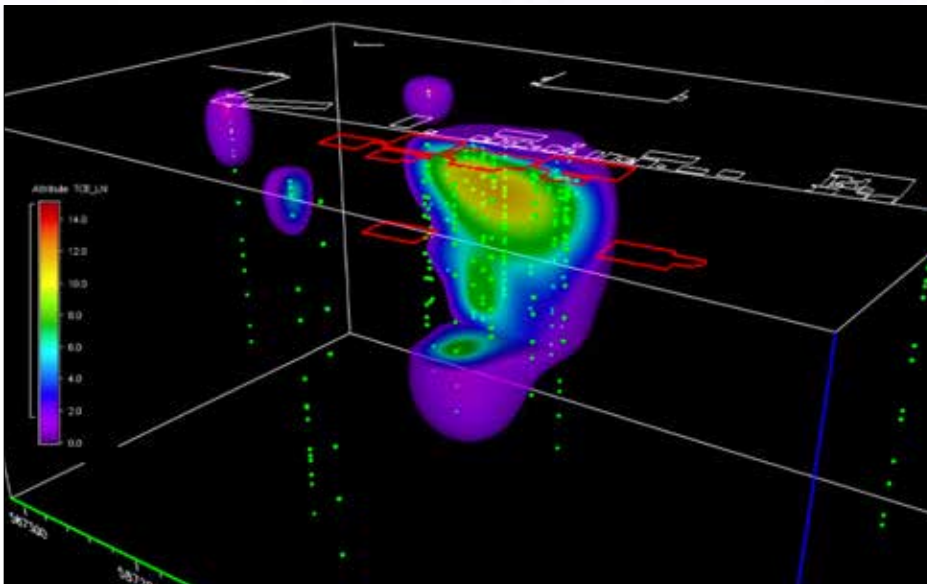


Investment in Monitoring Technology Pays Off in Improved Groundwater Cleanup Capabilities



OREM is able to use data from monitoring wells to create detailed mapping of potential sources of groundwater contamination. This rendering shows a 3-D model of a mass of halocarbon solvents -- used as a degreasing agent on equipment -- below ground at a former machine shop at ETTP. The coloration indicates concentration intensity. Outlines in red and white at the top of the image indicate the position of buildings above the solvents.

Groundwater underneath the Oak Ridge Reservation (ORR) is increasingly meeting safe water standards thanks to a mix of time, weather, and hundreds of millions of dollars invested in contamination monitoring, treatment, and prevention by the Department of Energy’s (DOE) Oak Ridge Office of Environmental Management (OREM), said David Adler, an OREM division director and biologist who presented a Groundwater Program update in February.

“The first priority for Oak Ridge cleanup programs is to make sure that no member of the public is exposed to contamination, so we’ve placed extra emphasis on ensuring that we understand and control any

contamination that’s migrating toward offsite locations,” said Adler.

After nearly 40 years of groundwater studies, there is some form of groundwater cleanup system in place in essentially every valley on the reservation. These tell researchers that groundwater problems on the reservation stem from basically three situations: Old burial grounds that have been infiltrated with groundwater; contaminants being carried by rainwater down to the groundwater; and spills of various liquids used by reservation’s former industrial facilities.

These issues are similar to those faced by any long-term industrial facility, but are compounded by the reservation’s size, and manufacturing processes used

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historically, said Adler.

“Some of the remaining cleanup at East Tennessee Technology Park (ETTP) will be very complex due to the materials involved and our area’s unique geology and average rainfall,” he said.

Treatment actions

A concentrated effort to categorize and prioritize treatment of these groundwater issues resulted in the creation of a regional groundwater flow model in 2015. In addition, OREM uses more than 2,000 monitoring wells to understand where groundwater contamination is and isn’t, how groundwater behaves in the subsurface, and how it interacts with surface water. Each year, OREM takes thousands of samples to test water quality.

That data, combined with mapping technology, has allowed OREM to create a 3-D model of the subsurface. It can then precisely identify, confine, and remediate a variety of liquids that have moved into the soil under former industrial facilities.

With major cleanup at ETTP nearing completion, the investment in characterization and monitoring means OREM is ready to propose some final decisions to regulators.

After nearly 30 years of monitoring,

(See Groundwater on page 6)

Reservation Update

Tours allow public to appreciate progress of OREM cleanup

From March through November each year, members of the public may tour the Oak Ridge Reservation by bus on weekdays. Volunteer guides lead tours of DOE's three major Oak Ridge facilities beginning at the American Museum of Science and Energy. Tours run from 11:15 a.m. to 2:30 p.m. and cost from \$5 to \$8, which includes admission to the museum.

