



OREM

Oak Ridge Office of Environmental Management

PROGRAM PLAN

FY 2022 to 2032

BIANNUAL UPDATE - FALL 2024

**CONTINUING PROGRESS.
RESTORING THE ENVIRONMENT.
ENABLING MISSIONS.**



U.S. DEPARTMENT OF
ENERGY

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A MESSAGE FROM THE MANAGER

Dear colleagues and stakeholders:

We released the first edition of our current 10-year program plan in 2022, and we're excited to unveil the latest developments in this version.

Our organization updates this document every two years so appropriators, partners, and stakeholders can track the progress we've achieved toward our goals, objectives, and performance measures. These updates also help readers understand how we are using investments from Congress and advancing the environmental cleanup mission locally.

This plan has been a significant driver behind our success by providing employees a uniform vision. It established four ambitious cleanup goals that give our workforce a fixed target to pursue, and it serves as a measurable method to gauge and track our performance through 2032.

Through this direction, the 2,500 men and women who support the Environmental Management mission in Oak Ridge know our standard and expectations, and they work daily to reduce risks, improve safety, and remove barriers to new missions and economic opportunities in Oak Ridge.

We have already achieved significant progress since issuing our first edition two years ago. Crews have completed soil remediation at the East Tennessee Technology Park (ETTP), demolished two former reactors at the Oak Ridge National Laboratory (ORNL), and transferred land at the Y-12 National Security Complex (Y-12) to support important national security missions. Teams are also actively preparing many more facilities for demolition at ORNL and Y-12.

By the final edition, we will accomplish much more. We are scheduled to complete most of the remaining remediation and transfers at ETTP, eliminate all the uranium-233 inventory and debris transuranic waste at ORNL, transform ORNL's central campus, and begin the teardown of massive high-risk buildings at Y-12.

As you read this plan, you'll see several of our projects marked complete in this new edition, and we are up to the challenge to accomplish the others in the years ahead. Our leadership team does a tremendous job identifying and proactively planning for new opportunities. We also boast highly qualified and committed employees, unmatched community and contractor partnerships, and strong support from Congress. Together, these elements make Oak Ridge a special and unique site that is setting the standard for excellence within DOE's Environmental Management complex.

As I look at what we have accomplished in recent years, I'm eager to witness the transformation and new opportunities made possible to the Department of Energy and the community through our mission in the future.

Jay Mullis
Manager



OUR MISSION

The U.S. Department of Energy's (DOE) Oak Ridge Reservation occupies more than 32,000 acres within Anderson and Roane counties in East Tennessee. Three sites lie within its borders—they include the Y-12 National Security Complex (Y-12), Oak Ridge National Laboratory (ORNL), and East Tennessee Technology Park (ETTP).

DOE's Oak Ridge Office of Environmental Management (OREM) has cleanup responsibilities at all three of these sites. Its efforts are removing risks and hazards, enhancing safety, opening land for re-development, and modernizing campuses to enable important science and energy research and national security missions. To accomplish these outcomes, OREM's mission is three-fold.

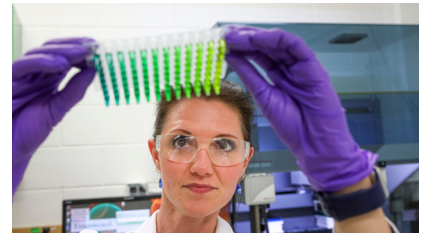
PROTECT THE REGION'S HEALTH AND ENVIRONMENT

Our work enhances the health and safety of the region. At Y-12, we are tearing down deteriorated buildings and constructing infrastructure and advancing research to remove sources of mercury contamination from the environment. At ORNL, we are demolishing contaminated facilities, eliminating waste inventories, and removing radiological risks. Finally, at ETTP, we are in the final phase of cleanup focused on groundwater remediation.



ENABLE DOE'S NATIONAL SECURITY AND SCIENCE MISSIONS ONSITE

We are actively demolishing excess and contaminated buildings at Y-12. These projects are clearing land for the National Nuclear Security Administration to build new facilities that support important national security missions. Our cleanup at ORNL is removing dilapidated facilities and radiological risks to open land for DOE's Office of Science to continue advancing its world-leading research.



MAKE CLEAN LAND AVAILABLE FOR FUTURE USE

At ETTP, our work has transformed the former enrichment site into a multi-use industrial center, national park, and conservation area. We have successfully completed all building demolition and soil remediation and transferred more than 1,700 acres to the community for economic development that's attracting new investments and businesses to the region.



CORE VALUES

The leadership and employees in OREM adhere to a set of core values that have proven invaluable as we conduct and accomplish challenging cleanup across the three major cleanup sites. These values provide a clear standard that guide our workforce and contributes to the organization's successful operations and oversight.



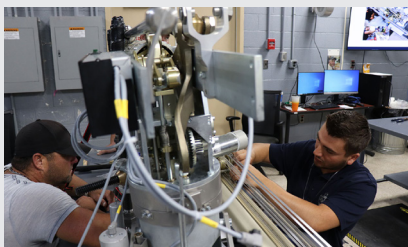
The safety and security of our employees, local residents, and the environment is our highest priority



Our results will demonstrate accountability and value for taxpayers' investment



We will value and utilize the diversity, experience, and skills of our people



We will pursue innovation and continuous improvement in every aspect of our operations



We will promote openness, collaboration, and teamwork with our stakeholders

THE 10-YEAR PROGRAM PLAN

This plan builds on the successes our program has accomplished since it was formed in 1989. Over the decades, we have made incredible progress remediating contaminated soil and groundwater and demolishing radioactively contaminated facilities across the Oak Ridge Reservation (see Cleanup Accomplishments on page 11).

Contamination areas that once threatened the environment have been contained through early actions and institutional controls. Through the years, we have also removed radioactive and hazardous wastes and portions of nuclear material inventories that could pose risks to the public or DOE's ongoing missions.

This plan outlines our approach from fiscal year 2022-2032 to continue removing contaminated facilities, reducing waste inventories, and addressing impacted soil and groundwater on the Oak Ridge Reservation in a safe and cost effective manner. This work is protecting human and environmental health and ushering in a future with new opportunities for DOE, the City of Oak Ridge, and the region.

