Advocate

A publication of the Oak Ridge Site Specific Advisory Board – a federally appointed citizens panel providing independent recommendations and advice to DOE's Environmental Management Program

Board Members Get Inside Look at U-233 Processing

Oak Ridge Site Specific Advisory Board (ORSSAB) members got an inside look at the uranium (U-233) processing operations at Oak Ridge National Laboratory (ORNL) in November.

Seven ORSSAB members joined Oak Ridge Office of Environmental Management (OREM) and OREM contractor Isotek representatives for a tour of the facility, the first in-person ORSSAB tour since Covid safety precautions began in March 2020.

OREM's Nathan Felosi had joined board members at the November board meeting to share information about the U-233 processing campaign, and the tour gave members the opportunity to see it first-hand.

EM contractor Isotek began processing the remaining inventory of U-233 stored at ORNL in October, moving EM closer to achieving its highest cleanup priority at ORNL: safe and secure disposal of the Cold War legacy nuclear material stored in the world's oldest operating nuclear facility, Building 3019.

From left, ORSSAB's John Tapp, Leon Shields, and Greg Malone look at a canister similar to the types of canisters being handled by OREM's U-233 processing campaign at ORNL.

Crews began the campaign by transferring a canister of U-233 oxide from Building 3019 into an adjacent, newly upgraded hot cell facility for downblending processing.

"Receiving startup approval for the initial processing campaign is a defining moment for the U-233 Disposition Project," Isotek President Jim Bolon said. "Isotek personnel have invested over 500,000 hours of effort over several years to make this dream come true. I am extraordinarily proud of their hard work and commitment to the U-233 disposition mission."

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ORSSAB members watch live camera views of hot cells—heavily shielded rooms where U-233 down blending takes place using remote mechanical arms.

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Reservation Update

A view of the Alpha-4 facility at the Y-12 National Security Complex. Workers are in the early stages of removing all utility sources to the building prior to demolition.

EM Crews Begin Alpha-4 Deactivation at Y-12

EM crews in September took the first steps to bring the massive Alpha-4 facility at the Y-12 National Security Complex (Y-12) to the cold-and-dark stage, a process in which they remove all utility sources to the building as a precursor to demolition.

This project moves EM closer to addressing one of the largest high-risk buildings at the site. It also marks the third former enrichment facility at Y-12 where EM has initiated deactivation work. Other crews are preparing the Alpha-2 and Beta-1 facilities for teardown.

EM Oak Ridge contractor UCOR began sampling and marking potential hazards and removing combustible materials from Alpha-4 last month. Workers will soon begin isolating the structure from any potential hazardous energy sources, an early step in the deactivation process.

The four-story Alpha-4 spans more than 500,000 square feet across 13 acre of land. The deactivation and demolition project is challenging not only due to the facility's size, but also its mercury contamination.

The facility was used for uranium separation from 1944 to 1945. A decade later, workers finished installing Column Exchange (COLEX) equipment on the west, east, and south sides of Alpha-4 for lithium separation, a process requiring large amounts of mercury.

A significant amount of mercury was lost into the equipment, building and surrounding soils during those operations. Mercury cleanup is one of EM's top priorities at Y-12.

Although employees drained the majority of materials from the equipment at Alpha-4 when operations ended in the 1960s, recoverable amounts of mercury remained in aging lines and equipment that had rusted and deteriorated over the decades.

UCOR crews have retrieved more than 6.5 tons of mercury from the COLEX equipment to date, demolished the equipment on the west side of Alpha-4 and finished deactivating the equipment on the east side of the building earlier this year.

Crews Demolish Former Criticality Experiment Lab

EM crews recently successfully completed the demolition of the former Criticality Experiment Laboratory after working this past summer to bring down the dilapidated 1940s-era facility, also known as Building 9213.

Work to demolish the former Criticality Experiment Laboratory began in May when crews began removing ancillary structures around it

More than 50 percent of the facilities throughout the National Nuclear Security Administration complex, which includes Y-12, are more than 40 years old. The Criticality Experiment Laboratory is one of them.