The three-hour tour takes participants through the site's past and present at ETTP, Oak Ridge National Laboratory (ORNL), and Y-12 National Security Complex (Y-12), allowing them to learn about Oak Ridge's diverse environmental cleanup, scientific research, and national defense missions. The bus has multiple stops along its route that allow riders to see everything from pre-Manhattan Project structures to the world's oldest nuclear reactor and cutting-edge research facilities.

Since DOE began offering the Oak Ridge Facilities Public Bus Tour in 1996, it has attracted more than 40,000 visitors from all 50 states. For more information and to register online visit www.amse.org.



Museum visitors board a bus for DOE's public tour of the Oak Ridge Reservation.

Panelists discuss WIPP's Future & new waste acceptance criteria

March marked the 20th anniversary since the Waste Isolation Pilot Plant (WIPP) began operations, and it continues to be critical to DOE's cleanup strategy, said speakers during the 2019 Waste Management Symposia.

Speakers discussed key plans, including structural upgrades to extend

operational life, regulatory activities, and continued characterization and certification requirements at generator sites to ensure shipments continue.

Workers start cleanup milestone: demolition of K-1037 at ETTP

OREM and cleanup contractor UCOR have started demolition on the largest remaining structure at ETTP. Originally built in 1945, Building K-1037 began as a warehouse, but was expanded and used for a variety of projects over time. It was most recently the home of the Atomic Vapor Laser Isotope Separation Product Conversion Demonstration Facility, which tested a new form of uranium enrichment technology in the 1990s.

Workers spent several months deactivating the 380,000-square-foot facility in preparation for demolition. They removed equipment and waste, performed asbestos abatement, and disconnected utilities. The demolition is expected to be completed later this year. The building's footprint will be a grassy area that will be available for reuse and redevelopment as part of OREM's goal to convert the site into a privately-owned and operated industrial



Building K-1037 is the largest remaining structure at East Tennessee Technology Park.

park. OREM is working to complete all major building demolitions at ETTP by the end of next year — a goal known as Vision 2020.

President releases FY 2020 budget with \$6.5B for EM

Last month, the Trump Administration released its initial FY 2020 Budget Request. The document lays out top line budget figures and funding priorities, with more detailed numbers for various federal agencies to come after.

For EM, the budget continues reforms in the program to address the challenge of environmental cleanup from the Manhattan Project era, Cold War projects and other missions. The budget includes \$6.5 billion for 16 sites remaining to be cleaned up to meet environmental regulatory requirements. Within this total, \$128 million is specifically marked to advance the initiative to accelerate deactivation and decommissioning of selected high-risk excess facilities to protect human health and the environment, and to support site modernization.

Cleanup contractors earn high marks for performance

Two OREM contractors, UCOR and North Wind Solutions, recently earned performance fee determinations in the upper 90s for excellent work and recent milestone accomplishments in their duties.

UCOR, the Oak Ridge Site cleanup contractor, received 96 percent of its total possible fee or nearly \$10.7 million. Its work includes prioritizing

and effecting cleanup at ETTP, work to address high-risk excess contaminated facilities at Y-12, and performing studies for future cleanup of ORNL's Molten Salt Reactor. UCOR also exceeded small business subcontracting goals and collaborated with the city of Oak Ridge regarding utilities transfers at ETTP.

The contractor also received the National Safety Council 2018 Community Advancement Award, which recognizes organizational commitment to health and safety programs. Ken Reuter, UCOR president and CEO, was recognized by the council as a 2019 "CEO Who Gets It," a designation that identifies leaders who go above and beyond to protect employees on and off the job.

North Wind Solutions, which operates the Transuranic Waste Processing Center, earned nearly \$383,000, or 97 percent of the available fee for the performance evaluation period. The company surpassed its contact-handled waste treatment goals by nearly six percent. It also implemented a safety and health program for receiving, treating, and packaging transuranic waste from ORNL. While North Wind and its subcontractors missed an internal goal for remote-handled waste by 2.8 percent, they still met a regulatory milestone for processing 97 cubic meters of the waste ahead of schedule.

Facility upgrades to increase safety, reduce costs at MSRE

A \$4.7 million project to enhance the Molten Salt Reactor Experiment's (MSRE) electrical distribution, sump pump, fire suppression, and monitoring systems is expected to save \$25 million in maintenance and operations costs over time. It will also allow about 30 employees housed at MSRE to relocate from the decades-old facility and assist with other projects.

