

Strategy Team Undertakes Projects to Understand and Address Groundwater Concerns

While groundwater investigations have been done on and adjacent to the Oak Ridge Reservation (ORR) since the 1980s, a dedicated effort began in 2013 to sample numerous offsite locations and identify near-term onsite groundwater remediation projects. At that time, the Department of Energy's Oak Ridge Office of Environmental Management (OREM), the Tennessee Department of Environment and Conservation (TDEC), and the Environmental Protection Agency (EPA) collaborated on a series of workshops to develop a groundwater strategy for the ORR.

"Representatives from the agencies met over six workshops to develop a strategy to deal with legacy groundwater challenges," said Dennis Mayton, DOE Groundwater Program Project Manager. "Some of these challenges involve multiple onsite plumes with multiple contaminants. These plumes range from just a few feet below the surface down to 1,000 feet. And it's all in a complex geology of fractured and locally karstified bedrock."

The strategy group discussed all of the known contaminated groundwater plumes that are located on the ORR and placed them in a hazard ranking system based

on the size of the plumes, contaminant concentrations, and if a plume was moving, especially if it might migrate off the reservation.

The group then discussed projects to address the 35 identified plumes and identified 36 potential projects.

Offsite Groundwater Assessment

Two projects were selected to begin right away. The first was an offsite groundwater assessment. Work began in 2014 to sample 49 offsite locations – 34 wells and 15 springs – to determine if contamination existed. Secondly, if contamination was found, the assessment would investigate if it originated from DOE operations on the ORR.

Three rounds of sampling have been completed. The first round of sampling at 43 locations was completed in the



Workers install a Westbay™ discrete zone groundwater sampling system in a deep monitoring well in Melton Valley. This type of sampling equipment allows sampling at very specific depth intervals in wells such as in individual fracture zones that may transport contaminated groundwater.

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second quarter of FY 2015. Mayton said three locations showed contaminant exceedances of EPA National Primary Drinking Water standards for lead, gross alpha activity, or radium. The second round at 48 locations in the fourth quarter of FY 15 and the third round at 18 locations in the second quarter of FY 16 showed no exceedances of the EPA National Primary Drinking Water standards.

Groundwater Flow Model

The second project undertaken was the creation of a regional groundwater flow model to help determine how groundwater moves. "Oak Ridge is one site in the DOE complex that does not have a sophisticated groundwater model," said Steve Haase, RSI Senior Geohydrologist. "Other sites are demonstrating

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Strategy Team Takes on Groundwater Projects

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that a flow model can be a powerful tool in planning and decision making.”

In 2015, a flow model was developed and a test case done on an 8-square mile area at Y-12 National Security Complex. The test was successful, and the flow model was expanded to a regional scale model of the ORR and surrounding area. “With a working model we can do a number of ‘what if’ scenarios,” said Haase.

Mayton said at the January ORSSAB meeting that a draft report on the flow model is being reviewed by a groundwater technical advisory group.

Upcoming Work

According to the Federal Facility Agreement, the document that sets milestones for cleanup actions on the ORR, the first large-scale decisions on groundwater will be made at East Tennessee Technology Park (ETTP). In 2005 a remedial investigation/feasibility study was done to offer alternatives to treat groundwater at ETTP.

One of the alternatives is a technique known as in situ thermal treatment, which heats water, and volatile organic

contaminants are extracted from the vapor. The technique might be used to restore groundwater contaminated with dense non-aqueous phase liquids (DNAPLs). DNAPLs were used in large quantities for degreasing equipment at ETTP. Five plume sources at ETTP are thought to have DNAPLs.

A second round of characterization this year could determine if in situ thermal treatment is a viable alternative, and if so, a proposed plan will be prepared recommending the treatment. If the proposed plan is accepted, a record of decision documenting the remediation technique will be signed; however, the final decision is currently scheduled for 2023 under the Federal Facility Agreement. If the technique is successfully employed it could be used on other plumes on the ORR.

A couple of other groundwater projects are also being evaluated. One is the Melton Valley/Bethel Valley Exit Pathways Study to gather data on groundwater behavior in the valleys. “It would look at five plumes at the Oak Ridge National Laboratory identified in the groundwater strategy document.


