UCOR

an Amentum-led partnership with Jacobs

FY 2021 Annual Report

10 years of cleanup excellence


EXIT
REUSABLE
RADIOACTIVE
CAUTION

Inside

2011

2021

Message from the President and CEO

The difference 10 years can make

In 2011, UCOR took over the East Tennessee Technology Park (ETTP) cleanup contract for the Department of Energy (DOE) Oak Ridge Office of Environmental Management (OREM). We committed to OREM, as well as the community, our labor partners, state and federal representatives, regulators, and other key stakeholders that we would deliver the environmental cleanup mission safely, expeditiously, and cost effectively.

We not only delivered on our commitments, but in many ways set a new standard for cleanup across the complex. We completed the historic cleanup of ETTP four years ahead of schedule and $80 million under budget, eliminating $500 million of environmental liability. Because of our accelerated ETTP schedule, combined with our investment-worthy performance and numerous successful partnerships, OREM entrusted us with cleanup of legacy excess contaminated facilities at Oak Ridge National Laboratory (ORNL) and the Y-12 National Security Complex (Y-12). Last year, we successfully moved much of our skilled workforce from ETTP to projects at ORNL and Y-12.

Fiscal Year (FY) 2021 was another stellar year. We delivered key, first-of-a-kind end states that reduced risks and are providing land for continuing science and national security missions. At ORNL, we removed one of the two remaining hot cells from the Radioisotope Development Laboratory. We are working on deactivating various reactor facilities and are preparing to disposition several buildings used for the processing of radioisotopes. We are updating piping and equipment associated with the Liquid and Gaseous Waste Operations to ensure no disruption to ORNL operations. We also continued our surveillance and maintenance activities at the site.

Our work to demolish the massive Y-12 Biology Complex is freeing up land for a new lithium processing facility. The demolition was a major change to the skyline at Y-12. In addition, our crews are deactivating some of the largest Manhattan-era facilities on the site, including uranium processing facilities.

We are continuing remedial actions at ETTP (also known as the Heritage Center), removing building slabs and excavating contaminated soil to make large tracts of land available for industrial development. Our cleanup efforts are certainly paying dividends—the transformed site is home to 20 private businesses, and they are about to be joined by two more companies bringing more than 250 new jobs to the area. The transformation of ETTP has had a significant positive economic impact for the region. Historic preservation and conservation efforts are also underway at the site.

We have also continued successful operation of various waste disposal facilities on the Oak Ridge Reservation, providing necessary and safe disposal capacity for demolition and other projects across the reservation.

We continue to perform this work with a focus on collaboration and shared governance—ensuring everyone at the table has a voice. We've also performed this work with an eye on environmental justice, ensuring underserved communities are not negatively impacted by cleanup operations.

Since we began operations, safety has always been our top priority. Despite the challenges of the COVID-19 pandemic, we continued in FY 2021 to be a DOE Complex-wide example of a strong safety culture. As we look ahead into the closing year of our contract, we remain focused on performing at the highest standards as we have during our successful 10 years in Oak Ridge.

In closing, I would like to honor one of my dear friends and a colleague of over 30 years, Leo Sain, who passed away this year. Leo, the original UCOR president, was a titan and laid the foundation for the success we've had. He was loved, respected, and will be remembered by thousands of members of our workforce, community, and throughout the nuclear industry.

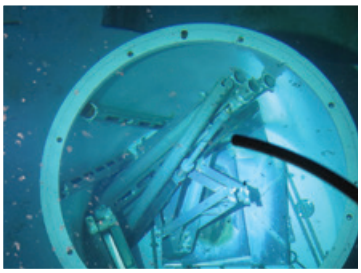
Enterprises

UCOR is responsible for cleaning up excess contaminated facilities at ORNL and Y-12. With major demolition at ETTP completed, UCOR is performing remedial actions at the site.

Oak Ridge National Laboratory

Integrated Facilities Demolition

UCOR made significant strides in FY 2021 creating a more stable and safe work environment while allowing expansion of site missions.



Materials in 3010 reactor pool (left) and being loaded into transport cask (below)

A significant accomplishment was the removal of highly irradiated items from the Building 3010 Reactor Pool. To remove the irradiated materials, UCOR moved a 6,100-pound waste transfer liner to a 21-foot depth in the pool. Workers placed the irradiated materials into the waste transfer liner and sealed it, lifted it from the pool, and placed it in a waste disposal liner. They then transferred that liner to a transport cask weighing over 88,000 pounds and safely shipped it offsite for disposal. Finally, 130,000 gallons of pool water was drained from the pool and shipped for treatment.

One of the priority projects at ORNL was demolishing the West Cell Bank at the Radioisotope Development Laboratory (Building 3026). Prior to the work, crews installed a six-story fabric tent over the area to keep nearby research facilities in the ORNL Central Campus protected while the first hot cell was demolished. Efforts were underway at the end of the fiscal year to prepare to demolish the final hot cell.

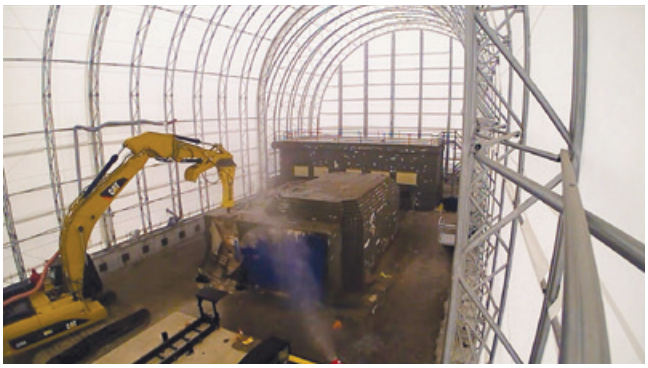
In addition to the progress at 3026 and 3010, deactivation crews continued work at the 3005 Low Intensity Test Reactor, 3042 Oak Ridge Research Reactor, and 3038 Development Laboratory (one of a series of buildings referred to as Isotope Row) focusing on abating asbestos and removing universal waste and lead. More than 158,000 pounds of deactivation waste have been removed and disposed of from the ORNL Reactor Area and Isotope Row buildings.

Loading 3010 cask onto truck for transport

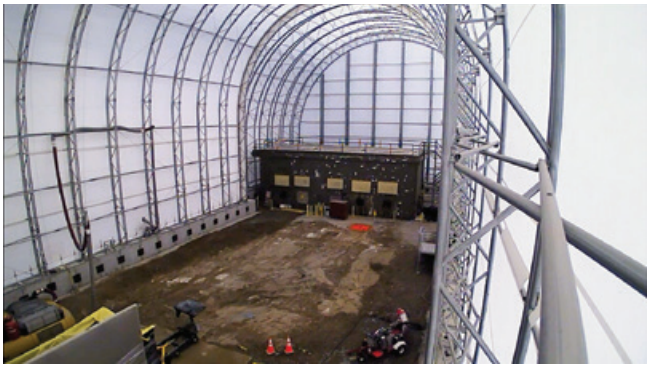
Innovation

To move demolition materials out of the tent structure built over the former Radioisotope Development Laboratory, UCOR designed and constructed a unique intermodal rail system to haul large waste containers. The rail system helped contain dust and minimize risks associated with the movement of the waste containers outside of the facility.

Cold and dark activities continued at Building 7600, the Experimental Gas-Cooled Reactor (EGCR), to prepare for future deactivation crews. Several openings were needed to allow workers to safely enter and exit while safety upgrades were completed inside. UCOR electricians worked closely with UT-Battelle, the ORNL site contractor, for the primary electrical isolations and made substantial progress performing the secondary electrical isolations during a single outage. Completing this work in one power outage minimized impacts to the active ORNL research missions in the facilities neighboring the EGCR complex. Workers began establishing the necessary infrastructure to support deactivation crews, including the installation of a transport platform cart system and trailers that will allow workers to maneuver around the 216-foot-high, eight-level, 107,922-square-foot building to remove steel and concrete.



Removal of 3026 hot cell



To support all of the work being conducted at ORNL, an area was prepared for maintenance services and heavy equipment that was transitioned from ETTP. The location on Chestnut Ridge is along the western portion of the Oak Ridge Reservation Landfills. This approximately three-acre area will serve for staging and storing equipment required to support future remediation and demolition efforts at ORNL and Y-12.

Surveillance and Maintenance Activities

After over 70 years of continued, 24/7 operations, the primary waste treatment plant for liquid and gaseous waste generated by laboratory operations

and retired nuclear facilities needed major repairs and refurbishment to maintain reliable operations. With the support and funding provided by OREM, UCOR has been focusing on Liquid and Gaseous Waste Operations (LGWO) upgrades while continuing to successfully treat and discharge waste from around the laboratory.

Comprised of more than 60 facilities and over 27 miles of piping, the LGWO system treats waste from cleanup operations, research and development labs, radiochemical pilot plants, and nuclear reactors. Any buildings that contain radioactive operations at ORNL are serviced by this system in some form.