Built in 1949, the two-story, 24,000-square-foot laboratory was used to conduct experiments with fissile uranium isotopes for nuclear reactor designs. Employees performed more than 9,700 experiments there in its first decade, and the facility later supported the Oak Ridge National Laboratory's High Flux Isotope Reactor program. The building has been closed since 1992.

With the building down, crews are working to remove waste and debris. They expect to move an estimated 525 truckloads of it in coming weeks.

Workers spent significant time deactivating the facility leading up to its teardown. They removed nearly 1,500 linear feet of asbestos-insulated piping, 300 linear feet of process piping and 8,500 square feet of other asbestos-containing material.

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Crews Demolish First Reactor in ORNL's Central Campus

EM recently completed the first-ever demolition of a reactor in the central campus area at ORNL.

OREM cleanup contractor UCOR has safely taken down the Bulk Shielding Reactor, also known as Building 3010.

The Bulk Shielding Reactor complex was built in the 1950s for radiation shielding studies as part of the federal Aircraft Nuclear Propulsion Program. It included a 27-foot-deep reactor pool filled with water to shield the radioactive components contained in the pool. Its mission changed to a general-purpose research reactor in 1963 and was shut down permanently in 1991.

Work continues at the reactor site to finish reducing the size of debris from the teardown and haul debris to a disposal facility. Workers recently completed packaging and disposal of the 250 truckloads of waste and debris generated by this project.

One of the most important pre-demolition activities involved removing and disposing irradiated components from the reactor pool. After those tasks, workers drained the 130,000 gallons of the water from the pool and sent it to an onsite treatment facility. Then the pool area was decontaminated and filled with a concrete mixture to close it.

In addition to stabilizing the reactor pool, workers removed asbestos and other waste from the facility.

The Bulk Shielding Reactor was one of more than a dozen research reactors constructed at ORNL over multiple decades. Each contributed to ORNL's reputation as a world leader in cutting-edge nuclear research and development. The facility was one of 16 inactive research reactors and isotope facilities EM is addressing at ORNL.

Oak Ridge Unveils Cleanup Vision for Next Decade

OREM recently unveiled its vision for the next decade to employees and partners, and progress is already under way toward achieving it.

OREM shared the vision in its new 10-Year Program Plan. This edition provides a course for cleanup operations across the Oak Ridge Reservation from 2022 through 2032, complete with specific goals, objectives, performance measures and timelines.

The newly released document comes nearly 10 years after the release of the site's initial program plan. That document established major cleanup goals and set clear expectations for employees and contractors that led to strong results. Now, there is an updated list of goals for the years ahead with the same purpose in mind.

The 2022-2032 plan lays out four overarching cleanup goals for the workforce. These goals are a fixed target for employees to pursue, and they serve as a measurable method to gauge and track performance.

Over the next 10 years, OREM is set to complete soil and groundwater cleanup and complete all land transfers at the East Tennessee Technology Park (ETTP).

The workforce also will accomplish major transformation at Oak Ridge National Laboratory (ORNL) and the Y-12 National Security Complex (Y-12). Employees are scheduled to remove all uranium-233 inventory and debris transuranic waste at ORNL, clear away numerous former reactors and labs in ORNL's central campus and begin the teardown of massive high-risk buildings at Y-12.

Within weeks of the plan's release OREM had already achieved multiple performance measures contained in it.

The beginning, middle and end: An aerial look at the teardown of the Bulk Shielding Reactor in the central campus of ORNL. Crews safely completed the demolition ahead of schedule, reducing risks at the laboratory and opening land for reuse at the site.

Advocate

EMDF Information Session Marks New Phase in Project

OREM Regulatory Specialist Roger Petrie, left, answered questions and shared details about the EMDF project to attendees of a public information session on Dec. 8.