Data gathered would be used with flow modeling to evaluate possible scenarios for groundwater flow westward off the reservation under the Clinch River,” said Mayton.

Another possible project is the 7000 Area Trichloroethylene Plume Remediation Project in the East Campus of the lab. Mayton said a pilot test using bioremediation was performed that has shown positive results. Bioremediation employs microbes to consume certain

contaminants, but additional characterization needs to be done. If DNAPLs happen to be found, it would render bioremediation ineffective.

ORSSAB’s Involvement

At the January 2017 ORSSAB meeting, the board’s Deputy Designated Federal Officer, Dave Adler, suggested that the board should discuss and offer suggestions on how DOE can best use its resources for groundwater work. Members of the board’s Environmental Management & Stewardship Committee toured ETTP and the lab to see for themselves where groundwater projects are being considered.

The committee continued the discussion at its January and February meetings. A draft recommendation on groundwater is being developed for consideration by the full board later this year. 



Dick Ketelle, UCOR/RSI, center, and Dennis Mayton, DOE, left, explain to ORSSAB member Ed Trujillo a proposed bioremediation project at the site of a monitoring well location at the East Campus of Oak Ridge National Lab.

DOE Community Budget Workshop



Wednesday, April 12

4:30 - 6:00 p.m.

DOE Building 2714-G

235 Laboratory Road

Oak Ridge, TN



Planning for FY 2019 DOE Oak Ridge environmental cleanup projects starts now, and you are invited to learn more about DOE’s plans. Come learn about the budget and prioritization process, ask questions, and offer your remarks during the public comment period.

For directions or other information about the workshop, contact the OREM Public Affairs Office at 865-574-4912.

Tentative Construction Start of K-25 Historic Preservation Effort Nears

After several years of discussions, planning, and design, construction is set to begin in late summer/early fall of 2017 on a facility that will commemorate the historic significance of the K-25 Gaseous Diffusion Plant.

“After review of the preliminary design by the consulting parties, we



Illustration of the planned Equipment Building that will replicate a portion of the K-25 Building at ETTP.

have incorporated their comments in a final design for their review,” said Steve Cooke, DOE’s K-25 Historic Preservation Coordinator.

Cooke said a \$6 million appropriation by Congress in FY 2016 funded completion of the preliminary and final designs. Additionally, there were sufficient funds remaining after the design phase for OREM to begin construction of the History Center later this year. This effort is part of a larger commitment made in a 2012 memorandum of agreement.

In 2012, numerous consulting parties, including ORSSAB, signed a memorandum of agreement with OREM that called for preservation of the U-shaped K-25 building footprint and the construction of a History Center and Equipment Building to commemorate the role K-25 and its employees played during the World War II Manhattan Project and subsequent Cold War.

The History Center will be built in the second floor of the East Tennessee Technology Park fire station, and it will include numerous exhibits and artifact

displays.

Meanwhile, the Equipment Building will be an open-air cross-section representation of a portion of K-25. It will be adjacent to the History Center at the south end of K-25’s footprint.

This structure will also feature a view-

ing tower with an enclosed observation deck so visitors can get a sense of the massive size of the former building and a 360-degree view of the site.

Finally, 12 wayside exhibits will be placed

around the K-25 footprint with information about the building and the people who built it and worked there.

“The final design is consistent with the conceptual design reviewed by



Example of one of the wayside exhibits to be placed around the K-25 footprint.

the consulting parties in 2015,” said Cooke, “except that the design has been refined in response to comments and the drawings have been further fleshed out.”

Museum professional Gerard Hilferty and Associates designed the exhibits for the projects, while Smee + Busby Architects provided the layout and design for the facilities.

Currently, there is no date set for the History Center’s completion or when it will be open to the public. Cooke said continuation and completion of the project is subject to annual appropriations. The estimated cost of the historic preservation efforts at K-25 total approximately \$20 million. 🌿

National Park Service and DOE Release Foundation Document for Manhattan Project National Park

The National Park Service and DOE have released the Foundation Document for the Manhattan Project National Historical Park. The unique park includes three separate locations in Oak Ridge, New Mexico, and Washington State.