Across the LGWO, upgrades have been initiated and/or completed to enable another 30 years of operations. The system was brought to 100 percent operability. One of the largest projects was the startup of the new zeolite treatment system at Building 3608, Process Waste Treatment Complex. The purpose of the project was to consolidate radiological and non-radiological wastewater treatment capability into a single facility, costing less to operate and allowing for deactivation and decommissioning of outdated processing facilities.

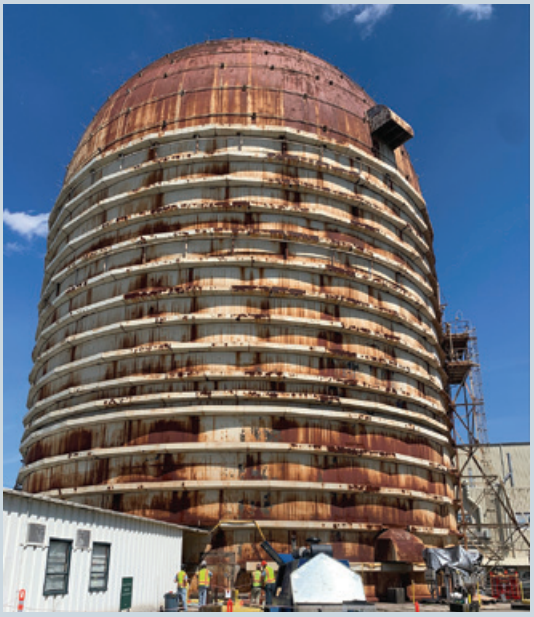
The recently installed system is now removing cesium and strontium from ORNL wastewater and protecting the environment. As a result, the Radiological Process Waste Treatment Complex, which has exceeded its design life, is now in standby and will be available for decommissioning once the new zeolite treatment process has been optimized and confirmed to be reliable.

After completing startup and operation acceptance testing, the new 3571 Process Waste Pre-Treatment Facility at ORNL was declared operational. Wastewater will be extracted from the facility or from the transfer piping. A Process Wastewater System connection adjacent to the facility will discharge the treated water. The system could treat other acceptable waste streams using tanker connections, potentially diverting up to 80 percent of the water that would otherwise go to the Liquid Low-Level Waste (LLLW) System.

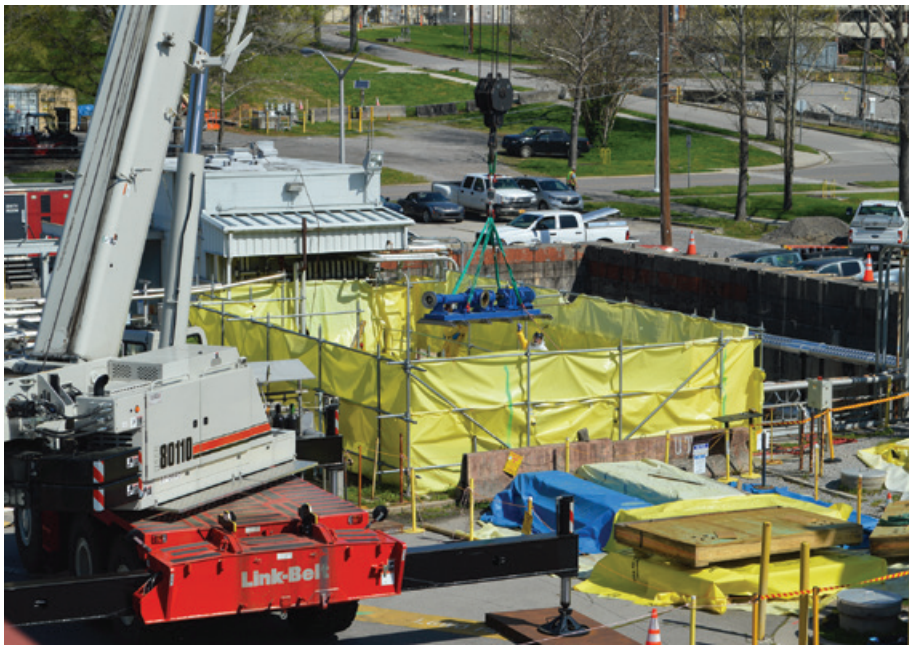
The Process Waste Pre-Treatment System will be key to maintaining available storage capacity for LLLW operations through processing some LLLW waste for

Innovation

Most people think of garnets as gemstones found in jewelry. However, they are also a key component in an innovative technology UCOR deployed to cut through metal. At the Experimental Gas-Cooled Reactor, workers used a unique waterjet technology that used garnet dust to cut through ¾-inch-thick steel. This technology was more cost effective and safer for the workers to manage.



acceptance into the process waste systems of LGWO at the 3608 Process Waste Treatment Complex.



Installation of the Moyno pump

Further improvements/upgrades that were addressed included replacing degraded piping, turbines, and pumps. Each of these critical parts to the LGWO plant held unique challenges due to the age of these systems. Because parts for the systems were no longer available, a new design was required. Installation took ingenuity and attention to detail to fit new items into existing small places. Planning for replacements included maintaining operability at all times. UCOR successfully replaced two runs of piping, lined an underground run of piping, replaced two turbines and corresponding gearboxes, and replaced a major displacement pump (referred to as a Moyno pump)—all without interruption to LGWO operations.

UCOR used a rail system to remove an old generator from the Oak Ridge Graphite Reactor during an exhaust system upgrade project. A section of wall was removed from the historic facility in order to install a rail system to remove the large generator from the confined space.

In addition to LGWO upgrades, UCOR successfully completed the historic 3001 Oak Ridge Graphite Reactor roof repair and exhaust system installation. The roof effort—which will help preserve this national monument—exposed workers to heat and wind while working at a height of 70 feet. A HEPA unit and stack were installed for continued off-gassing of the graphite reactor, which was the first-ever nuclear reactor facility built. The new exhaust system was installed to enable the eventual deactivation and demolition of the 3002 facility and 3018 stack.

Other surveillance and maintenance work is going on at the Molten Salt Reactor Experiment (MSRE) site, including developing a Continuous Purge System (CPS). The MSRE CPS will enable continuous off-gassing of the drain tanks used by the MSRE reactor. A non-manual purging system enables the shutdown of the Reactive Gas Removal System and the eventual deactivation of the MSRE facility.

Some major accomplishments at MSRE include opening valves on top of two fuel drain tanks, establishing a weld shop at the Heritage Center to fabricate necessary components, and performing hazard reduction activity in the drain tank pit.