HISTORY AND BACKGROUND

The U. S. Army Corps of Engineers began acquiring land, in the area that became Oak Ridge, in October 1942 for the Manhattan Project. By March 1943, 56,000 acres were sealed behind fences and major industrial facilities were under construction.

The K-25, S-50, and Y-12 plants were all built to explore different methods to enrich uranium, while the X-10 site was established as a pilot plant for the Graphite Reactor and to explore how to produce plutonium. Throughout the following decades the three major sites— K-25 (present day ETTP), X-10 (present day ORNL), and Y-12— purified isotopes, conducted research, built weapons, and created environmental legacies that OREM is now cleaning and removing.



*Above Left: East Tennessee Technology Park
Above: Oak Ridge National Laboratory
Left: Y-12 National Security Complex*

EAST TENNESSEE TECHNOLOGY PARK

The K-25 plant was constructed during the Manhattan Project to enrich uranium for the first atomic weapon using the gaseous diffusion process. Due to the success of this technique, the original plant was expanded during the Cold War and employed 12,000 workers. At its peak, the site contained five enormous uranium enrichment facilities—K-25, K-27, K-29, K-31, and K-33— and hundreds of support facilities. DOE ceased all gaseous diffusion operations at the K-25 plant in 1987.

Environmental cleanup to address the deteriorating facilities and environmental hazards created during decades of uranium enrichment began shortly thereafter. In addition to conducting much needed cleanup, DOE pursued a vision to convert the site into a private industrial park by transferring land and infrastructure back to the community. The site was renamed the East Tennessee Technology Park in 1997. OREM has completed all demolition and soil remediation at ETPP. Remaining work includes completing groundwater, surface water, and sediment remediation, transferring cleaned land to the community for beneficial reuse, and transitioning the site to long term stewardship.

QUICK FACTS

Site manager: Office of Environmental Management and the Community Reuse Organization of East Tennessee

Size: 2,200 acres

Cleanup priority: Complete groundwater, surface water, and sediment remediation, transfer remaining federal land to the community for beneficial reuse, and transition site to long term stewardship.

EM value-added: The cleaned site offers an abundance of flat real estate and robust infrastructure to attract large industry to the region. OREM opened the K-25 History Center to share the stories of the men and women who built and operated the site, and construction is underway on the K-25 Viewing Platform to help visitors at the national park understand the scope of the former enrichment complex. OREM also created a 3,000-acre conservation easement adjacent to ETPP that protects wildlife and provides residents with nature-friendly trails.



Y-12 NATIONAL SECURITY COMPLEX

Y-12 was built during the Manhattan Project to enrich uranium for the first atomic weapon that ended World War II. After World War II, the site provided lithium separation and key components for the thermonuclear weapons that helped end the Cold War.

Today, the Y-12 National Security Complex is managed by NNSA. Y-12 is responsible for maintaining the safety, security, and effectiveness of the U.S. nuclear weapons stockpile, and its employees have extensive expertise in machining, handling, and protection of radiological materials. Y-12 is responsible for surveillance testing, which determines how weapons in the active stockpile are aging, and it is also charged with dismantlement, which involves separating components of retired weapons and recovering their nuclear materials. Safe and secure storage occurs throughout all these processes.

In addition, Y-12 works with other federal agencies to secure vulnerable nuclear materials internationally. Through NNSA's Global Threat Reduction Initiative, employees safely secure materials and transport them to Y-12 for ultimate storage or disposition. Finally, Y-12 provides highly enriched uranium to fuel reactors in the Navy's nuclear-powered aircraft carriers and submarines.

QUICK FACTS

Site manager: National Nuclear Security Administration

Size: 811 acres

Cleanup priority: Construct infrastructure to support mercury cleanup, remove large excess contaminated facilities, and address sources of mercury in the environment.

EM value-added: Removing mercury laden facilities and remediating soils and surface/groundwater eliminates risks, enhances safety, and opens land for modernization at one of DOE's most important national security sites.



OAK RIDGE NATIONAL LABORATORY

ORNL dates back to the Manhattan project, when it was previously known as X-10. Its first mission was to develop and test the experimental Graphite Reactor, which went critical in March 1944. It was also used as a pilot test facility for plutonium production.

13 reactors were designed and built onsite that developed numerous nuclear material reprocessing methods. In the 1960's, research into genetics and the biological effects of radiation were added to the site's mission. In the 1970's, ORNL began ecological and biological research of the impacts of nuclear power plants on the environment. During the 1980s and 1990s, the mission grew to encompass alternative energy and Strategic Defense Initiative research.

Today, ORNL is a state-of-the-art research complex at the forefront of supercomputing, advanced manufacturing, materials research, neutron science, clean energy, and national security that is managed by Office of Science.

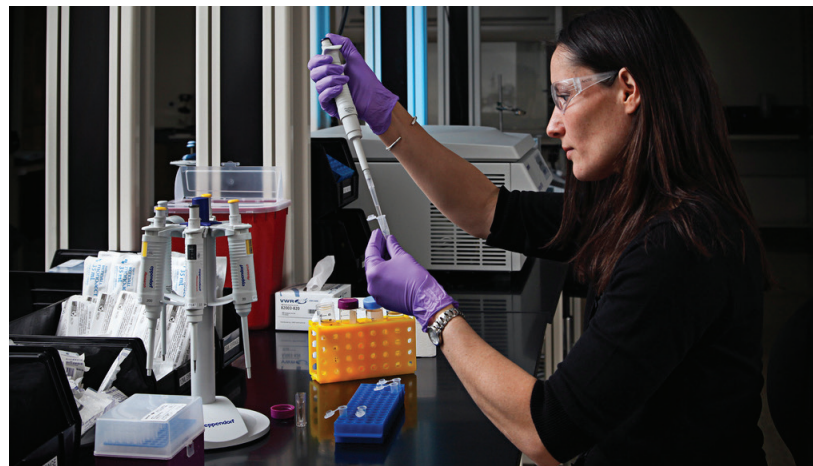
QUICK FACTS

Site manager: Office of Science

Size: 4,400 acres

Cleanup priority: Removing radiologically and chemically contaminated facilities and eliminating inventory of uranium-233 and transuranic waste.