Although it was shut down 50 years ago, certain systems within the reactor building continue to operate to keep the facility safe and stable until it can be demolished. EM is responsible for the facility's safety until decommissioning — scheduled to start in the 2030s — begins.

Crews will replace existing electrical systems with a newer model that will minimize maintenance costs, reduce risk of injury to workers, and provide reliable electrical service. The new sump pump system, which removes groundwater from the building's basement and foundation, will provide more reliable operations, improve safety, and reduce risks during maintenance activities. The new dry fire suppression system will eliminate costs associated with purchasing and providing steam from the laboratory. The upgrades are estimated to be complete by April 2020.



The Molten Salt Reactor Experiment is in maintenance mode until scheduled demolition can begin in the 2030s.

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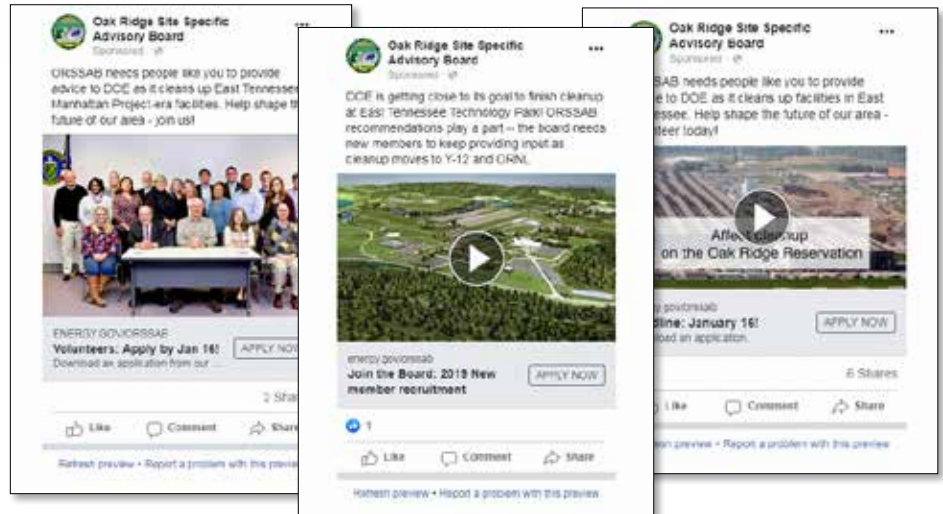
Membership Recruitment Results Exceed Expectations for Second Year

Board members on the ORSSAB serve two-year terms and are limited to three terms total. Each fall recruitment for new members is advertised in area newspapers — *The Oak Ridger*, *The Loudon County News-Herald*, *The Roane County News*, and others — as well as public spaces like the Oak Ridge Chamber, the American Museum of Science and Energy, and area libraries. OREM also reaches out to local government representatives and other leaders in the areas in and around Oak Ridge.

During the most recent recruitment period, board staff built on last year's success using Facebook ads with continued excellent results. Ads in *Oak Ridge Today*, a local online news site, were also included in the outreach and drove traffic to ORSSAB's website.

"We had more applicants this year than we've had in the past two years combined," said Melyssa Noe, an OREM branch chief who serves as ORSSAB's alternate designated federal officer. "I think that was largely because of our recent Facebook and other online activity."

In about a month, the Facebook ads were seen by nearly 30,000 people in



Facebook activities, including ads like those above, help fuel recent recruitment successes. The recruitment campaign also raises awareness of the board and its role in OREM's cleanup efforts.

OREM's multi-county target area.

For the next term, the board will need to fill the several open seats left by members who resigned during their term, as well as some from members who will retire when their terms are complete at the end of June.

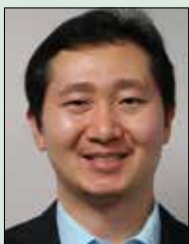
Because of the number of applicants, OREM was able to immediately fill two seats vacant from recent resignations with new candidates;

see their profiles below. For the other planned retirements, OREM leaders selected replacements from the many outstanding applications, and sent a final slate of potential members to DOE headquarters for approval.

Those not appointed will form a pool of candidates from which appointments can be made in the future as vacancies on the board arise.

Board Welcomes New Members Nannan Jiang and Harriett McCurdy

ORSSAB welcomed two new site-appointed members during the February monthly meeting.



Nannan Jiang

Nannan Jiang is a graduate student at the University of Tennessee pursuing a doctorate in energy science and engineering. He is also part of an interdisciplinary

research team at ORNL studying challenges related to energy and applied data sciences.