Planned and ongoing cleanup work at ORNL

2021 ORNL achievements by the numbers

More than
1.8 million
pounds of demolition debris disposed of from 3026

More than
91,000
pounds of lead removed from Building 3005

More than
58,000
pounds of asbestos and universal waste removed from buildings

17
highly irradiated items removed from 3010 reactor pool

More than
130,000
gallons of water drained from 3010 reactor pool

Biology Complex demolition

Y-12 National Security Complex

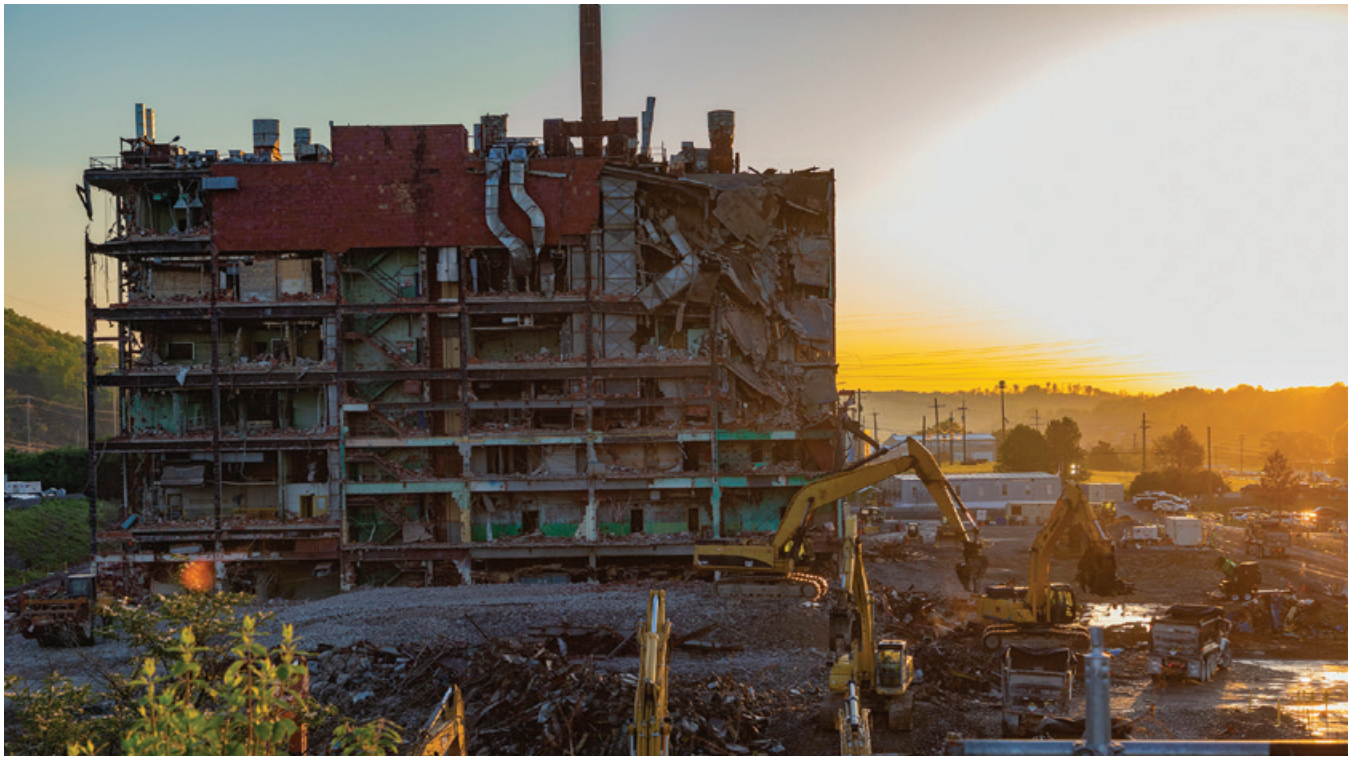
UCOR's most significant accomplishment at the Y-12 National Security Complex was completing demolition of the historic Biology Complex. The deteriorated facilities presented significant structural risks and were on DOE's list of high-risk, excess contaminated facilities. When the final two buildings in the complex (9207 and 9210) came down, the Y-12 skyline changed dramatically. To be able to demolish these buildings, workers removed 1,750 tons of asbestos and universal waste from the buildings. Crews first demolished the three-story, 65,000-square-foot Building 9210 and then completed demolition of Building 9207, a 255,000-square-foot facility, at which point crews transferred more than 59,000 tons of waste for disposal (5,000 shipments).

At the close of the fiscal year, workers were removing the remaining foundations and slabs. Ultimately, the land will be turned back to Y-12, which has announced plans to build a new lithium processing facility on the footprint.

UCOR's demolition work at Y-12, including the recent demolition of the Biology Complex, frees up space for future national security missions. UCOR is helping to set the stage for more safe decommissioning and demolition work on contaminated and deteriorating facilities. These are complex tasks in the midst of a working production facility, and UCOR coordinates closely with us to get the job done while we accomplish our mission.

Bill Tindal
Chief Operating Officer
Consolidated Nuclear Security, LLC

Biology Complex site (above) after demolition of the facility (below)



With the Biology Complex demolition completed, crews turned their attention to deactivating several other Y-12 facilities. Among them were Alpha-2 (Building 9201-2) and Beta-1 (Building 9204-1). Both of the buildings originally housed calutron tracks for uranium processing for the Manhattan Project. The three-story Alpha-2 building, with a footprint of 107,619 square feet, is in a cold and dark state, meaning all power sources to the building have been cut.

As workers continued deactivation tasks at Alpha-2, other crews were busy deactivating Beta-1, a multi-level facility that is the largest in the Beta-1 Complex, standing on a footprint of 75,012 square feet. It was expected to be cold and dark early in FY 2022. Workers removed more than 31 tons of asbestos and universal waste from Alpha-2 and Beta-1 combined.

Alpha-4 and East COLEX

Another facility that originally housed calutrons, Alpha-4, Building 9102-4, was transferred for deactivation. It is one of Y-12's larger high-risk, excess facilities due to the elemental mercury contaminating much of the structure. UCOR undertook planning to deactivate the four-story, 500,000-square-foot facility and began deactivating one of the two remaining column exchange (COLEX) process structures adjacent to it. Crews have been removing mercury, asbestos, and other hazardous waste from East COLEX. West COLEX was removed in 2018. Nearly one ton of mercury has been removed from East COLEX, which along with the mercury removed from West COLEX, totals more than five tons. This mercury removal is a significant reduction in onsite hazards and environmental risk at Y-12, further safeguarding our community.

Characterization and deactivation activities in Y-12's Alpha-2 and Beta-1 facilities will help prepare the buildings for eventual disposition

Workers tap and drain pipes in the East COLEX facility

Former steam plant deactivation

Old Criticality Experiment Laboratory and Former Steam Plant

In addition to these larger facilities, crews also brought the Old Criticality Experiment Laboratory (9213) to the cold and dark state and have subsequently been characterizing the facility.

The two-story lab housed more than 9,700 scientific experiments between 1950 and 1961 and later supported the High Flux Isotope Reactor program. Deactivation of this facility will be a focus in FY 2022.

Workers also completed deactivation of the former Steam Plant (9401-1). As part of the Alpha-2 Complex, the steam plant supported uranium enrichment operations. It was later used for other purposes, including the development of a uranium dipping process.

Innovation

Transport platforms

Because UCOR is doing cleanup projects at both Y-12 and ORNL, it constantly look for ways to optimize operations. The following example saved taxpayers nearly $3.5 million.

To be able to deactivate the top floors of Biology Buildings 9207 and 9210, UCOR installed transport platforms (large elevator-like devices) on the outside of the facilities. Those platforms tremendously accelerated removal of waste from the higher floors and the roof, enabling demolition to start sooner. It also made removal safer for the workforce.

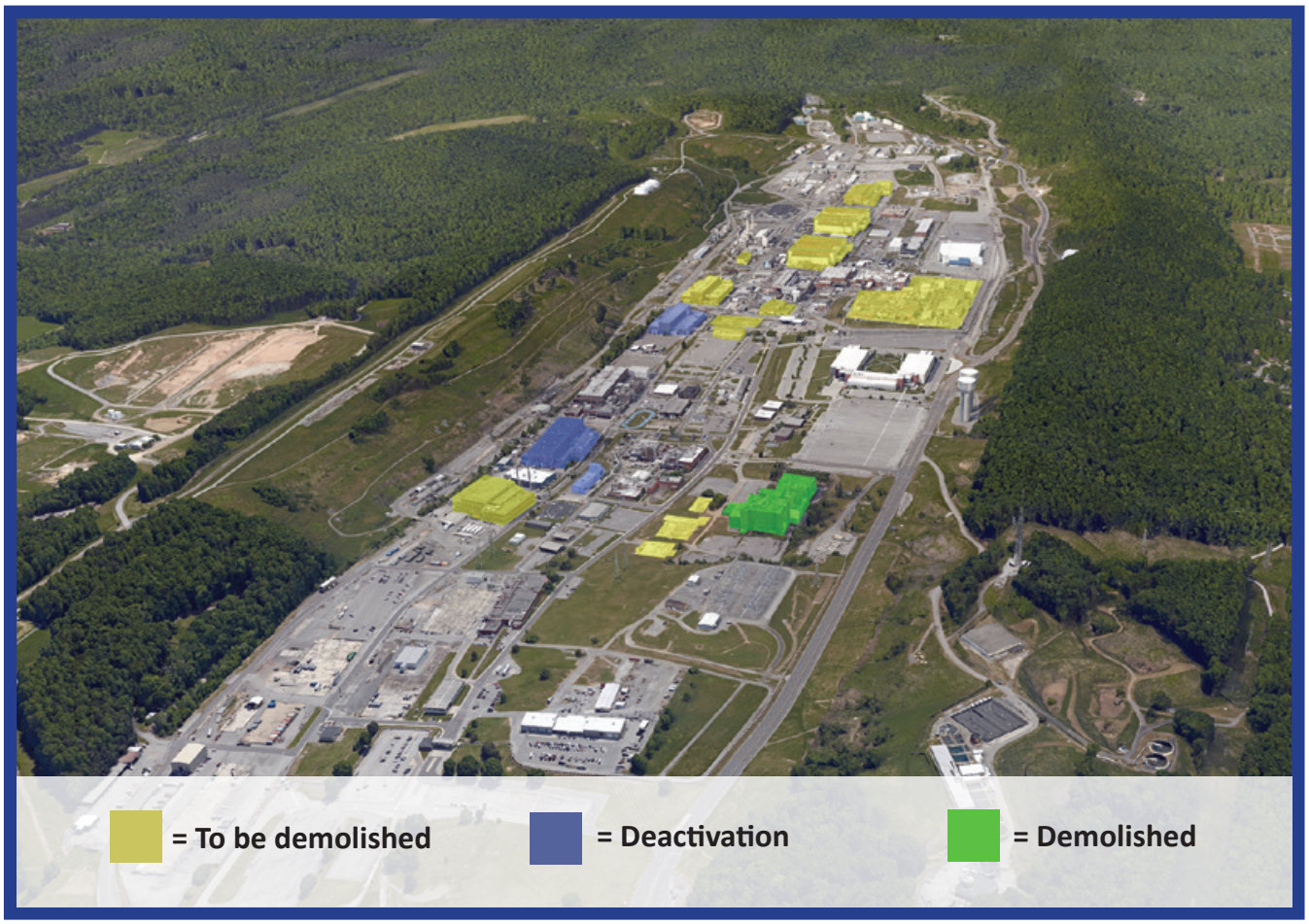
Fortunately, when the platforms were no longer needed at Biology, an eight-story cleanup project was just coming online at ORNL—the Experimental Gas-Cooled Reactor. Due to the size of the reactor, the transport platforms were just what the project needed to enable crews to deactivate the facility's upper levels. UCOR disassembled the platforms at Y-12 and transported them for reassembly and installation at the ORNL site, thereby alleviating the need to buy additional, expensive equipment.