EM value-added: Removing inventories of nuclear waste and deteriorated and contaminated facilities eliminates risks, enhances safety, and opens land for further modernization at one of DOE's most important science institutions.



REGULATORY FRAMEWORK

As a result of legacy contamination from past operations, in 1989, the U.S. Environmental Protection Agency (EPA) placed the Oak Ridge Reservation on the National Priorities List. The list names national priorities where there are known or threatened releases of hazardous substances. Since then, OREM performed extensive sampling that showed more than 19,000 of the 32,000 acres are clean, and they were eliminated from the list.

In 1989, DOE responded by establishing the Office of EM to oversee cleanup of hazardous materials at its facilities located across the U.S. Three years later, DOE, EPA, and the Tennessee Department of Environment and Conservation (TDEC), signed the Federal Facility Agreement, which establishes the guidelines and milestones for cleanup in Oak Ridge in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) and other laws.

This tri-party agreement provides a checks and balances system to ensure the cleanup in Oak Ridge is prioritized and conducted in a way that best protects human health and the environment in the region. Members of each organization communicate and collaborate regularly as we plan and execute projects.

In recent years, we helped establish a new regulatory partnership framework with EPA, TDEC, and UCOR that resulted in Oak Ridge earning its position as the top performing federal cleanup site in the nation. The framework is designed to aid decision-making and approvals.

Management representatives serve on a leadership team and an emerging issues team that help reach resolution on issues unresolved on the staff level. The framework also includes project management representatives who serve on a project team. These teams are working to resolve regulatory challenges and improve communication so the agencies can make protective, timely cleanup decisions.



CLEANUP ACCOMPLISHMENTS

We have made significant progress cleaning up the Oak Ridge Reservation. While the transformation is ongoing, it is important to acknowledge the magnitude of the work that OREM has already accomplished. Since the EM program's inception, hundreds of facilities have been removed, environmental legacy sites have been remediated, and infrastructure to treat, process, and dispose of waste has been constructed.



Demolishing old, contaminated facilities

Our efforts have removed hundreds of facilities across ETTP, Y-12, and ORNL. We became the first site in the world to remove a former enrichment complex, which involved removing nearly 500 structures spanning a total footprint of 13 million square feet. Now, the trained, experienced crews responsible for this historic accomplishment are busy deactivating and demolishing excess contaminated facilities at Y-12 and ORNL. We anticipate removing more than 300 structures at those sites in the years ahead.



Waste treatment and removal

We have constructed and upgraded numerous waste treatment systems and facilities focused on removing legacy contamination and keeping sites safe. The TSCA Incinerator treated 35 million pounds of waste before it was taken down. The ORNL Liquid and Gaseous Waste Treatment System treats millions of gallons of process wastewater and over a billion cubic meters of gaseous waste annually. Additionally, we have removed half of the uranium-233 inventory stored at ORNL and started hot cell operations to process the remaining material. We have processed 98% of the legacy transuranic debris waste and are continuing to ship processed waste to WIPP.



Risk reduction

We have addressed and eliminated major hazards across the Oak Ridge Reservation including removing 6,000 cylinders of depleted uranium hexafluoride, emptying waste storage tanks, shipping all spent nuclear fuel offsite, excavating the greatest source of groundwater contamination at ORNL, and clearing contaminated scrap yards.



Addressing mercury

We have reduced offsite mercury migration from Y-12 and are actively investigating technologies that can effectively remove it from the environment. Our projects have eliminated some of the mercury sources from mercury contaminated tanks and facilities, cleaned storm drain systems, excavated contaminated soil, dredged sediments, re-routed and removed old process piping, and extracted more than 6.5 tons of mercury from old equipment. We are also constructing an onsite mercury treatment system that will capture and treat mercury contaminated water originating and mobilizing from major mercury cleanup areas at Y-12.



Groundwater monitoring and treatment

The safety of human health and the environment is our top priority. One of the ways we ensure that continues is through supporting groundwater protection for Oak Ridge. Our projects have addressed necessary groundwater actions, treated millions of gallons of water, and installed a vast collection of monitoring wells across the Oak Ridge Reservation to ensure safety and inform plume modeling for remedial action decisions. OREM now has regulatory decisions in place that provide guidance and approval to begin addressing groundwater plumes at ETPP, which will begin soon.



Innovative transportation

We constructed a dedicated road on DOE land to transport waste from cleanup sites to our onsite disposal facilities. This road prevents the potential for traffic accidents or spills on public highways. More than 200,000 truckloads have been diverted from local roadways. We have also developed advanced tracking systems to identify the location and contents of each truck while they are in transit.



Reindustrialization and economic development

We were the first DOE site to launch a reindustrialization program. To date, we have transferred more than 1,700 acres, 14 buildings, along with roadways, electrical, water and sewer systems, and emergency services. These transfers have saved taxpayers millions of dollars. Additionally, 25 private businesses have located or announced plans to build on these transferred parcels so far, bringing in \$1.35 billion in investments and generating an anticipated 1,400 jobs to the region.



Public involvement and input

Since 1995, the Oak Ridge Site Specific Advisory Board has provided independent advice and recommendations to our cleanup program. The federally appointed citizens' advisory panel is comprised of 22 members that reflect the diversity of the region, and their active engagement and insight is invaluable as we formulate cleanup strategies and decisions. OREM will continue conducting robust outreach efforts and seek public input and involvement with major CERCLA-related cleanup decisions. We have also increased STEM outreach in the community, local schools, and colleges nationwide highlighting and promoting our mission and career opportunities. OREM also has a monthly news program that airs in 24 counties across the state.



Regulatory Decisions

Oak Ridge set the model for environmental regulatory collaboration, and those efforts have led to numerous key decisions and documents that allowed cleanup to advance across the reservation. Those decisions are allowing for the completion of cleanup at ETPP and the start of cleanup at ORNL and Y-12. We will continue strengthening our relationship with EPA and TDEC to complete the remaining decisions and documents required to support ETPP site closure and final remediation at ORNL and Y-12.