Jiang received a bachelor's degree

in biological sciences from Purdue University and a master's degree in microbiology from the University of Illinois. He has an interest in educational and environmental issues. He lives in Knoxville.



Harriett McCurdy

Harriett McCurdy retired in 2014 after more than 40 years as a teacher for middle- and high-school students, both in the United States and abroad, with a focus on science.

Most recently McCurdy served as

a teacher of science and biology for grades 6-10 at Yangon Academy in Yangon, Myanmar. Prior to that, she taught a variety of science courses and environmental studies courses in China, Morocco, Kuwait, and Ecuador.

McCurdy received a bachelor's degree in Biology from Earlham College and an M.A.T. in Biology and her teaching certificate from Washington University. She lives in Oak Ridge and is interested in educational and environmental issues.

OREM Introduces New Deputy Manager to Board in February

Since Jay Mullis was promoted to manager of OREM in 2017, several senior executives have taken turns in the deputy manager role in an acting capacity. In December, DOE announced the position would be permanently filled by Laura Wilkerson, who previously served as director of OREM's planning and execution division. She was introduced to ORSSAB at its February meeting by Mullis.

"We are very fortunate to have Laura help lead our organization forward as we begin crucial new phases of cleanup at Y-12 and ORNL," said Mullis. "She brings an extensive amount of experience and in-depth knowledge about both of those sites, our employees, vision, goals, and challenges, and she will use that to ensure we maintain our momentum."

The board also learned Wilkerson has a long history with Oak Ridge and permanent roots in the area.

"Although I am originally from Puerto Rico, I have reached the point in my life where I have lived in East Tennessee longer than I did in my birthplace," she said. "I began my career with the Department of Energy in Oak Ridge immediately after graduating with a B.S. in Industrial Engineering."

Her first position was as program manager for infrastructure programs at ORNL. That was 28 years ago and since then, Wilkerson has served in a variety of positions that spanned every major programmatic area of DOE's work in Oak Ridge. She spent 10 years as part of the team that launched the ETTP Reindustrialization Program and was responsible for the first of many successful transfers from DOE to the Community Reuse Organization of East Tennessee. She also served as a senior technical advisor to the manager of the Oak Ridge Operations office.

The most recent 10 years of her career have been with OREM. She previously served as portfolio federal



Jay Mullis, right, introduces new OREM Deputy Manager Laura Wilkerson at the February 2019 ORSSAB meeting.

project director for Y-12 and ORNL projects. There, she oversaw the \$630 million OREM received in American Recovery and Reinvestment Act funds for cleanup at those sites—directing the successful completion of more than 30 projects. She was also deputy federal project director for Uranium-233 disposition.

In the planning division, she oversaw all planning and execution activities related to the cleanup at ETTP, Y-12, and ORNL.

"I still have the privilege of working with the same outstanding management team and staff," she said. "I'm very fortunate to be able to take the best things with me into this new role." So far, my favorite parts have been the increased interactions with the various stakeholders including the community, regulators, contractors, and EM headquarters."

During her time in East Tennessee, Wilkerson also met and married her husband, Mark, and they have two daughters, Andrea and Gabriella.

Most of her free time, she said, is spent with them, either cheering for

Gabriella, an avid soccer player, or mentoring Andrea, who is majoring in engineering at the University of Tennessee. Wilkerson also loves to cook, especially with cuisines from different places and cultures; travel; and enjoy the many outdoor activities the region offers.

"I love East Tennessee! It's a great area with top notch recreational, educational, and economic opportunities," she said. "My husband is from Chattanooga and our 'Tennessee' kids were born in Knoxville. This is home to me, and I am honored to have the opportunity to work in a role that aims to make this region even better!"

While the focus for now will be on completing Vision 2020 at ETTP, Wilkerson's previous experience will be quickly used as OREM ramps up cleanup work at other sites. Over the next five years she hopes to complete treatment and disposition of Oak Ridge's transuranic waste and Uranium-233 inventories and advance other cleanup efforts at the two sites.

Tour Offers Members Deep Insight into Water Remediation Activities

ORSSAB members saw first-hand some of OREM's groundwater program work being done at ETTP recently.

Members joined DOE's Dave Adler as he guided the group through parts of the 800-acre main plant site, highlighting key areas where OREM is focusing its efforts.

The tour included the sites of five former gaseous diffusion plants – K-31, K-33, K-27, K-29 and K-25.