Reusing recovered mercury

Instead of disposing of mercury that had been removed from one of the COLEX structures at Y-12, UCOR found a way to use it. The mercury from the COLEX equipment contains dirt, rust, and grit that has collected in the deteriorated setting over the years. As crews retrieved the element, UCOR sent it offsite to be treated for its subsequent storage.

The vendor treated and returned nearly 1,200 pounds of laboratory-grade mercury. Researchers at ORNL needed it for an experiment to determine physical properties for liquid metal flow. The data from their research will inform models for innovative concepts for material transfer and storage in a variety of fields.

Planned and ongoing cleanup work at Y-12



2021 Y-12 achievements by the numbers

1,750
tons of waste removed from Biology Complex

More than
59,000
tons of demolition debris removed from Biology Complex

More than
320,000
square feet demolished in final Biology Complex building (9207)

5.5
tons total mercury removed from COLEX facilities and inside Alpha-4

More than
1 million
square feet of facilities being prepared for demolition

East Tennessee Technology Park

After the historic completion of ETTP cleanup in 2020, UCOR turned its focus to completing remaining remedial actions at the site while assisting DOE in transforming it into a multi-use industrial park, national park, and conservation area.

Across the site, building slabs were removed, and contaminated soil was excavated and replaced with clean fill. One of the largest projects was removal of the Centrifuge Complex slab. Approximately 65,000 cubic yards of backfill soil was brought in to complete the Centrifuge Complex area site restoration. More than 30,000 cubic yards of that came from a soil borrow area located where the site's former Powerhouse facilities stood. Using that soil as backfill rather than purchasing it commercially saved almost $200,000. The Centrifuge site will remain a grassy field until plans move forward on a proposed airport that will use that land.

Remedial activities were also completed at the former Powerhouse area. Two separate tracts of land—one consisting of 9 acres and another of 21 acres—were covered with a consistent two-foot layer of soil. Contouring on portions of the land will help with drainage.

While all major facilities have been demolished at ETTP, a few minor structures remained, such as a water tank on McKinney Ridge and a meteorological tower. Several of these items were demolished in FY 2021.

As a part of the closure of the ETTP Zone 1 Record of Decision, UCOR was required to evaluate ecological habitats within each Exposure Unit (EU)—varying-sized tracts of land within the zone—and determine potential contaminant exposure to plants and animals in the area. Zone 1 is the area surrounding the plant. UCOR completed remediation in the following identified locations:

- 901 Area: 2,546 cubic yards
- Blair Quarry Area: 77 cubic yards
- K-1085 Area: 4,436 cubic yards
- K-722 Area: 40 cubic yards

Excavation projects across ETTP remove contaminated soil and replace it with clean backfill

2021 ETTP achievements by the numbers

547
cubic yards of materials recycled

More than
80,000
cubic yards of waste disposed of

48
acres of land remediated

Centrifuge slab removal

Workers have removed the Centrifuge Complex slab, covering a footprint of 235,000 square feet. Clean backfill was brought in to finish the project.

Powerhouse area remediation

Two tracts of land in the former ETTP Powerhouse area, totalling 30 acres, were remediated. The site once contained power-producing facilities, shown at right, as well as an oil tank farm.

Innovation

Crews on the former Powerhouse area soil cover project used an innovative GPS technology to determine the appropriate amount of soil needed to provide a consistent cover for the area. Workers placed a 2-foot-thick soil cover over 30 acres of the site. Because the area contained various contours, ensuring the entire area was covered by two feet of soil was difficult. Without the technology, workers would likely have covered the contours with more soil than necessary to ensure the entire area has at least two feet of cover. Significant surveying time would also have been required. The technology was also used at the Centrifuge Complex remediation project.

The GPS system, which works both as a handheld device (as shown above) and as equipment installed on the soil-moving vehicles, maps out all the contours and lets workers know how much soil is needed to ensure a continuous two-foot cover. Because the technology allowed UCOR to use less dirt, it generated significant savings. This type of coverage also facilitated proper drainage by maintaining the site's contours.

Removing unneeded structures

Various minor structures remained after ETTP cleanup was completed in FY 2020. These structures, such as a water tank on McKinney Ridge and a meteorological tower, were demolished.

Sampling activities

Soil sampling took place across the ETTP site in FY 2021. The sampling helps determine how much remediation is needed and the effectiveness of remedial measures.

ETTP continues transformation

With major building demolition projects completed in 2020, ETTP moved closer to achieving the three end state goals of a multi-use industrial park, national historic preservation, and conservation/green space areas.

Multi-Use Industrial Park: In 2021, UCOR completed the transfers of Portal 4 to the Community Reuse Organization of East Tennessee (CROET) and Portal 11 and adjacent land to the City of Oak Ridge. UCOR also continued to make progress in transferring three additional areas of ETTP, including a former switchyard, the former K-1037 area, and the former Toxic Substances Control Act Incinerator site. CROET and the City of Oak Ridge requested these parcels for economic development and expanded support of city services. Additionally, UCOR supported CROET in its sale of the former K-31/K-33 area to Kairos Power, which plans to construct an advanced nuclear energy project that will include a $100M investment and create 55 new jobs.

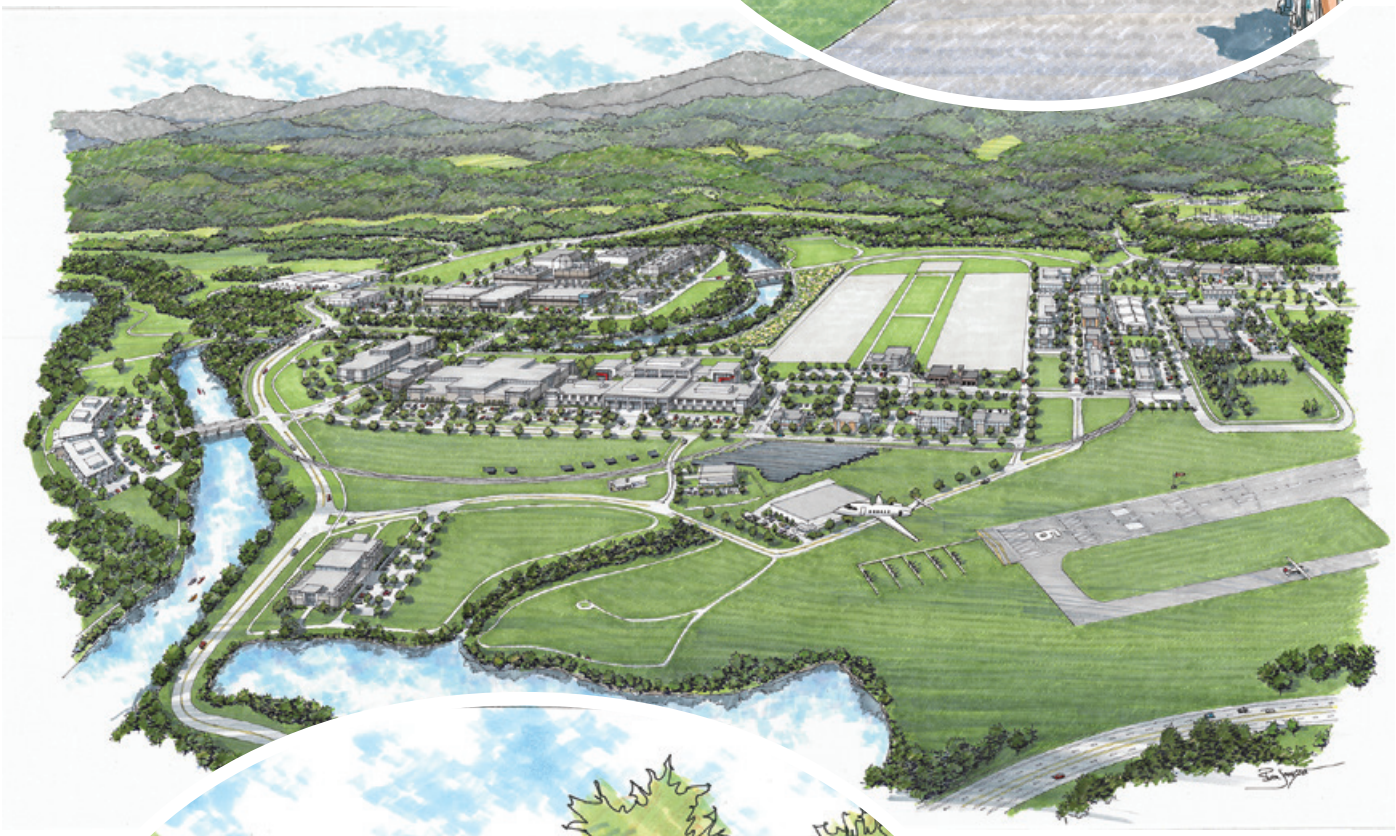
UCOR continued supporting the City of Oak Ridge on the proposed general aviation airport project. This support included preparing a property acquisition plan to define the property needed for project implementation that includes existing DOE, CROET, and private business properties.