The Foundation Document affirms the park’s core mission and significance, key resources and values, and the interpretive themes that tell its stories. The park

was established in November 2015 to preserve portions of the three World War II sites where the United States developed the first atomic weapons. The park commemorates the history of the people, science, and events that led to creation of the first atomic bomb.

The Foundation Document is the result of public input from workshops in Los Alamos, N.M.; Hanford, Wash.; and Oak Ridge, plus planning by the Park Service and DOE.

The document is available online at: www.nps.gov/mapr/foundation-document.htm. 🌿



Oak Ridge Reservation Update

Shipments to WIPP Scheduled to Resume in April

Shipments of transuranic (TRU) waste to the Waste Isolation Pilot Plant (WIPP) in New Mexico are scheduled to resume in April. WIPP has been closed since February 2014 because of two unrelated incidents: an underground truck fire and the accidental release of contamination from a ruptured storage drum.

Oak Ridge had been sending TRU waste to WIPP for disposal prior to the accidents.

According to DOE the “exact allocation and sequence for shipping will be adjusted based on the emplacement rate at WIPP, operational needs at WIPP and generator sites and logistical issues (such as weather) that affect shipping.”

WIPP expects to receive 24 shipments from Oak Ridge between now and January 2018.

Before the accidents WIPP received almost 12,000 shipments totaling more than 14 million miles from DOE sites in several states without incident.

OREM Completes Roof Repairs on Alpha 4 Building at Y-12

OREM recently finished roof repairs on the Alpha 4 Building at Y-12 National Security Complex. “We are applying lessons we’ve learned from previous cleanup projects,” OREM

Acting Manager Jay Mullis said. “Buildings that are neglected cause cleanup to be much more costly and complicated. Performing smaller tasks like this one to maintain facilities will create considerable savings by the time we begin major demolition at Y-12.”

Water leaks cause rapid deterioration and can spread contamination in old buildings, which can lead to more hazardous and costly demolition. Residual mercury in Alpha 4 is of particular concern as it could become more mobile with water intrusion.

Subcontractor Nations Roofing repaired 20 areas across Alpha 4’s four-acre roof. The company completed the work two months ahead of schedule and \$200,000 under the \$1.25 million budget.

The 560,000-square-foot building was built in 1944 to enrich uranium for the Manhattan Project using the electromagnetic separation process. In 1953 the systems were changed to the column exchange process for thermonuclear weapons production. Large amounts of mercury were used in the operations, which ceased in 1962.

Construction on Oak Ridge Airport Could Begin in 2018

The General Aviation Committee of the Metropolitan Knoxville Airport Authority has recommended that an Airport Layout Plan for a general aviation airport in Oak Ridge be submitted to the Federal Aviation Administration.

The airport authority will vote on the recommendation later in April.

The plan for the airport, proposed to be built along Tennessee Highway 58 fronting ETTP, includes a

5,000-foot runway, a parallel taxiway, and about 40 hangars.

Pending approvals, construction could begin in late 2018 or early 2019. Estimated cost for the airport is \$35-\$40 million, with funding from several government agencies.

Former OREM Manager Stresses the Important Role of Communities in Cleanup Work

In February, the former manager of OREM, Sue Cange, stressed the importance local communities play in the environmental cleanup of DOE sites during a meeting of the Energy Communities Alliance in Washington, D.C. Cange left OREM in January to take the role of DOE Acting Assistant Secretary for EM.

“The local communities near our sites can be some of our most passionate and driven advocates that we have for our mission,” Cange said. “That’s because you understand the EM mission — why we do what we do — because your communities have been home to our nation’s defense nuclear weapons production programs and government-sponsored nuclear energy research in some cases for over 70 years.”

Cange highlighted how EM’s partnerships with local communities and other stakeholders helped achieve success across the DOE cleanup program in 2016, including completing the demolition of the former uranium enrichment process buildings ETTP.