Although many of the buildings that once comprised the site have already been removed, the tour gave members a sense of the scale of the buildings once housed on the land.

Adler directed members' attention to the remaining concrete slab from K-25.

"The original building was about a



From left, members Nannan Jiang, Marite Perez, and Bill Clark learn more about OREM's groundwater program during a tour at ETTP in February.

mile around," he said. "It was at one time the biggest building in the world. Now the footprint of the building is

going to be part of the National Park

(See Tour on page 7)

Groundwater

(Continued from page 1)

OREM is pursuing an agreement with EPA and the Tennessee Department of Environment & Conservation (TDEC) for No Further Action for the K-31/K-33 site, which means the site does not present a danger to the public or the environment. A clear groundwater decision will make the site much more attractive to a potential business, said Adler.

The Offsite Remedial Site Evaluation Report for portions of the reservation near the Clinch River approved by regulators in December found "no indication that there was an unacceptable health risk related to possible DOE groundwater contamination," and OREM will continue to sample 14 offsite well locations over the next three years.

An extensive study of potential In-Situ Thermal Treatment was conducted over the past couple of years on a one-acre test area at ETTP's main plant site, resulting in "probably the most perforated and understood acre of land in North America in terms of well studies," said Adler. Results show that the treatment, which drops probes deep

underground to heat liquids to the point of vaporization for easier extraction, is not suitable for materials in bedrock. However, it's still under consideration for shallower zones.

For ongoing treatment of known contamination plumes, there are nine "pump and treat" operations to capture and clean water in various areas prior to re-releasing it into the environment. Another remedy, and one used at several burial grounds and building sites, is removing source contamination by digging up contaminated soil and replacing it with clean fill dirt, such as is ongoing at the former Building K-29 area at ETTP or was previously done by removing some burial grounds in the main plant area. OREM is also digging up technetium contaminated soils that are part of a plume at ETTP. For areas where removal isn't feasible, OREM has taken steps to isolate wastes by lowering the water table, installing impermeable caps, and creating water collection systems.

Many current cleanup activities are meant as interim actions, meaning there's still work to do before completing the transfer of ETTP for private industrial redevelopment. And large-scale demolition work at Y-12 depends

on some big water treatment projects under construction.

Future actions

OREM is working with TDEC and EPA to establish final Record of Decision (ROD) for main plant groundwater. The next step is evaluating various groundwater approaches in a feasibility study that should be completed this fall. Options include continued monitoring; deployment of microbes that could actually consume contaminants; and further containment, among other strategies. Discussion of the study would be followed by a proposed plan, tentatively scheduled for 2021, and a ROD in 2022. Some additional wells are also planned.

A Melton Valley/Bethel Valley Exit Pathway Remedial Investigation Work Plan has been submitted to regulators and OREM continues to pay for public water to 40 private residences previously on well water. More sampling wells will be installed; the first phase is estimated to be done in 2022.

Groundwater monitoring data is released in the annual Remediation Effectiveness Report. Find it at doec.science.energy.gov. For 2018, search for document 01-2757.

FY 2018 Annual Publications Detail Cleanup Successes, Progress

Organizations involved in cleanup on the ORR have released several publications detailing their efforts for the past year.

Cleanup Progress is OREM's annual report to the community on the ORR cleanup effort. It's available at energy.gov/orem/about-us/news/cleanup-progress-reports.

UCOR, OREM's main cleanup contractor, said in its *FY 2018 Annual Report* that this year was UCOR's safest operations year since the company's inception. Read more at www.ucor.com/companyinfo.html.

The ORSSAB *2018 Annual Report* offers an overview of board activities for the year, from tours to topics heard and recommendations written. Find it at energy.gov/orssab. In 2018, the board provided recommendations to DOE on on-site waste disposal options; advocated for new



technology investment groundwater modeling, and sampling in its budget recommendation; and joined with the national EMSAB in two recommendations

DOE EM headquarters published its *2018 Year in Review*, outlining cleanup achievements across the DOE complex. Oak Ridge was noted for completion of site preparation for the Mercury

Treatment Facility. Read more at www.energy.gov/em/mission/year-review.

For physical copies visit the DOE Information Center at 1 Science.gov Way, Oak Ridge, TN 37831.

Tour

(Continued from page 6)

System – in this case, a historical park. The footprint set aside for the park is about 80 acres, and the actual building occupied close to 45 acres.”

Nearby, members saw the work still in progress toward removing Building K-29's concrete slab as well as soils, which will be replaced with clean fill to ensure a safe transfer of the property as part of OREM's goal to turn most of ETTP into an industrial park.