BALANCING PRIORITIES

We have a portfolio of projects designed to complete cleanup at ETPP, Y-12, and ORNL. All three portfolios are integrated into a single plan that balances risks from the perspectives of DOE, regulators, and stakeholders.

We have successfully completed most of the cleanup scope at ETPP. The remaining work involves completing groundwater remediation and activities that facilitate the site's transition to private ownership. Completing these efforts will allow the community to reuse the site for economic development, historic preservation, and conservation, leaving a small amount of acreage for long term stewardship.

With major fieldwork complete at ETPP, we have shifted our focus to the cleanup of Y-12 and ORNL. The hazards and challenges at Y-12 and ORNL are different than those we faced at ETPP. While EM is the landlord of ETPP, with full control over the site, we are only a tenant at Y-12 and ORNL. Crews had space and flexibility with cleanup projects at ETPP due to its open footprint and absence of enduring DOE missions at that site; however, crews must maneuver in smaller, confined footprints at Y-12 and ORNL as they conduct cleanup activities in close proximity to ongoing research and national security missions. It is also important to note that workers are addressing different hazards at each site—mercury at Y-12, radiological contamination at ORNL, and previously uranium at ETPP.

Our priority at Y-12 is the demolition of excess buildings and remediation of underlying soils and groundwater that are contaminated with mercury. Mercury continues to migrate into the Upper East Fork Poplar Creek, which enters public water at the site boundary. We are funding research and executing projects that will reduce mercury migration into waterways and address its sources.

Our priority at ORNL is the disposition of U-233 material and legacy transuranic waste, the demolition of excess facilities, and remediation of underlying soils and groundwater that have nuclear and radiological contamination from years of isotope production and reactor research.

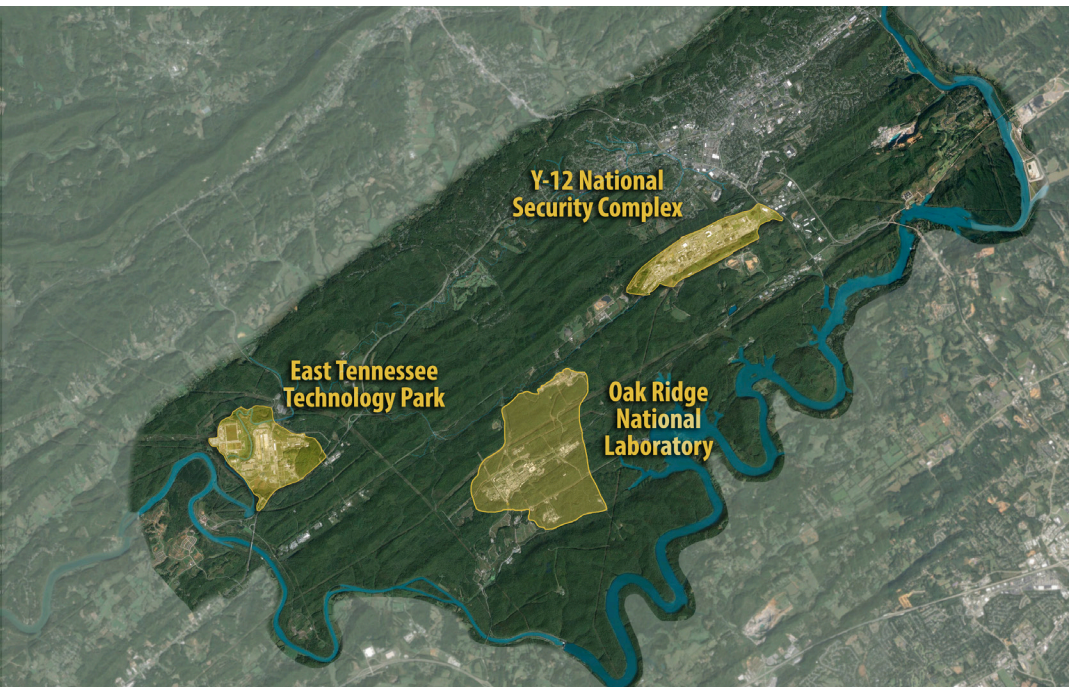
OREM uses the following criteria to prioritize its work within the constraints of annual appropriations across three sites that have different hazards and operating conditions:

- 1. Eliminate any offsite releases**
- 2. Prevent contamination from traveling offsite**
- 3. Address sources of onsite contamination**
- 4. Demolish aged, contaminated facilities**
- 5. Address soil, groundwater, sediment, and surface water**