National Historic Preservation: Historic preservation efforts at ETTP will honor the men and women who designed, built, and operated the world's first gaseous diffusion plant, K-25, and the hundreds of facilities and structures that followed. In FY 2021, UCOR successfully coordinated with the National Historic Preservation consulting parties to develop a cost-effective alternative to the proposed equipment building and viewing tower that aligned with available construction funding. The new plans have been initiated to construct a viewing platform that will provide an overview of the K-25 historic footprint. This facility will be near the K-25 History Center, which opened in early 2020.

Conservation/Greenspace: With conservation and greenspace being a key component of the integrated end state, UCOR continued to focus on opportunities to enrich the community and enhance public recreation opportunities at ETTP. UCOR facilitated development of a partnership between the Tennessee Wildlife Resources Agency (TWRA) and DOE that will result in thousands of acres of land with limited development potential being transferred to TWRA for development of mixed-use recreational and conservation areas. An agreement in principal has been developed between the two agencies that formalizes a partnership for expanding natural resource management at ETTP.

To date, UCOR's Reindustrialization Program has facilitated the transfer of almost 1,300 acres for beneficial reuse. The continued transfer of parcels as more of the site cleanup is completed provides the best opportunities for industrial development and provides the community with a viable asset.

A vision of ETTP's end state



Waste Management

In FY 2021, UCOR compliantly disposed of 190,255 cubic yards of waste at onsite and offsite disposal facilities. This waste included the structural material from Y-12's Biology Complex.

FY 2021 was wetter than normal and included several significant storm events. However, even during this year with limited resources due to the global pandemic, the Environmental Management Waste Management Facility (EMWMF) and Oak Ridge Reservation Landfills continued with safe and compliant operation.

Crews disposing of waste in EMWMF

In February 2021, a massive winter storm system blanketed the central United States, cancelling flights and stranding the UCOR analytical and radiological samples en route to the contract laboratories. Continuing rain generated additional landfill water, and weekend forecasts called for 4 to 6 additional inches of rainfall. UCOR responded by resampling and hand delivering the samples to the contract lab in Charleston, S.C. This proactive response allowed the landfills to make timely water management decisions and minimize the storm's impact.

In March 2021, a severe storm resulted in a 6.5-hour power outage while dumping 3.79 inches of rain. In May 2021, a severe storm dumped 4.29 inches, including 2 inches in 2 hours. In all cases, advanced planning and aggressive water management before and during the storms mitigated potential impacts from these events and helped ensure the disposal facilities remained operational to support the cleanup effort.

Preparing for future waste disposal

EMWMF, the main Oak Ridge Reservation disposal facility, is nearing capacity. Preparation is underway for the next onsite disposal facility, known as the Environmental Management Disposal Facility (EMDF). The EMDF project reached a number of important milestones in FY 2021 as UCOR continued to interface and collaborate with state and federal regulators and DOE to bring this vital facility closer to reality.

Waste disposed of in FY 2021

Location	Cubic yards
EMWMF	115,192
ORR Landfills	51,569
Other onsite	19,345
Offsite	4,149
TOTAL	**190,255**

Molten Salt Reactor Experiment (MSRE) disposal

At MSRE, UCOR completed the disposal of a number of outstanding contaminated items, including cabinets and associated piping. Each one required careful removal, packaging, and shipment documentation to meet rigorous regulatory requirements.

This disposal resolved prior commitments to the Tennessee Department of Environment and Conservation (TDEC) and was an important step toward the eventual cleanup of this test reactor site.

Portable vent and purge unit disposition

UCOR also disposed of a population of legacy waste drums that were not vented. Prior to disposal, these drums had to be vented and the headspace gas sampled for explosive gases and total volatile organic compounds before they could be sent to the Transuranic (TRU) Waste Processing Center. A portable vent and purge system was used to insert vents in the lid of drums of TRU waste by puncturing the drum lid and installing the vent in the hole created. After the vent was installed, these drums could be disposed of safely and compliantly.

Once venting of the TRU waste drums was complete, the project was left with a significant amount of equipment that could not be decontaminated to a level suitable for it to be made available as excess government property. This equipment was disposed of according to regulations and the permitted enclosure was cleaned and rinsed.

Installation of a new scale

UCOR implemented an innovative modernization project aimed at streamlining and synergizing the tracking of waste shipments from work sites to disposition locations. This project involved the installation of new hardware and radio frequency identification (RFID) tracking technology for trucks and implementation of a new database software. These important upgrades replace a number of outdated systems and will allow for a seamless and automated tracking system to deliver up-to-the-minute waste disposal data. The most significant physical upgrade came in May with installation of a truck scale at the Oak Ridge Reservation Landfills. The scale can accommodate full-size semi-trucks and complements existing scales at the EMWMF and the Transportation Hub. When linked with RFID technology, this system of scales identifies a truck's weight and delivers that information into the database via control hardware.

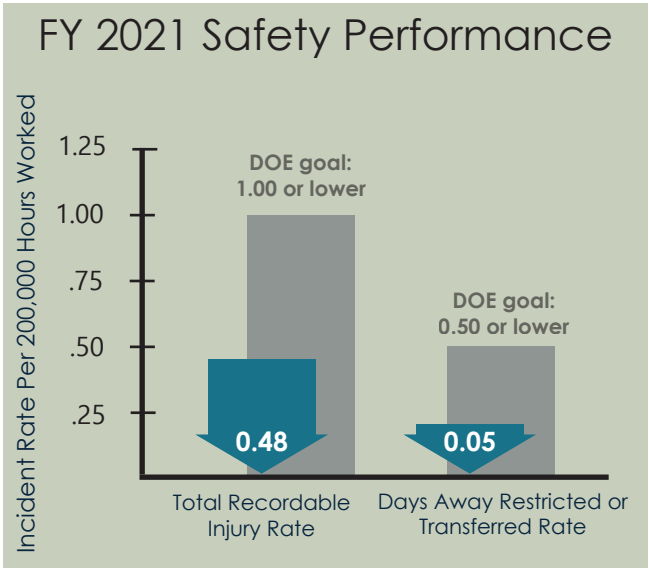
Safety and Health

UCOR's commitment to safety is unwavering, and it is a prerequisite to all that we do. Our goal is to ensure all workers return home at the end of the day in the same condition they arrived for work. We will never cut corners, and we have empowered members of our workforce to stop work if they perceive unsafe conditions. We promote a strong safety culture through workforce engagement initiatives, campaigns, special workforce safety recognition programs, exercises, and sponsorship of safety-related events and activities.

Safety excellence

UCOR's commitment to operational excellence is demonstrated through stellar safety performance, which has yielded a three-year average total recordable case rate of 0.73 per 200,000 hours worked (83 percent below the industry average) and a days away restricted or transferred rate of 0.27 (92 percent below the industry average).

The UCOR Infectious Disease/Pandemic Response Plan, coupled with outstanding implementation of a Coronavirus-19 (COVID-19) Enhanced Mission Ready Requirements Standing Order, allowed for the completion of mission milestones while protecting the workforce and community during the COVID-19 pandemic. COVID-19 Response Team initiatives such as proactive self-health checks, social distancing, face coverings, sanitization, and contact tracing provided positive results that yielded zero workplace transmissions. The UCOR onsite COVID-19 vaccination program made vaccines available to the workforce and their family members. At the end of the fiscal year, 1,546 members of the UCOR workforce had been fully vaccinated with 325 additional workers receiving their first dose.



Total Worker Health

UCOR employs a total worker health approach that collectively addresses worker safety, health, and well-being. A variety of wellness program initiatives and the innovative Mission Ready Program enhance the comprehensive integrated safety management system. The unique Mission Ready Program challenges workers to recognize situations that might hinder their ability to be physically, mentally, and emotionally ready to perform work safely. The safety culture fosters a psychologically safe environment where individuals are empowered and expected to voice concerns and improvement ideas. The allocation of resources and timely responses to address safety and health, environmental, security, and/or quality concerns provides evidence of a strong management commitment to total worker health.