OREM officials reached an important milestone this fall in preparing for a new onsite disposal facility by signing a record of decision with the U.S. Environmental Protection Agency (EPA) and Tennessee Department of Environment and Conservation (TDEC).

The recently signed document allows OREM and its contractor UCOR to move forward with a final design for the facility and begin activities to prepare for its construction.

The Environmental Management Disposal Facility (EMDF) is key to providing the waste disposal capacity needed to continue cleanup efforts at the Y-12 National Security Complex (Y-12) and Oak Ridge National Laboratory (ORNL). OREM's current waste disposal facility is at 83 percent capacity.

While all high-level radioactive waste is shipped out of state for disposal, OREM needs the new onsite disposal facility for low-level waste, such as soil and building rubble, generated from cleanup projects.

ORSSAB officer Harriett McCurdy (right) learned more about EMDF at a public information session at Scarboro Community Center.

As the EMDF project enters a new phase following the record of decision, OREM is maintaining its commitment to keep the community informed about the project as it progresses. OREM hosted an information session last week as the most recent effort to continue public outreach.

The two-hour open-house-style event on Dec. 8 featured posters with new information on the next phase of the project, upcoming site preparation activities and the Groundwater Field Demonstration project. That study will help OREM and regulators understand how groundwater well levels adjust, informing the final EMDF design.

Site preparation activities, scheduled to begin in summer 2023, will involve moving roads and utilities and developing an area to support future construction crews. The Groundwater Field Demonstration project is expected to begin late next year.

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EM Leadership Sees Progress, Hears Perpectives in Visit

EM Senior Advisor William "Ike" White met with ORSSAB leadership during his visit to Oak Ridge. Pictured from left are OREM Acting Manager Laura Wilkerson, ORSSAB Chair Leon Shields, White, and ORSSAB Vice Chair Amy Jones.

EM Senior Advisor William "Ike" White met with ORSSAB's chair and vice chair during White's visit to Oak Ridge in October.

White sat down with ORSSAB Chair Leon Shields and Vice Chair Amy Jones for breakfast while he was in town. The meeting gave White the opportunity to hear their perspectives and express his gratitude for their time and service with the board.

White's visit with ORSSAB executives was part of a full agenda that included speaking to government and industry leaders, observing cleanup progress and meeting with local officials.

His tour began at ORNL, where he saw deactivation and demolition projects in the central campus area, a focal point for many of EM's near-term cleanup projects.

Local leadership with EM and Oak Ridge cleanup contractor UCOR took White to the Bulk Shielding Reactor. Demolition began on the building in September, marking the first teardown of a former reactor in the central campus area.

White also observed work happening at the adjacent Low Intensity Test Reactor and Oak Ridge Research Reactor, which has since been demolished. Removing those buildings eliminates risks, opens land for reuse and enhances accessibility to a central attraction of the Manhattan Project National Historical Park — the Graphite Reactor.

Next, the head of EM toured Building 2026, where employees had recently finished all facility upgrades, safety reviews and other steps needed to begin processing uranium-233. EM's highest priority at ORNL is processing uranium-233, which will eliminate an inventory of nuclear material stored in the world's oldest operating nuclear facility.

White also traveled to the Y-12 National Security Complex, where he viewed two demolition projects recently completed. Demolition just wrapped up at the former Criticality Experiment Lab, and workers finished removing the slab of the former Biology Complex in past weeks, allowing that 18-acre site to be returned to the National Nuclear Security Administration in the coming month.

Local EM leaders and project managers also took White to the future site of the EMDF. That project crossed a major threshold at the end of September when officials from DOE, the U.S. Environmental Protection Agency and Tennessee Department of Environment and Conservation signed a record of decision.

That document allows EM to move forward on a final design and begin site preparations for EMDF. The facility is needed to continue advancing cleanup at Y-12 and ORNL because Oak Ridge's existing waste disposal facility has exceeded more than 80 percent of its capacity.