CHALLENGES AND CONSIDERATIONS

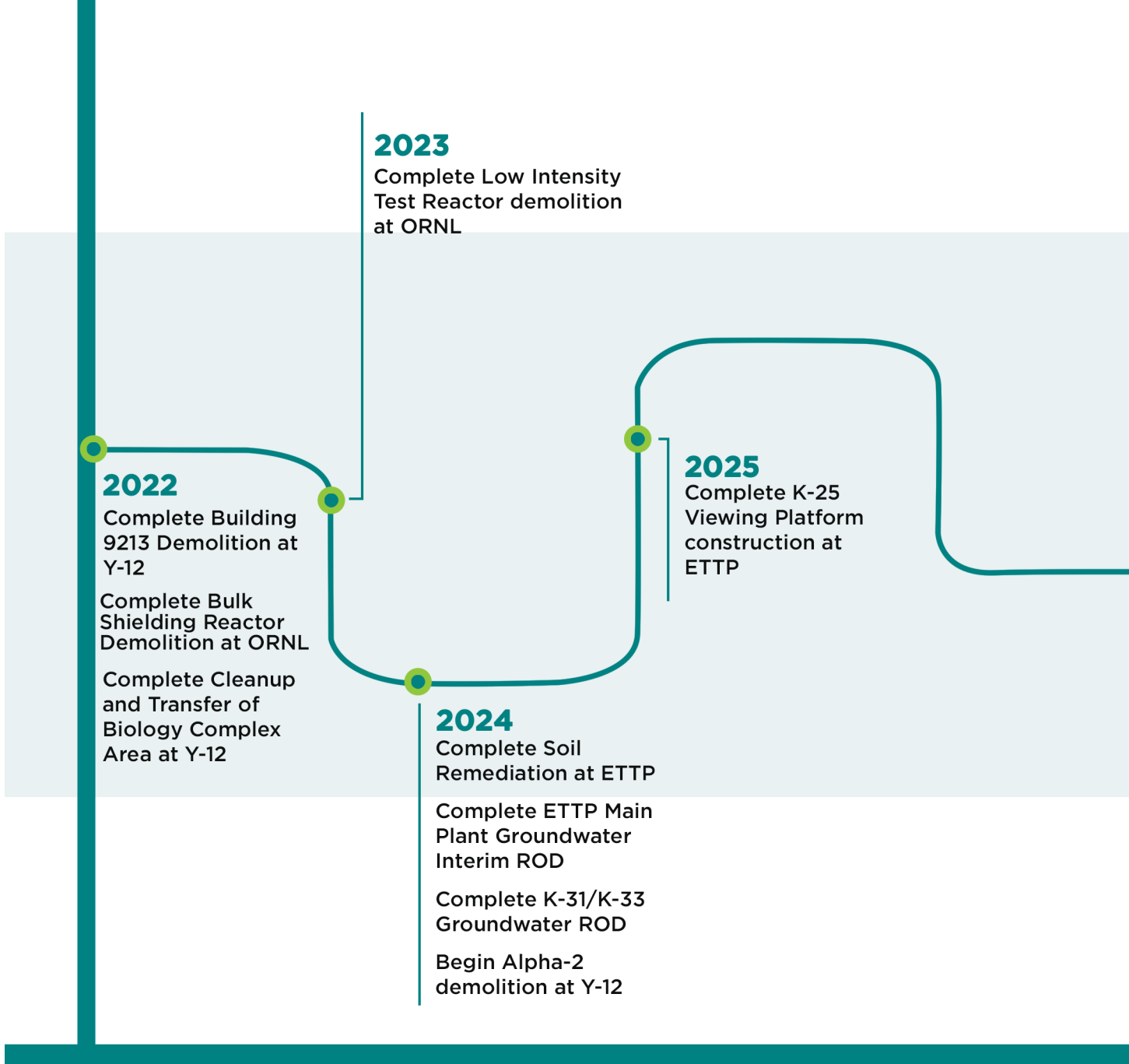
Oak Ridge has unique cleanup challenges. The Oak Ridge Reservation has three major cleanup sites, each owned by different programs with different operational histories, risks, physical, chemical and radiological hazards, footprints and ongoing missions.

- More than 500,000 people live within a 30-mile radius of our cleanup, and the entire Oak Ridge Reservation is within the Oak Ridge city limits.
- Oak Ridge receives one of the highest annual rainfall levels of any site within the Environmental Management complex. It also has shallow groundwater capable of carrying contaminants into local waterways.
- The Department's largest inventory of high-risk excess contaminated facilities is at Y-12 and ORNL. These buildings present different hazards than crews experienced at ETRP.
- Since EM is a tenant at Y-12 and ORNL, EM work at these sites must be coordinated with the Office of Science and NNSA landlords.
- Cleanup at Y-12 and ORNL is conducted on confined footprints in close proximity to important ongoing research and national security missions. EM must ensure cleanup does not impact those missions.
- We must balance myriad risks and meet regulatory requirements across three sites within the constraints of Congressional appropriations while engaging a diverse group of stakeholders with differing priorities and expectations.