Professional Development

As a Board of Certified Safety Professionals (BCSP) diamond level sponsor, UCOR is home to 218 Safety Trained Supervisor Construction (STSC) certificants —approximately 70 percent of all STSCs in Tennessee. Management support and worker dedication to professional development are also demonstrated through the approximately 80 additional safety-related professional certifications held by UCOR workers. Among those who hold advanced safety certifications are 27 Certified Safety Professionals (CSP), 7 Certified Industrial Hygienists (CIH), 5 Certified Health Physicists (CHP), and 6 Safety Management Specialists (SMS).

In addition to BCSP initiatives, UCOR has radiological control, industrial hygiene, industrial/construction safety, and construction and heavy equipment program training, qualification, and professional development initiatives. These serve to create a highly skilled workforce that enhances workplace safety and protection of the public, environment, and DOE-owned assets.

An active college intern program, identification and mentoring of rising senior leaders, and support for community-based higher education initiatives help to ensure availability of a well-trained and capable future workforce.

Safety training helps ensure that the UCOR workforce operates safely and is a key part of the safety culture

In addition to previously employed MyZone technologies that alert pedestrians who are in proximity to moving equipment, approximately 85 percent of the UCOR commercial motor vehicle and/or trailer fleet was outfitted with PRECO® Electronics radar detection devices. These devices alert operators of people, other vehicles, equipment, and fixed objects in proximity to equipment operations.

The UCOR workforce realized a reduction of vehicle-related incidents through the use of innovative technologies, improved data analytics, and effective implementation of administrative controls.

Performance

UCOR has delivered **$3.38 billion** worth of work for **$3.31 billion**

since contract inception (August 2011) through the end of FY 2021

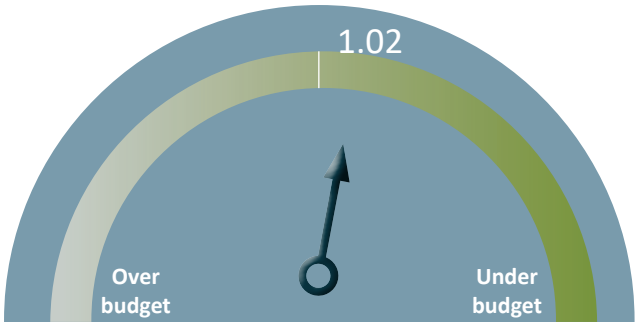
More than 1.47 million cubic yards of waste safely disposed

More than 7 million square feet of facilities demolished

More than 7.6 million safe miles traveled

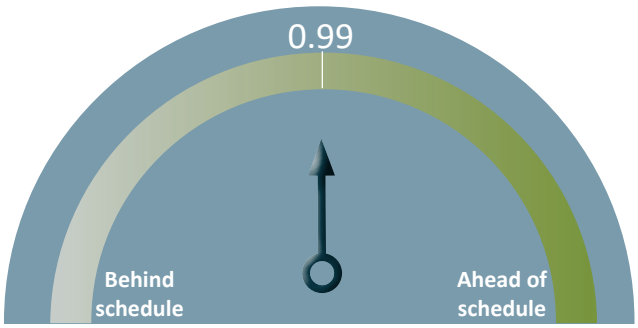
82 percent of subcontracted work awarded to small businesses ($1.4 billion)

Cost Performance Index



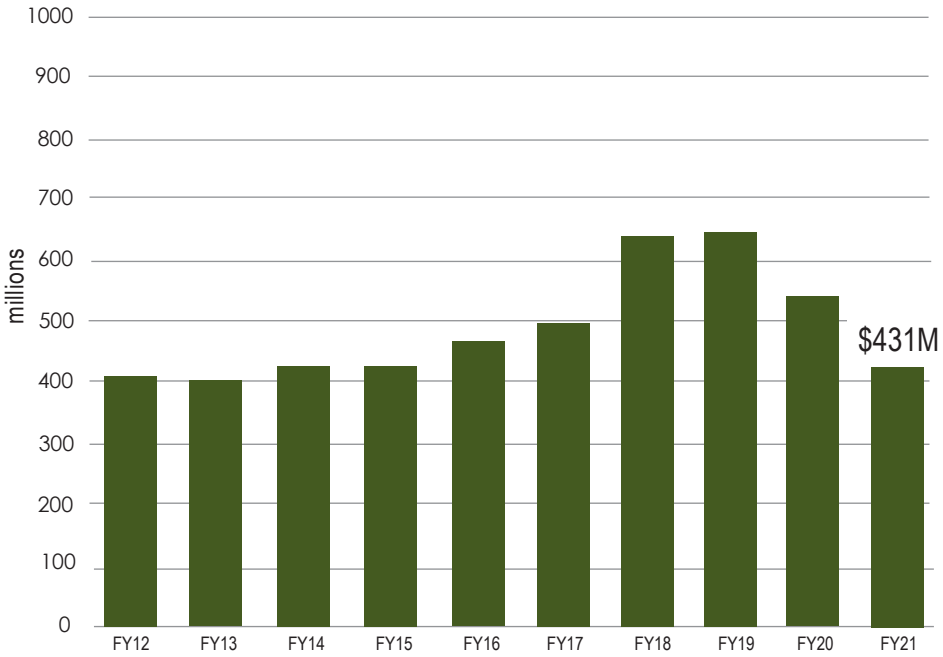
The cost performance index (CPI) is the measure of the efficiency of expenses spent. CPI is equal to budgeted cost divided by actual cost. A value higher than one indicates a favorable condition, while a value less than 1 would be considered unfavorable.

Schedule Performance Index

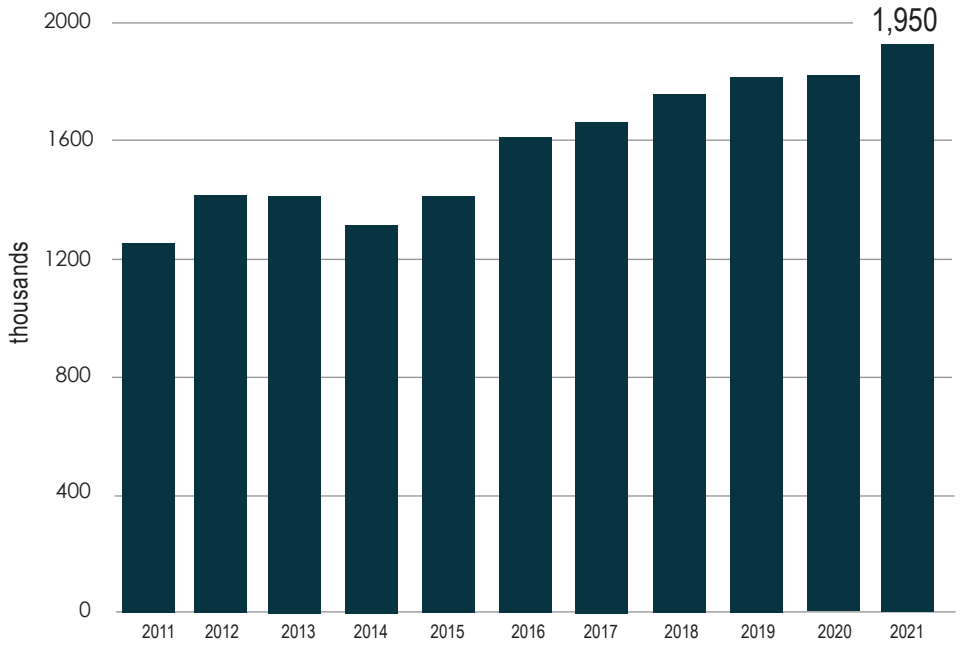


The schedule performance index (SPI) is the measure of schedule efficiency. It is predictive of whether a project will finish ahead of schedule, on time, or behind schedule. A value higher than one indicates ahead of schedule, while a value less than 1 would be behind schedule.

Funding



Employment



ORNL's Experimental Gas-Cooled Reactor

Community

Community involvement is a key aspect of UCOR's success. During FY 2021, UCOR contributed to a wide array of community programs, both monetarily and with volunteer hours. The underlying purpose of UCOR's philanthropic efforts is to serve the diverse populations of the East Tennessee region in four specific focus areas: children's advocacy, education and workforce development, health and wellness, and conservation and preservation. We particularly focused on agencies and efforts providing COVID-19 relief, such as food drives and educational endeavors.

Children's Advocacy

Focusing on the welfare, healthcare, and education of children

Education & Workforce Development

Preparing the next generation to enter the workforce

Health and Wellness

Promoting wellness through programs and activities that encourage healthy choices

Conservation & Preservation

Preserving the lands and contributions of the ETTP site and associated natural assets

UCOR's Community Investment and Involvement Program is designed to make the company an active corporate partner in the communities where we conduct business. It contributes to the causes in which our workforce believe, aligning with UCOR's value of cultivating a culture of caring in the workplace and community.

