes
Hanford Site: Richland Operations Office	Plutonium Finishing Plant	No
Oak Ridge Reservation	Outfall 200 Mercury Treatment Facility	Yes
Portsmouth Site	X-326 Process Building Demolition Project	Yes
Portsmouth Site	On-Site Waste Disposal Facility (CAP-1)	Yes
Portsmouth Site	On-Site Waste Disposal Facility (CAP-2)	Yes
Savannah River Site	Saltstone Disposal Unit 7	Yes[a]
Savannah River Site	Saltstone Disposal Units 8 and 9	Yes
Savannah River Site	Saltstone Disposal Units 10 through 12	Yes
Waste Isolation Pilot Plant	Safety Significant Confinement Ventilation System	No
Waste Isolation Pilot Plant	Utility Shaft	No
West Valley Site	Main Plant Processing Building	Yes

Legend: WTP LBL= the Low Activity Waste Facility, the Balance of Facilities, and the Analytical Laboratory.

Observation 2: *EM did not have sufficient staffing capacity to properly manage three capital asset projects, two of which are expected to overrun their cost and schedule baselines.*

Three capital asset projects—two at WIPP and one at the Oak Ridge Reservation (ORR) —experienced issues during either their design or construction phases that were, in part, due to the capacity of federal and contractor staff, according to EM officials.

GAO has previously reported that the Carlsbad Field Office, which oversees WIPP, had experienced staffing shortages for multiple years, and an EM document cited this problem as a factor contributing to problems with the SSCVS project. The flaws in the Utility Shaft project were also attributed to a limited number of staff with sufficient experience at the Carlsbad Field Office.

The Outfall 200 Mercury Treatment Facility project at ORR encountered bedrock and soils problems during construction of the foundations of the project's two main buildings. EM officials said that the project staff did not have the necessary technical expertise to address these problems, so outside contractors were brought in with the necessary technical experience.

Observation 3: *EM has not completed updates to life-cycle estimates for operations activities, and prior data have limitations, which impacts EM's ability to accurately measure operations activities' performance.*

A recent EM protocol requires sites to update their life-cycle estimates for operations activities annually as part of a broader process for maintaining the overall life-cycle cost and schedule estimates for completing cleanup at each site. Officials at 10 of the 11 sites reviewed told GAO that they were in the process of updating their cost and schedule estimates for their operations activities.

The EM sites included in the report had not yet completed new estimates using the process established in the new protocol. Several of the estimates that GAO collected had not been updated in several years, though there have been

significant changes to the conditions at certain sites. For example, the estimate for the operations activity at WIPP has not been updated since 2013 and EM officials stated that the estimate does not take into account how operations at the site have changed following a radiological release in 2014.

In 2019, GAO reported that the tools EM uses to measure contractors' performance on operations activities do not provide a clear picture of performance for EM leadership, Congress, and other stakeholders. EM's ability to have the information EM needs to assess the performance of cleanup work managed as operations activities will depend, in part, on whether updates to the cost and schedule estimates for all operations activities are completed in accordance with EM's protocol.

Observation 4: *EM officials at multiple sites identified examples of ways in which current and future EM cleanup funding could affect cleanup costs.*

Examples of scenarios in which funding increases or shortfalls could have significant impacts on the costs for completing cleanup work were given for Hanford, Portsmouth, ORR, and Idaho National Laboratory (INL).

At Hanford, EM officials stated that annual appropriations are not sufficient to meet certain legal requirements for high-level waste treatment. Various analyses indicate that achieving certain milestones for the high-level waste and pretreatment facilities are improbable given the imbalance of reasonably anticipated congressional appropriations and the current anticipated funding requirements to complete the WTP project. EM officials also said that the Hanford Lifecycle Scope, Schedule and Cost Report forecasts a significant increase in life-cycle cost and schedule for completing the cleanup of the entire Hanford Site.

EM officials at the Portsmouth Site stated that funding to support the timely transition of experienced contractors from one decontamination or demolition project to the next is not always available when work on one project is completed. As a result, some of the experienced workforce has to be demobilized and is potentially lost to other work. In this case, EM will likely incur additional costs to transition a contractor to other projects once funds become available.

EM officials at both ORR and INL stated that the life-cycle cost and schedule estimates for site operations activities are directly dependent on the schedule for completing the cleanup activities they are supporting. For example, if additional funding were prioritized for completing deactivation and decommissioning of excess facilities at ORR, the cost for that work would likely decrease, as the schedule could be accelerated. This would also likely reduce the life-cycle cost for the operations activity with the highest estimated cost because EM would likely shorten the period it had to maintain surveillance and maintenance activities, according to EM officials.

Observation 5: *The extent of cost increases for EM capital asset projects and operations activities due to COVID-19 are not fully known.*

According to EM officials at multiple sites, contractors have tracked the costs incurred from implementing safety measures to address COVID-19, and EM had reimbursed contractors for some of these costs. EM officials interviewed at several sites told GAO that EM incurred other costs as a result of COVID-19, such as costs from new sanitization programs, installing new workspaces for social distancing, and higher commodity prices, and that the full extent of these other costs is not yet known. Additionally, a COVID-19 reemergence leading to a return to minimum on-site work is possible.

ECA encourages all members to review the full report. Additional information from the report, including site-specific details, will also soon be available in a forthcoming cleanup guide resource on the ECA webpage.