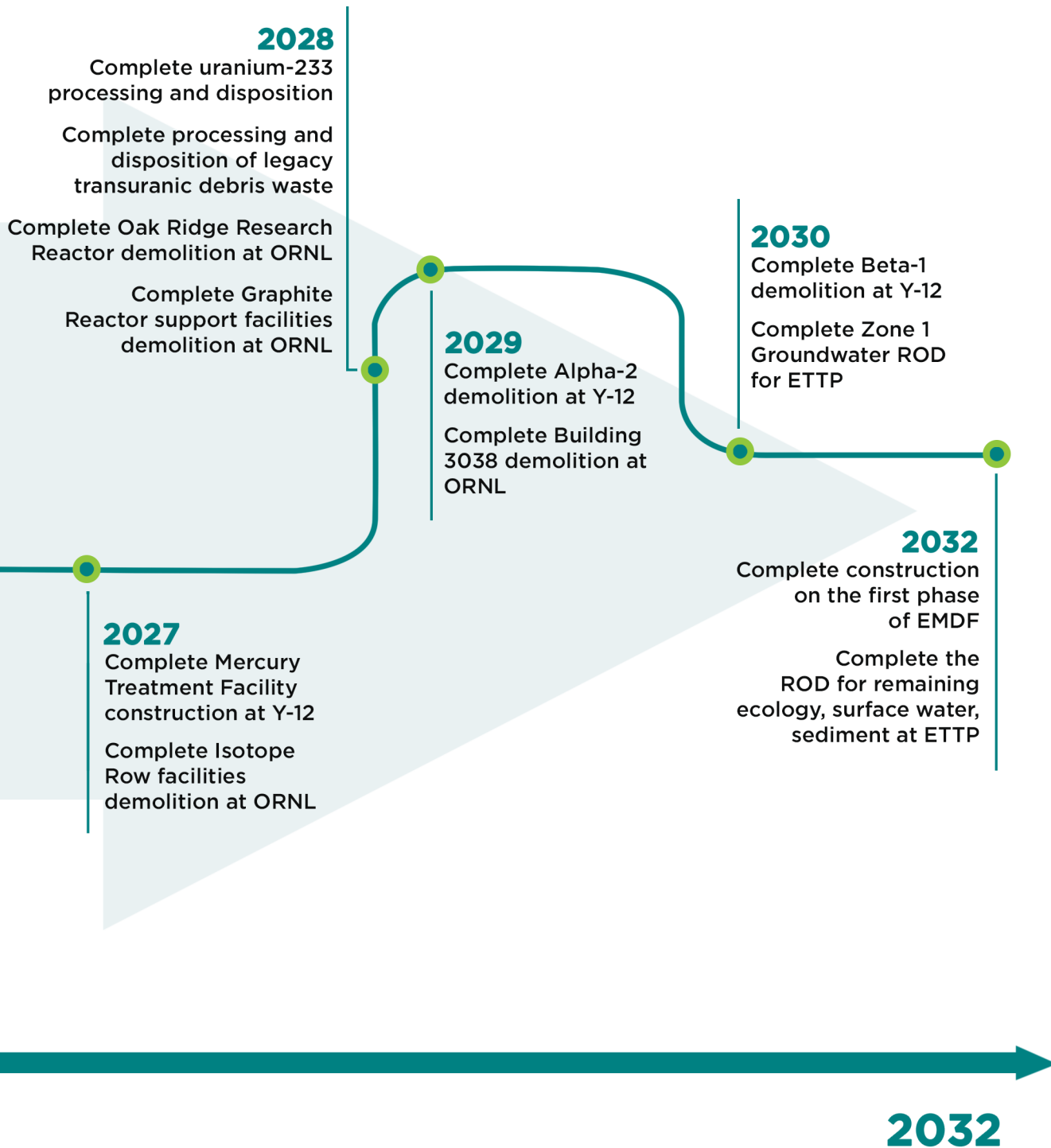


Above Left: Satellite view of the Oak Ridge Reservation. **Top Right:** Anticipated cleanup scope at ORNL (labeled in red).
Lower Right: Anticipated cleanup scope at Y-12 (labeled in red)

Decade Timeline 2022-2032



2022



OUR GOALS

This section of the plan focuses on our primary goals through 2032. The timeline on the following pages highlights our major planned accomplishments during that span that will set us on a course to complete OREM's mission by 2047. We have established four goals, eight objectives, and numerous performance measures to help us track our progress over the next decade. These goals and measures are explained in more detail in the next section.

Goal 1: Complete ETPP cleanup and transition site to long-term stewardship

Objective 1: Complete all remedial actions consistent with CERCLA agreements

Objective 2: Complete reindustrialization, conservation, and historic preservation activities and transition site to long term stewardship

Goal 2: Reduce radiological risks at ORNL

Objective 1: Disposition uranium-233 inventory

Objective 2: Deactivate and demolish excess contaminated facilities in central campus

Objective 3: Disposition legacy transuranic waste inventory

Goal 3: Reduce environmental risks at Y-12

Objective 1: Deactivate and demolish high-risk excess contaminated facilities at Y-12

Objective 2: Build infrastructure and advance research to support mercury cleanup

Goal 4: Ensure adequate onsite waste disposal capacity to support remaining cleanup

Objective 1: Build and operate EMDF



PROGRESS ON THE ROAD TO 2032

GOAL 1: COMPLETE ETPP CLEANUP AND TRANSITION SITE TO LONG-TERM STEWARDSHIP

Objective 1: Complete all remedial actions consistent with CERCLA agreements

PERFORMANCE MEASURES:

- Complete soil remediation
- Complete regulatory agreements for groundwater
- Implement groundwater remedies
- Complete investigation for CERCLA decision on remaining ecology, surface water, and sediment remediation

When we first released this program plan in 2022, all demolition was complete at ETPP, but OREM was tasked with completing soil and groundwater remediation to finish our work under CERCLA. Since then, crews have been busy removing building slabs and soil impacted by previous operations beneath the footprint of the former structures, and they successfully completed that work in 2024. Initial estimates indicated approximately 100,000 cubic yards of soil would require excavation but that increased as work progressed. By the end of the project, workers had removed and disposed of more than 554,000 cubic yards of soil, equaling nearly 50,000 dump truck loads.



Crews excavated 500,000 cubic yards of soil at ETPP

Completing all the soil remediation eliminates risks and allows OREM to transfer the remaining federally owned parcels to the community to attract new businesses and economic development. In 2024, regulators also signed two Records of Decisions that provide the guidance and approval necessary to address groundwater in the Main Plant Area and the K-31/K-33 area at ETPP. Those decisions, along with two others under development, will be implemented to guide remediation for groundwater, surface water, and sediment to complete our cleanup mission at ETPP.



The largest dig at ETPP, known as Exposure Unit 21, occurred on the K-25 footprint

Objective 2: Complete reindustrialization, conservation, and historic preservation activities and transition to long term stewardship

PERFORMANCE MEASURES:

- Complete all activities to preserve the historical significance of K-25
- Transfer all applicable economic development parcels to the community
- Transfer all applicable conservation parcels to the State of Tennessee
- Complete closure activities and transition to long-term stewardship

OREM is successfully achieving its ambitious vision to transform the former enrichment complex into a multi-use industrial center, national park, and conservation area. We have transferred more than 1,700 acres for economic development, opened a history center, and signed an agreement to transfer nearly 3,500 acres of scenic East Tennessee land to the Tennessee Wildlife Resources Agency for conservation and recreational uses.

We are continuing efforts to complete our commitments listed in the multi-party agreement to preserve the historical significance of K-25, which includes constructing the K-25 Viewing Platform. Construction is progressing, and it is scheduled to open to the public in 2025.

OREM is also intently focused on transforming the site into an economic engine for the region. Our reindustrialization efforts are giving new life to infrastructure and land that are no longer needed by DOE by transferring them to the community and the City of Oak Ridge.

Since the last update, reindustrialization efforts have continued to expand at ETP. 25 private businesses have located or announced plans to build on these transferred parcels so far, bringing in \$1.35 billion in investments and generating an anticipated 1,400 jobs to the region. With major cleanup complete, the development potential is more apparent, and interest has grown to locate and invest at the site.

With soil cleanup complete, OREM is working to transfer the remaining economically viable parcels of land to the community for reuse. Plans are also underway to transfer conservation areas to the Tennessee Wildlife Resources Agency.