UCOR's support for children's advocacy included donations to organizations such as Second Harvest of East Tennessee's Food for Kids Program and East Tennessee Children's Hospital Fantasy of Trees fundraiser. UCOR donated $80,000 to purchase 100 laptops for Oak Ridge schools. With virtual classrooms being the norm during the COVID-19 pandemic, UCOR's donation helped keep kids on track and enable continued participation in STEM programs. The donation is part of UCOR's focus on developing the workforce of tomorrow.

To promote educational and workforce development, UCOR provided 40 mini-grants totalling $30,000 to teachers in 2021 to fund specific projects based on proposals they submitted. UCOR also continued support of the Roane State Community College (RSCC) Chemical Engineering Technology Program and began a new partnership with the Environmental Health Technology Program.

In the health and wellness focus area, UCOR provided support for worker engagement in area races, such as the Secret City Half Marathon and the UCOR Oak Ridge VELO Bike Race. UCOR executives served on community boards related to this focus area, including Methodist Medical Center of Oak Ridge and the American Society for Safety Professionals.

In conservation and preservation, UCOR provided monetary support and board members as well as coordination and interface with key stakeholders for the Clinch Valley Trail Alliance, Foothills Land Conservancy, and the Legacy Parks Foundation. While continuing support of the Oak Ridge Children's Museum and Oak Ridge Playhouse, UCOR also supported preservation efforts in Oak Ridge and Roane County. UCOR's $100,000 contribution to the Wilson Street Project will help transform downtown Oak Ridge into a multi-use, walkable, urban place with buildings surrounded by sidewalks and streetscapes. UCOR also supported Roane County's efforts to redevelop walking trails and historical markers in the Bacon Ridge Wilderness area with a $25,000 donation.

Teachers from Stanford Eisenberg Knoxville Jewish Day School receiving mini-grants

UCOR's workforce conducted a variety of fundraising efforts to support the United Way, including payroll deductions from the workforce. Workers also held fundraisers for Second Harvest Food Bank and local schools. UCOR is a member of, sponsors events for, and participates in a number of community economic organizations. Those include the East Tennessee Economic Council; the Energy, Technology and Environmental Business Association; the Oak Ridge Chamber of Commerce; and the Roane County Alliance. UCOR supports community programs by its labor unions, including the Atomic Trades and Labor Council and Knoxville Building and Construction Trades Council.

UCOR's laptop donation has assisted with distance learning

Recognition

UCOR's exemplary performance was noted several times in FY 2021. The company as a whole and individuals and teams within the company were honored for their efforts. UCOR is especially proud of the honors it received related to safety.

UCOR continued to receive awards and accolades for its outstanding performance in environmental cleanup work on the Oak Ridge Reservation.

UCOR, OREM win Project of the Year

UCOR and the DOE Oak Ridge Office of Environmental Management (OREM) were recognized with the prestigious 2020 Washington Executive Pinnacle Award for Government Team Project of the Year.

The award recognized UCOR and OREM for completing Vision 2020, finishing the project $80 million under budget and four years early—avoiding $500 million in costs to taxpayers. A contributing factor to Oak Ridge's cleanup success and nomination for this award is its shared governance model. This model promotes a work environment that operates with a high degree of stakeholder engagement among UCOR, OREM, workers, labor unions, subcontractors, regulators, appropriators, and the community.

Vision 2020 completed - ETTP

UCOR receives VPPPA Innovation Award

The Voluntary Protection Programs Participants' Association (VPPPA) awarded UCOR a 2021 Innovation Award for efforts associated with training, qualification, and professional development programs. Specific areas of excellence were Radiological Control, Industrial Hygiene, and Construction and Heavy Equipment. The award recognized UCOR's successful recruiting, retention, and training efforts targeting approximately 160 Radiological Control Technicians who now have the technical depth and knowledge to seamlessly rotate between diverse UCOR projects.

Industrial hygiene performance also continues to benefit from exceptional training and development programs. UCOR did not exceed occupational exposure limits for more than 11,000 hazardous or toxic materials samples analyzed during 2020.

Non-injury construction equipment struck-by/contact with incidents that were prevalent in 2019 have been reduced to two non-injury incidents in the past year. Non-injury load incidents that were prevalent with industrial lift truck operations prior to inception of the Construction and Heavy Equipment Program in 2018 have been reduced to one non-injury incident in the past three years.


Radiological control training

UCOR has "Best Overall Safety Program"

UCOR was named Best Overall Safety Program and Culture by the *EHS Daily Advisor* as part of its Safety Standout Awards.

ETTP wins seventh EPEAT Award

ETTP was named a winner of the 2021 Electronic Product Environmental Assessment Tool (EPEAT) Purchaser Award. EPEAT is a global ecolabel for the Information Technology sector that helps purchasers, manufacturers, resellers, and others buy and sell environmentally preferable electronic products. This is the seventh year in a row that ETTP has received the EPEAT Award.

DOE Sustainability Award recognizes ETTP cleanup

The historic, successful cleanup of ETTP was recognized as part of DOE's Sustainability Awards program during the year. The awards celebrate excellence in energy, water, waste, fleet, sustainable acquisition, and resilience, as well as achievements in projects representing exemplary sustainability practices.

As a result of DOE's largest-ever cleanup effort, Oak Ridge has transferred almost 1,300 acres of land and numerous buildings to the private sector for use in a multi-use industrial park. Three solar fields produce an average of approximately 1.7 megawatts of electricity annually. Oak Ridge also placed 3,500 acres of land into conservancy for protection of wetlands, flora, and fauna. Reuse and recycling have been central to the project. Over the last five years, more than 26.5 million pounds of demolition debris, 3 million pounds of scrap metal, 1.2 million pounds of paper and cardboard, 133,000 pounds of plastics, 95,000 pounds of electronics, and 235,000 pounds of universal waste were diverted from landfills.

UCOR team members serving on national boards

The American Society of Safety Professionals (ASSP) appointed UCOR President and CEO Ken Rueter to a term on the board as the Society's public director—a position created in 2015 to gain a corporate perspective from outside the occupational safety and health profession.

UCOR's Michelle Keever has been appointed to the Voluntary Protection Programs Participants' Association's Board of Directors as the DOE VPP sites representative.

Beckworth named Rising Star of Safety

Leah Beckworth, Industrial Safety Programs Manager, received the Rising Stars of Safety Award from the National Safety Council. The award recognizes safety professionals under 40 who show dedication to safety leadership at work.

Wolfley receives STSC Award of Excellence

The Board of Certified Safety Professionals (BCSP) has recognized UCOR's Clint Wolfley, Safety Systems and Services Manager, with the 2021 Safety Trained Supervisor Construction (STSC) Award of Excellence. BCSP noted that Wolfley has led UCOR to four straight years as a VPP Star of Excellence award winner.


Second Harvest awarded UCOR the Allegiance Award, which honors those who are faithful and committed food bank partners. Pictured accepting the award are UCOR Executive Sponsor for Second Harvest Bobby Atkinson and UCOR Community Outreach Coordinator Shannon Potter.

Partnerships

UCOR understands that maintaining strong partnerships is key to completing work safely and efficiently. Our partnerships with other prime contractors, regulators, subcontractors, labor unions, appropriators, and other organizations have allowed us to work more efficiently and complete projects ahead of schedule. They have also been a key component of our workforce development efforts. We work under a shared governance philosophy to ensure all voices are heard.

Workforce Development

To prepare students for future careers in chemical operations, UCOR sponsored a Chemical Engineering Technology Program at Roane State Community College (RSCC). Eight students have been selected for internships with UCOR and offered employment as chemical operators after the conclusion of their internships. In 2021, UCOR provided additional support to the program with a $25,000 donation to purchase equipment for its laboratory. UCOR's efforts to recruit the next generation of cleanup workers was featured in the public television *In Depth* series.