Members also saw the building where the barriers associated with the gaseous diffusion process were built, K-1037.

“That's one of the last two big demolition projects we have,” said Adler. “They're in the process of removing it right now.”

He told members that every major building remaining at ETTP will be removed by 2020. Removing the buildings on the site not only clears the way for redevelopment, but it also facilitates addressing groundwater issues

by allowing DOE to remove the source of groundwater degradation. Removing soil also similarly facilitates this.

Adler directed members' attention to an area where DOE is digging to remove soil containing technetium.

“That's the most significant and productive thing we can do to eliminate continued degradation of groundwater,” he said. “Getting at groundwater itself is kind of tricky, but we can get rid of the source that degrades the groundwater.”

Adler told members that DOE has studied the groundwater issues extensively and is now looking for practical solutions to address them.

“In a few months, we'll have our best engineers' best ideas on what we can do, and the field of options is not limited,” he said.

He emphasized, though, that the groundwater issues do not affect surface use at the site.

“This property has been through the entire vetting process to ensure it is usable for industrial purposes on the surface,” he said. “It's a good, clean site ready for a factory.”



Join Us for a Briefing on Extending Operational Life of Facilities & Reducing Surveillance and Maintenance Requirements

6 p.m. Wednesday, April 10
DOE Information Center
1 Science.gov Way
Oak Ridge, TN 37831

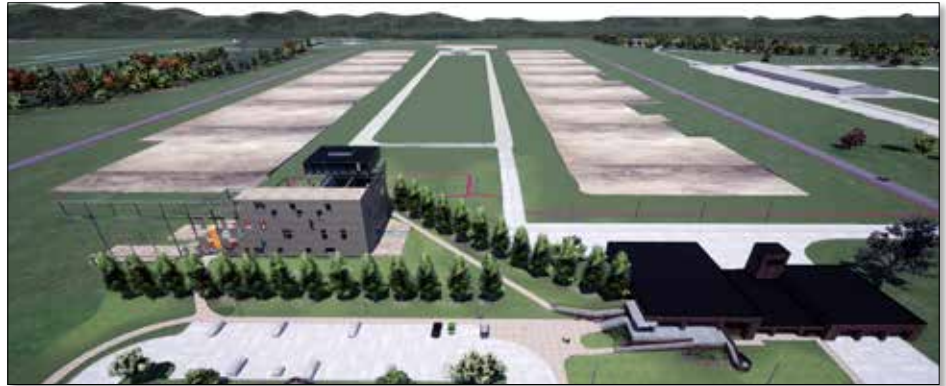
OREM is responsible for monitoring many buildings at ORNL and Y-12 that await decommissioning and demolition. Most date back to the Manhattan Project and Cold War and have deteriorated to various degrees. Hear about OREM's efforts to safely maintain buildings slated for removal. Presenters will also discuss ongoing improvements to other older facilities that are supporting ongoing missions.

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

DOE Expects to Open K-25 History Center to Visitors in Fall of 2019

The K-25 History Center museum will open to visitors this Fall, according to David Adler, a division director with DOE's Oak Ridge Office of Environmental Management. The museum to commemorate the history of the former K-25 site, now known as East Tennessee Technology Park, has been in the works since a 2012 agreement between DOE and local groups, including ORSSAB. That agreement expires in August and DOE is asking the city of Oak Ridge to extend its time frame.

Plans also call for an equipment building and viewing tower, which would overlook the footprint of the K-25 building that is part of the Manhattan Project National Historical Park. Those facilities should be complete



A rendering of the K-25 History Center and associated facilities. A virtual tour of the project is available at www.youtube.com/user/usdoeoakridge

by 2021, said Adler. That will also coincide with the planned final cleanup of the ETTP site.

“There has proven to be more

remediation work needed than originally anticipated,” he said. “And 2021 is a good time frame because all the cleanup work will be done.”



ABBREVIATIONS	
DOE	– Department of Energy
EM	– Environmental Management
EMDF	– Environmental Management Disposal Facility
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	– URS CH2M Oak Ridge
WIPP	– Waste Isolation Pilot Plant
Y-12	– Y-12 National Security Complex

UPCOMING MEETINGS	
Meetings are held at 6 p.m. in the DOE Information Center, 1 Science.gov Way, Oak Ridge, TN, unless noted otherwise.	
Board: Wednesday, April 10	
EM & Stewardship Committee: Wednesday April 24	

Oak Ridge Site Specific Advisory Board
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