IDAHO

Idaho National Laboratory

Background

The Idaho National Laboratory, located in southeastern Idaho with additional research and support facilities in Idaho Falls, was established in 1949 as the National Reactor Testing Station.[1] For many years, Idaho National Laboratory housed the largest concentration of nuclear reactors in the world.[2] In total, 52 reactors were built at Idaho National Laboratory, including the U.S. Navy's first prototype nuclear propulsion plant.[3] Four agreements form the regulatory framework at the Idaho National Laboratory: the Federal Facilities Agreement Consent Order, which mandates milestones for cleanup under the Comprehensive Environmental Response, Compensation, and Liability Act; the Site Treatment Plan; the Notice of Noncompliance Consent Order, which governs certain waste management activities; and the 1995 Settlement Agreement, which settled a lawsuit between the State of Idaho, the U.S. Navy and the U.S. Department of Energy (DOE) and requires that certain waste be removed from Idaho by specific dates.[4]

FIGURE 1: Demolition of CPP 601-602 at the Idaho site. Photo courtesy of U.S. Department of Energy.

Major Accomplishments

DOE EM has worked with Idaho to achieve the following outcomes:

- Completed a total of 6,716 shipments of transuranic waste to the Waste Isolation Pilot Plant (WIPP), representing approximately half of all shipments to the repository since it began receiving waste in 1999;
- DOE EM completed transuranic waste retrieval activities at the Advanced Mixed Waste Treatment Project's Transuranic Storage Area-Retrieval Enclosure (TSA RE), and removed equipment and debris from a combined area of 179,000 square feet in support of RCRA closure;
- Completed more than 50 equipment modifications focused on contamination control and off-gas filters in preparation for radiological operations at the Integrated Waste Treatment Unit (IWTU), which culminated in a successful confirmatory run in mid-2022 where the facility ran over 60 continuous days treating nearly 140,000 gallons of simulated waste. During the run, the facility also successfully completed two independent assessments which verified the facility readiness to commence radiological waste treatment operations;

[1] U.S. Department of Energy. (n.d.). Brief history of the Idaho National Laboratory (INL). Retrieved from https://www.id.energy.gov/insideNEID/BriefHistory.htm.
[2] Public tours offer insight into Idaho National Laboratory. (2011, June 10). Idaho State Journal. Retrieved from https://www.idahostatejournal.com/news/online/public-tours-offer-insight-into-idaho-national-laboratory/article_960e3196-9332-11e0-a7d0-001cc4c03286.html.
[3] U.S. Department of Energy. (n.d.). Brief history of the Idaho National Laboratory (INL). Retrieved from https://www.id.energy.gov/insideNEID/BriefHistory.htm.
[4] U.S. Department of Energy. (n.d.). Commitments and agreements. Retrieved from https://www.id.energy.gov/insideneid/commitme.htm.

- Certified 2,497 drums stored at the Advanced Mixed Waste Treatment Project (AMWTP) for shipment and disposal at WIPP;
- DOE EM completed the required exhumation of solvent, transuranic waste, contaminated graphite and filter media waste for eventual shipment to WIPP in New Mexico from nearly all of the required acres at the Subsurface Disposal Area;[5]
- DOE EM treated and shipped 124 m3 of remotely handled transuranic waste for disposal at WIPP; and
- DOE EM transferred more than 118 metric tons of heavy metal from spent nuclear fuel (SNF) from wet storage facilities to dry storage.

Site-Specific Issues

Leading challenges at Idaho National Laboratory include meeting the obligations of the 1995 Settlement Agreement and other legal agreements between DOE and the state. Among other things, the agreements require disposal of transuranic waste outside of Idaho, retrieval and treatment of high-level waste (HLW) calcine from the bin sets generated from SNF reprocessing conducted decades ago, and treatment of liquid HLW (including sodium-bearing waste) stored in tanks above the Snake River Plain Aquifer, a critical drinking water and agricultural resource for much of southern Idaho. DOE EM has constructed the Integrated Waste Treatment Unit (IWTU) for the liquid sodium-bearing HLW, but delays during testing prevented DOE EM from meeting deadlines to achieve full facility operation. During the 2021 outage, over 50 modifications were made to the IWTU to improve the performance of the process gas filter elements, increase plant reliability, long-term operability and implement numerous contamination control measures. DOE completed testing with waste simulant and performed multiple readiness assessments Waste treatment operations are scheduled to begin in early 2023.

Relationship to Other Sites in the Complex

Idaho National Laboratory's relationships with other DOE sites are critical to completing the requirements of the 1995 Settlement Agreement around waste shipments, removal of transuranic waste, treatment and removal of high-level waste streams and transfer of spent nuclear fuel from wet storage into dry storage. The WIPP is particularly important given the need to remove transuranic waste from Idaho. In addition to high-level waste and spent nuclear fuel stored and generated on-site, Idaho National Laboratory stores the damaged reactor from Three Mile Island and spent nuclear fuel from Navy vessels and foreign research reactors. Disposal of high-level waste and spent nuclear fuel from Idaho National Laboratory depends on future decisions regarding permanent geologic disposal. The Idaho National Laboratory plays a key role in treating mixed low- level waste and transuranic waste from around the complex.

Low-level waste and mixed low-level waste cleanup at Idaho National Laboratory relies on onsite disposal, the Nevada National Security Site (NNSS) and commercial sites around the country providing an avenue for the ultimate disposal of legacy waste. According to DOE EM estimates, more than 35,000 m^3 of LLW and 3,500 m^3 of mixed LLW will be sent from Idaho to the NNSS for disposal between 2018 and 2050.[6]

[5] U.S. Department of Energy. (2021, December 29). *DOE-Idaho Buried Waste Project Marks Major Accomplishment Ahead of Schedule* [Press release]. Retrieved from https://www.energy.gov/em/articles/doe-idaho-buried-waste-project-marks-major-accomplishment-ahead-schedule.
[6] Applied Research Center, Florida International University. (n.d.). Welcome to WIMS: Waste Information Management System. Retrieved from http://www.emwims.org.