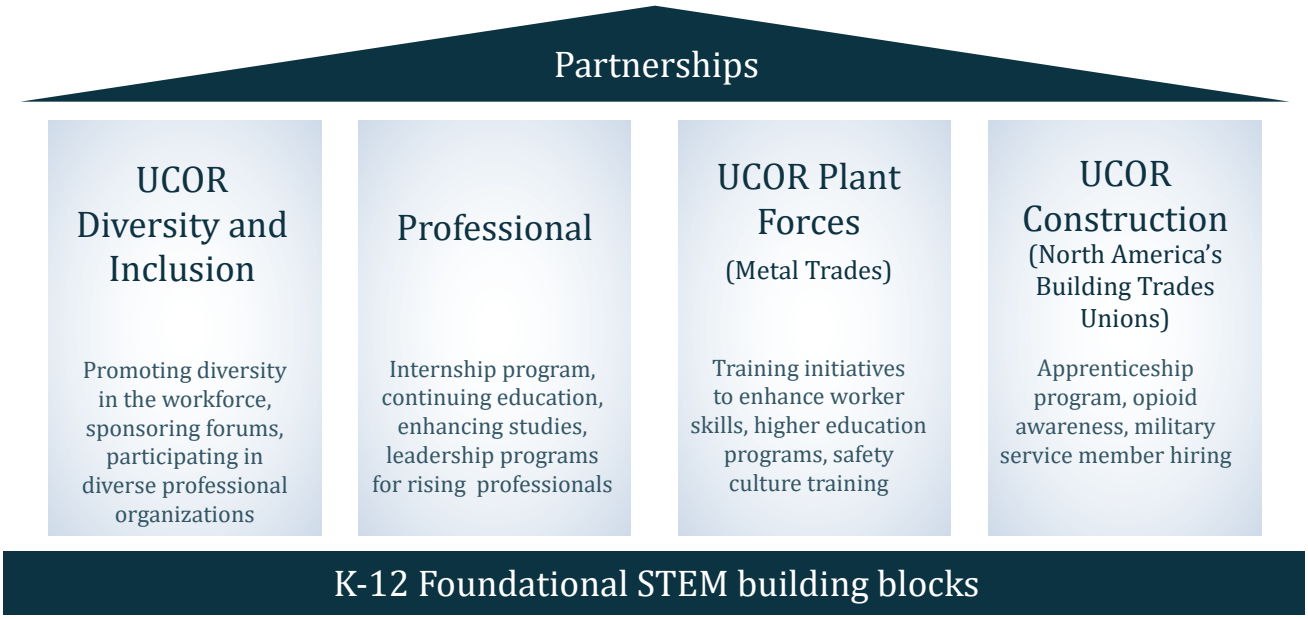
UCOR continued strengthening its partnership with RSCC by donating $25,000 for a new apprenticeship effort in the Environmental Health Technology Program, which is modeled after the Chemical Engineering Technology Apprenticeship Program. The collaboration supports UCOR's strategy to help build a highly skilled workforce for today and tomorrow.

In FY 2021, UCOR continued its support of the nation's first nuclear engineering decommissioning minor at the University of Tennessee (UT). Since 2016, 13 students have graduated from the program. The goal of the program is to provide an educated workforce with expertise in nuclear site decommissioning to strengthen environmental management and cleanup capabilities.

UCOR also sponsored a UT Senior Design Project, providing engineering evaluations to students majoring in nuclear waste solutions. In addition to academic sponsorships, UCOR's president and senior managers engage with students and faculty as part of the UT Nuclear Engineering Colloquium series.

Haley Glandon launched her career with UCOR through the RSCC Chemical Engineering Apprenticeship Program

Emma Richesin is the first UCOR apprentice in the RSCC Environmental Health Technology Program



UCOR's workforce development model

Diversity

UCOR hosted its second Diversity Summit in May 2021 in partnership with RSCC. The summit provided free training for local small businesses to gain respectful and ethical insight to build their own diversity programs. The event featured keynote speaker Nicole Nelson-Jean, Associate Principal Deputy Assistant Secretary for Field Operations for DOE's Office of Environmental Management.

UCOR also sponsored interns through the DOE Mentorship for Environmental Scholars, which draws students from Historically Black Colleges and Universities. UCOR hired one of those interns to serve as the company's environmental justice lead.

Regulatory Partnership Accelerates Cleanup Decisions

During the year, UCOR and OREM celebrated the first anniversary of a key regulatory partnership that has helped accelerate cleanup projects on the Oak Ridge Reservation. OREM and UCOR formed the partnership with state and federal regulators in 2020 to aid in timely decision making and approvals needed to conduct cleanup operations at ORNL and Y-12.

Members of the regulatory framework include OREM, UCOR, the U.S. Environmental Protection Agency, and the Tennessee Department of Environment and Conservation. Management representatives serve on an emerging issues team, and project representatives serve on an executive leadership team. These teams work to resolve regulatory challenges and improve communication so the agencies can make protective, timely cleanup decisions.

In its first months, the emerging issues team resolved several long-standing issues and expedited approvals for soil removal projects, allowing effective use of the available workforce and funding. The team resolved comments on a section of the draft record of decision for the site's planned Environmental Management Disposal Facility. That document is crucial in the approval process for the facility, which will provide onsite waste disposal capacity for low-activity waste generated from Y-12 and ORNL cleanup.

Nicole Nelson-Jean, Associate Principal Deputy Assistant Secretary for Field Operations for DOE's Office of Environmental Management, speaks at UCOR's Diversity Summit

UCOR and Labor Partners Promote Safe Cleanup

Close working relationships between UCOR and its labor partners continue to form the foundation for safe and successful environmental cleanup on the Oak Ridge Reservation. The value of this partnership was highlighted in a public television special during the year. Hosted by noted actor Laurence Fishburne, the program described the partnership between UCOR and AFL-CIO Metal Trades.

The program depicts how UCOR and its labor partners form a team that works compliantly and safely as it helps workers achieve their aspirations. For its part, UCOR management recognizes that labor delivers the skills and productivity needed to achieve environmental cleanup under hazardous conditions. In carrying out its mission, UCOR uses an inclusive shared governance model that allows everyone to participate.

UCOR also helps address the lack of fresh, diverse talent in the labor industry, partnering with local educational institutions like RSCC to develop the next generation of workers.

Partnerships with ORNL and Y-12

Communication and coordination among UCOR, ORNL, and Y-12 are essential to meeting schedules and adhering to established budgets for cleanup. UCOR must coordinate its cleanup activities in a way that avoids interference with ongoing work.

On a management level, UCOR regularly briefs ORNL and the DOE Office of Science leadership regarding sequencing for deactivation and demolition plans to ensure coordination of utility isolations and relocations in support of demolition. Ultimately, cleanup will benefit both ORNL and Y-12 by reducing hazards to the public and the environment and making room for new missions for the future.

During 2021, UCOR worked closely with ORNL and Y-12 to reroute and isolate utilities to support cold and dark activities in several facilities. UCOR team members also coordinated with Y-12 in the demolition of the Biology Complex, including mobilization of heavy equipment and a high volume of waste truck traffic. This coordination is necessary to minimize impacts to site traffic at the start and end of the workday.

Using a shared governance approach, UCOR ensures that all partners have a voice

In another example, UCOR's Nuclear Operations team finished a multi-year project to install and test new fire alarm systems in UCOR-managed facilities at ORNL. The project was part of modernizing the emergency signaling system at ORNL. The older, obsolete system that had served the facility since Manhattan Project days is being deactivated.

Cleanup Advisory Council and Cleanup Integration Initiative

UCOR has many integration and collaboration objectives and teams such as the Cleanup Advisory Council, which includes a number of key stakeholders such as client representatives, site contractors, and community stakeholders. UCOR also has a Cleanup Integration Initiative that has two tiers of membership. Tier 1 is made up of executive leaders across UCOR, UT-Battelle, Consolidated Nuclear Services, and Oak Ridge Associated Universities, whereas Tier 2 is made up of working level members across those same organizations to ensure close alignment among all parties.

International Partnership Allows Information Sharing

UCOR benefited from an international partnership related to optimization efforts for a zeolite treatment process at ORNL's Liquid and Gaseous Waste Operations. The agreement—between DOE and the Nuclear Decommissioning Authority, which oversees cleanup of nuclear facilities in the United Kingdom—allowed UCOR to discuss ion exchange media performance with Great Britain's ion exchange effluent treatment plant at the Sellafield site.

UCOR shared zeolite systems information with Great Britain's Sellafield Site Ion Exchange Effluent Plant

Delivering end states

that facilitate economic growth and federal missions

UCOR's cleanup work at all three Oak Ridge Reservation sites is not only reducing significant environmental risks, but is delivering end states that make land available for federal missions, industrial development, historic preservation, conservation, and recreation. As detailed throughout this report, our cleanup efforts across the reservation allow dilapidated, contaminated facilities to be replaced with new industrial endeavors. The now-demolished Y-12 Biology Complex site will be replaced with a lithium processing facility. At ETTP, completing the Centrifuge slab removal project has left a large grassy field that is part of the footprint of a planned airport at the site. We've also seen completion of the EU-19 and K-770 projects as progress continues on other remedial actions, further facilitating the site's transition to a multi-use industrial park, national park, and conservation area. At ORNL, work continues on delivering end states for various projects—such as removal of a hot cell at the Radioisotope Development Laboratory—to provide much needed property for the site's scientific research. We are cleaning up from past operations to provide a bright future for the Oak Ridge Reservation.

K-770 site at ETTP after remediation

Biology Complex site after demolition

Once the site of a massive Centrifuge Complex, this tract of land is planned to become an airport

Hot cell removal at ORNL's Radioisotope Development Laboratory

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