White served as the keynote speaker at this year's Energy Technology and Environmental Business Association Business Opportunities Conference. He noted that EM's level of progress would not be possible without the cleanup program's industry partners, both large and small. The conference was held nearby in Knoxville, with participants from government agencies and numerous contractors of all sizes from across the region.

EMDF

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Top subject matter experts from the project were on hand at the Dec. 8 event to discuss updates and answer questions from attendees.

"There are still a lot of questions the public has," said OREM Regulatory Affairs Specialist Roger Petrie. "We know more questions would arise as we proceeded, so we want to have these public meetings to address as many of those as possible."

OREM will continue sharing the latest developments about the project at the next information session scheduled for next summer.

The Dec. 8 event follows two public comment periods, formal meetings, information sessions and numerous presentations since 2018.

(Above) Board members learned more about the hot cells and remote handling technology used in the U-233 processing campaign. (Below) ORSSAB members watched as Isotek personnel processed U-233 at ORNL.

U-233

(Continued from page 1)

Using the hot cells, which are heavily shielded rooms, workers are protected from radiation exposure as they handle the radioactive nuclear material remotely by controlling mechanical arms. Employees manipulate the arms to open canisters inside the hot cells, strip the transuranic material — which has a higher atomic number than uranium — from the U-233, and mix it with depleted uranyl nitrate.

This downblending lessens the enrichment of the U-233 material, converting the material into a form safe for transportation and permanent disposal. Downblended uranyl nitrate is solidified onsite, packaged and transported offsite for secure disposal.

EM and Isotek's work to safely process this Cold War-era nuclear material will reduce risks and eliminate costs to taxpayers of keeping the material safe and secure in storage.

U-233 was created as an alternative nuclear fuel source in the 1950s and 1960s. However, due to its trace amounts of U-232, a highly unstable radioactive isotope, it was too difficult to use. Eventually, it was moved to ORNL for storage.

EM and Isotek completed an earlier phase of the project last year. Together, they successfully finished processing and disposing the low-dose inventory of U-233. That two-year effort eliminated a portion of the site's legacy nuclear material and provided rare nuclear isotopes for next-generation cancer treatment research.

An initial approach involved processing all of the remaining U-233 inventory in hot cells. However, the building required significant upgrades before that work could begin.

Isotek identified a subset of the U-233 material with lower radioactivity levels that employees could begin processing in gloveboxes while other crews prepared the hot cells to address the U-233 material with higher radioactivity levels. Now that the hot cells have been upgraded, employees can begin processing the high-dose inventory.

The U-233 Disposition Project is not only reducing risks and eliminating future costs, but also benefiting the medical field. Under a partnership with TerraPower, Isotek is extracting thorium-229 from U-233 during processing.

Thorium-229 will be used to produce vital medical isotopes ideal for a promising new cancer treatment, known as alpha targeted therapy. The inventory of U-233 stored at ORNL is the only source of Thorium-229 in the world. Processing of all U-233 canisters in Building 3019 is expected to yield enough thorium to produce up to 200 times more cancer treatment doses per year than what is currently available.

The U-233 processing campaign is expected to continue for several years. By the end of the campaign, about 90 percent of the original nuclear inventory in Building 3019 will be dispositioned.

Members

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can be requested by phone or email.

Board membership will take some time — two or three hours for the 8 or 9 sessions the board and its committees meet. There are also optional opportunities for exclusive site tours or educational travel, which can vary in their time commitments. But if you're looking to participate in your community or learn more about where you live, here's why we think it's a pretty good deal.

"Membership is the best, most direct way to understand the environmental cleanup underway, interact with project managers, and to make your opinions known to DOE," said Laura Wilkerson, OREM acting manager.

"The recommendations from this board and the perspective of its members are incredibly valuable to our program, and they help influence and guide our decision-making."

That's no small thing when the cleanup program is one of the largest employers in the region and makes contributions to the local and state economy worth billions of dollars.