Rendering of Kairos Power's Hermes demonstration reactor



Construction progress on the K-25 Viewing Platform



Cleanup has transformed ETP

GOAL 2: REDUCE RADIOLOGICAL RISKS AT ORNL

Objective 1: Disposition uranium-233 inventory stored at ORNL

PERFORMANCE MEASURES:

- Complete facility upgrades necessary to begin processing operations in Building 2026
- Downblend and disposition all remaining U-233 inventory
- Transition Building 2026 and 3019 for decommissioning and deactivation

While approximately half of the U-233 inventory stored at ORNL was able to be disposed of without processing, the remaining material requires processing to convert it into a form that can be shipped and disposed offsite. Eliminating this material is OREM's highest priority at ORNL since it drives the security posture at the site.

The campaign to process this material is steadily moving forward. Employees began processing the remaining U-233 inventory in hot cells in October 2022, and now they have processed more than 125 canisters of high dose material. Processing and disposition of the remaining material is expected to be completed by 2028.

The removal of the U-233 inventory from ORNL will save significant annual funds dedicated to keeping the material safe and secure, reduce the security posture of ORNL, and allow OREM to decommission and deactivate Building 3019, which is the oldest operating nuclear facility in the world.

This project is also benefiting the medical field. Employees are extracting medical isotopes as they process the material that are supporting next generation cancer treatment research.



Teams move downblended U-233 material using an air pallet



Employees load a canister of U-233 into a hot cell for processing



Processed U-233 is loaded for shipment and disposal

Objective 2: Deactivate and demolish excess contaminated facilities in ORNL's central campus

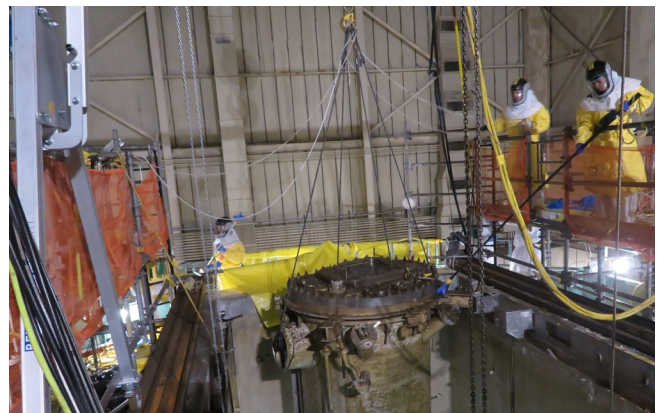
PERFORMANCE MEASURES:

- Demolish Building 3026 Hot Cells
- Demolish Low Intensity Test Reactor (Building 3005)
- Demolish Bulk Shielding Reactor (Building 3010)
- Demolish Oak Ridge Research Reactor (Building 3042)
- Demolish Graphite Reactor support facilities (Buildings 3002, 3003, 3018)
- Demolish Radioisotope Laboratory (Building 3038)
- Demolish Isotope Area Facilities (Buildings 3029, 3030, 3031, 3032, 3033, 3033A, 3034, 3036, 3093, and 3118)

ORNL is DOE's largest multi-program national laboratory, and it is one of the nation's most important research assets. While researchers there are conducting world-leading research in modern facilities on the east and west ends of campus, there are numerous deteriorated and contaminated former research reactors and excess isotope production facilities in the heart of the ORNL campus that date back to the 1950s.

OREM is tasked with safely deactivating and tearing down these facilities without impacting nearby science missions. Crews are making significant progress deactivating and demolishing these excess contaminated facilities in ORNL's central campus.

Crews have completed demolition on the Bulk Shielding Reactor and Low Intensity Test Reactor, and they are actively preparing the Oak Ridge Research Reactor, Graphite Reactor support facilities, and Building 3026's final hot cell for near-term demolition. Together, these projects eliminate risks at the site, clear land for future research missions, and enhance access to the Graphite Reactor - which is a component of the Manhattan Project National Historical Park. Crews will then turn their focus to demolish Isotope Row facilities and Building 3038.



Teams remove the reactor vessel from the Oak Ridge Research Reactor



Workers take down the Low Intensity Test Reactor



Crews deactivate the Experimental Gas Cooled Reactor

Objective 3: Disposition legacy transuranic waste inventory

PERFORMANCE MEASURE:

- Complete processing of legacy remote-handled and contact-handled debris transuranic waste
- Complete shipping legacy remote-handled and contact-handled debris transuranic waste to the Waste Isolate Pilot Plant
- Complete testing using the Mock Test Sludge Processing Facility

Dispositioning the legacy transuranic debris waste is an important component of Oak Ridge's cleanup mission. The legacy transuranic debris waste is being processed at the Transuranic Waste Processing Center located at ORNL.

We are in the final stages of processing and certifying the small percentage of Oak Ridge's remaining inventory of legacy debris contract-handled and remote-handled transuranic waste. The processed and certified transuranic waste is steadily being shipped out of state for disposal at the Waste Isolation Pilot Plant (WIPP) near Carlsbad, New Mexico.



Employees inspect TRU debris waste during processing operations

There are also 400,000 gallons of transuranic sludges stored in underground tanks at ORNL. Our commitment to regulators is to remove all of this waste from Oak Ridge. Since the last update, we have tested critical technology elements at our Mock Test Facility to gather the data necessary to develop plans on how to address the inventory of transuranic sludges in future years.



Processed TRU waste is ready for shipment to WIPP



Workers load processed TRU waste into a shipping cask

GOAL 3: REDUCE ENVIRONMENTAL RISKS AT Y-12

Objective 1: Deactivate and demolish high-risk excess contaminated facilities at Y-12

PERFORMANCE MEASURE:

- Demolish Old Criticality Experiment Lab (Building 9213)
- Remediate and turnover footprint of Biology Complex to NNSA
- Demolish Alpha 2 Complex
- Demolish Beta-1 Complex
- Demolish Beta-4 Complex

Since the last update, crews have made considerable progress at the Y-12 National Security Complex. OREM completed the cleanup and transfer of the former Biology Complex footprint to the National Nuclear Security Administration to begin construction on its new Lithium Processing Facility. Workers have also started demolition on the Alpha-2 complex. This is a significant milestone that marks the first removal of a former enrichment facility at Y-12.

Crews have also advanced deactivation in Beta-1 and Alpha-4, former Manhattan Project-era enrichment facilities. These excess contaminated structures pose risks at the site and stand on land that can be reused to support national security missions in the future.

Crews cleaned out the old, rusted, mercury-contaminated Column Exchange (COLEX) equipment on the exterior of Alpha-4. This activity retrieved nearly seven tons of mercury and reduced a major threat to the environment. Crews have also tested decontamination methods to clean old mercury process piping and field tested a newly developed fogging fixative and application process aimed at controlling mercury vapors during future deactivation and demolition projects at Y-12. Technologies like these will be essential as we continue tackling the heavily mercury contaminated buildings Alpha-4, Alpha-5, and Beta-4.

Cleanup of Alpha-5 and Beta-4 are dependent on NNSA's West End Protected Area Reduction Project. That project will reroute portions of the high-security area around Y-12's mercury-contaminated buildings, allowing access for cleanup crews without having to ingress and egress through a high-security area.



NNSA breaks ground on its new Lithium Processing Facility



EM is tasked with demolishing numerous excess contaminated facilities, like these, at Y-12



Crews demolish Building 9213

Objective 2: Build infrastructure and advance research to support mercury cleanup

PERFORMANCE MEASURE:

- ❑ Complete construction and begin operations of the Outfall 200 Mercury Treatment Facility
- ❑ Support technology development for future mercury cleanup

The Mercury Treatment Facility is designed to treat up to 3,000 gallons of surface water per minute and store 2 million gallons of excess stormwater. It will be comprised of two components at two locations — a headworks facility and a treatment plant— connected by a half mile pipeline. The headworks facility will capture creek flow, store excess stormwater collected during large rainfalls, remove grit, and pump water through the pipeline to the treatment plant. The treated water will then flow back into the creek. Construction is progressing on both the treatment facility and headworks facility.



Construction progress on the headworks facility

Mercury cleanup at Y-12 is one of OREM's highest priorities, and our ongoing research is positioning us for future success. We developed a Comprehensive Mercury Technology Development Plan and a Strategic Plan that serves as a roadmap for what must occur to complete the mercury cleanup at the site. This plan includes supporting research at ORNL's Aquatic Ecology Laboratory. Researchers there are expanding our understanding of mercury in the environment, advancing technology development, and identifying solutions for future remediation of the East Fork Poplar Creek.



Construction progress on the treatment facility

We completed an expansion of the Aquatic Ecology Laboratory that enables new research capabilities. The expansion allows actual mercury-contaminated water from local streams to flow through the facility so researchers can test mercury removal technologies in a real-life setting. This first-of-a-kind capability will help researchers discover which technologies will offer the most effective remediation results. This research is helping us gain a deeper understanding of the local environment and find new tools that will be more effective in addressing the complex mercury challenge at Y-12.



Researchers gather samples from the East Fork Poplar Creek to advance mercury-related studies

GOAL 4: ENSURE ADEQUATE ONSITE WASTE DISPOSAL CAPACITY TO SUPPORT REMAINING CLEANUP

Objective 1: Build and operate EMDF

PERFORMANCE MEASURES:

- Finalize Record for Decision for EMDF
- Finalize design for EMDF
- Construct first phase of EMDF

The Environmental Management Waste Management Facility, Oak Ridge's current onsite CERCLA disposal facility, is more than 85% full, and it is expected to reach its full capacity in the late 2020's.

OREM needs another low-level onsite disposal facility, known as the Environmental Management Disposal Facility (EMDF), to provide the disposal capacity required to complete cleanup at Y-12 and ORNL. This project is vital to the success of the other projects and goals listed in this Program Plan. EMDF will provide the infrastructure to enable the cost effective and efficient cleanup of Y-12 and ORNL.



Early site prep is complete, and the future footprint of EMDF is taking shape

We have worked collaboratively with the EPA and the State of Tennessee and engaged the public on our data based and science-driven approach that ensures a safe and protective design for the proposed engineered disposal facility. DOE, EPA, and the State signed a final Record of Decision in 2022. With that approval in place, OREM broke ground on the EMDF project in 2023. Since then, crews have completed early site prep. They completed that work five months ahead of schedule and more than \$13 million under budget.

Now, the second phase of the project, known as the groundwater field demonstration study, is underway. The purpose is to understand how groundwater levels adjust following construction of the landfill. The study will span two wet seasons to capture data to help inform and finalize EMDF's design on the bottom elevation of the landfill. OREM is scheduled to begin monitoring groundwater elevations in December 2024.



A LOOK TOWARD THE FUTURE

While our cleanup is scheduled to continue through 2047, completing the goals identified in this plan will significantly alter the landscape across the Oak Ridge Reservation and create impactful opportunities for the community.

By 2032, we will be in the final stages of remediation at ETPP and achieving our vision of transforming the former uranium enrichment site into a multi-use industrial center, historic park, and conservation area. Major changes will also be visible at ORNL and Y-12. Crews will clear away many of the old reactors and labs in ORNL's central campus to make room for expanding research missions. At Y-12, infrastructure will be completed that allows us to address sources of mercury contamination, and workers will be in the midst of taking down some of the largest high-risk buildings at the site.

We will also achieve major progress toward eliminating inventories of nuclear material and waste currently stored at the site. Employees will finish processing and dispositioning the inventory of uranium-233 stored at the world's oldest operating nuclear facility located at ORNL. Also, we will have completed the processing and removal of all legacy transuranic debris waste from Oak Ridge.

Our contributions are transforming the site by removing barriers to economic development, eliminating risks, and opening land for important ongoing missions that are benefiting our nation. Every day, we are working toward our vision of a clean, modernized Oak Ridge that is poised to provide solutions to the nation's pressing needs.





Federal Building
200 Administration Road
Oak Ridge, TN 37830

Phone: (865) 576-0742

energy.gov/orem

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