Each year the board works with OREM to develop a work plan on the topics it will consider. Presentations take place at the main board meeting on the second Wednesday of most months. If appropriate, a site tour may follow. Next, the board's EM & Stewardship Committee meets to ask additional questions and begin drafting a recommendation if the board wants to offer one or if OREM requests it.

Recommendations from the board shaped the final form of projects like recreational green spaces and trails at the Heritage Center and East Tennessee Technology Park, among others. Both the American Museum of Science and Energy and the K-25 History Center, had board input. The board historically weighed in on the land transfer program that now helps bring employers like Coqui Pharmaceuticals and Ultra Safe Nuclear Corp. to Oak Ridge.

Want more information? A detailed guide and much of the new member training packet are available to the public at www.energy.gov/orem/articles/orssab-membership-application-information and staff can answer questions at orssab@orem.doe.gov or 865-241-4584.

Each year, new board members tour the Graphite Reactor at ORNL as part of their orientation training.

Join Us for a Briefing on Waste Disposal and EMDF

6 p.m. Wednesday, February 8
Virtually via Zoom

Learn more about EM's plan to ensure there is enough on-site waste capacity to complete demolition and environmental remediation at ORNL and Y-12.

Join the Board on February 8 as DOE's Brian Henry and Dennis Mayton discuss the new waste disposal facility to be built.

Questions? Want to attend? Contact us at 865-241-4584 or orssab@orem.doe.gov

Sharpe Makes the Grade with Honors

Board member Michael Sharpe has been very busy.

In December 2022 Sharpe received his Master's in Business Administration from Tusculum University. It was the capstone of five years of effort.

Since joining the board in 2020, Sharpe has been active, attending and representing the board at national events, and taking on two leadership roles. He was first elected vice chair of the board's EM & Stewardship Committee, then stepped up as chair when the position became vacant unexpectedly.

At the same time, he has been achieving professional milestones.

Michael Sharpe

Sharpe completed his bachelor's degree with a focus on business administration and was promoted to System Administrator at Oak Ridge Associated Universities, where he has worked for more than 6 years. And he's not stopping there. Sharpe plans to build on his experience combined with the new degrees to advance into future leadership roles.

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Oak Ridge Site Specific Advisory Board
January 2023

We Want You: ORSSAB Seeks New Faces During FY 2023 Recruitment

ORSSAB is seeking new board members to fill open seats this fall. Recruitment kicked off in December during OREM's poster session on the planned new disposal facility (see page 4). Staff manned a table with applications and board materials, while members mingled to share their experiences.

There are at least six open slots available and terms are for two years. All adult residents of the multi-county area surrounding Oak Ridge are encouraged to apply. The board draws from Anderson, Blount, Campbell, Knox, Loudon, Meigs, Morgan, Roane and Union counties, but may also consider candidates from other locations.

It's important for OREM to hear advice from a broad spectrum of those who live or work in the area, so whether you're a native East Tennessean, a retiree drawn by lakeside living in Loudon, or moved here for a job opportunity, we want to share the important cleanup work underway and hear your thoughts. Applications are available on the board's website, **www.energy.gov/orssab**, and

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ORSSAB staff and members attended the recent EMDF information session to share details of board membership with attendees at the Scarboro Community Center event.

ABBREVIATIONS

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act, also known as Superfund
DOE – Department of Energy
EM – Environmental Management
EMWMF – Environmental Management Waste Management Facility
ETTP – East Tennessee Technology Park
OREM – Oak Ridge Environmental Management
ORNL – Oak Ridge National Laboratory
ORR – Oak Ridge Reservation
ORSSAB – Oak Ridge Site Specific Advisory Board
TDEC – Tennessee Department of Environment & Conservation
UCOR – United Cleanup Oak Ridge
Y-12 – Y-12 National Security Complex

UPCOMING MEETINGS

Meetings are at 6 p.m. virtually for the public until further notice.
Email orssab@orem.doe.gov at least 1 week prior for access.

Board: Waste Disposal and EMDF Update, February 8
EM & Stewardship Committee: February 22

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