“When I was the field manager at Oak Ridge, we were successful because of strong partnerships across the board — with the Oak Ridge community, as well as our elected officials and



Sue Cange

environmental cleanup of DOE sites during a meeting of the Energy Communities Alliance in Washington, D.C. Cange left OREM



Workers repair the roof of the Alpha 4 Building at Y-12.

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other important advocacy groups. In addition, we had meaningful partnerships with our contractors and our regulators. The importance of growing strong partnerships is a principle that I've brought with me to Washington, D.C.," she said.

Oak Ridge to Become Part of an EM National Lab Network

The DOE EM Program wants to link the capabilities of its national labs across the country to support its environmental cleanup mission.

Acting EM Assistant Secretary Sue Cange charged Savannah River National Laboratory EM's corporate lab, with establishing and leading the EM National Laboratory Network. It will be chaired by the Savannah

River lab director and co-chaired by the director of the Pacific Northwest National Laboratory at the Hanford Site. Oak Ridge, along with Los Alamos and Idaho National Labs will also be part of the network.

Creation of the network is a result of recommendations from the Commission to Review the Effectiveness of the National Energy Laboratories to make the best use of the labs' know-how in environmental cleanup.

"We are strengthening historic partnerships and relationships with individual labs to take advantage of the synergies of a larger network supporting the EM program," said EM Laboratory Policy Office Director Mark Gilbertson.

Public Bus Tours Restart

DOE has begun its public bus tours of some of the Oak Ridge facilities for the season. The tours have been a popular attraction for tourists and locals since 1996.

The tours begin at the American Museum of Science and Energy and include stops at the Y-12 New Hope Center, the New Bethel Baptist Church, and the historic Graphite Reactor at Oak Ridge National Lab. The tour includes drive-bys of the Spallation Neutron Source, located at the lab, and ETTP, the site of the now-demolished five gaseous diffusion buildings.

For schedules and prices call the museum at 576-3200 or visit www.amse.org.

New Reports Now Available at the DOE Information Center & Online

Three reports have been issued recently that will be of interest to members of the community who follow cleanup activities on the DOE ORR. All three are available online and from the DOE Information Center, 475 Oak Ridge Turnpike, Oak Ridge, TN 37830; (865) 241-4780 or 1-800-382-6938, option 6; <https://doeic.science.energy.gov>.



Cleanup Progress is OREM's annual report to the Oak Ridge regional community and provides a synopsis of activities and accomplishments for the year. It's produced by URS/CH2M Oak Ridge LLC, OREM's contractor for the ORR. The report is available online at energy.gov/orem/downloads/cleanup-progress-report-2016.

The *UCOR FY 2016 Annual Report* also details progress on OREM projects and provides information on UCOR topics, such as financial performance, safety, and how UCOR works with the community. The report is available online at www.ucor.com/_docs/AnnualReviewReport/annualreview_2016.pdf.

The *ORSSAB FY 2016 Annual Report* provides information on the board's activities, its committees, and members, and it describes the key issues the board addressed during the year. It can be found online at energy.gov/orem/downloads/orssab-fy-2016-annual-report.

ORSSAB Chair Belinda Price Leads a Diverse, Dynamic Group

“We have a dynamic board, and I’m excited about the people we have,” says ORSSAB Chair Belinda Price. “We have a good diversity of backgrounds. The community is well-represented.”

Belinda was first appointed to the board in 2013. “Like everyone else it took about a year for me to get up to speed,” she says, “so I didn’t say much that first year. But I got involved in writing a couple of recommenda-



Belinda in one of her Sweet Adelines outfits.

tions. I also served on the Board Finance & Process Committee and the Nominating Committee for board officers.” She also regularly helps out at the board’s booth at Oak Ridge Earth Day celebrations.

Belinda was elected chair for FY 2016 and was re-elected for FY 2017. As chair she leads the Executive Committee and runs the monthly board meetings. In addition, she made a presentation at the 2016 Waste Management Symposium and attended the 2016 National Cleanup Workshop.

Belinda first became aware of ORSSAB when a colleague mentioned it to her, and she decided to attend a meeting. At the time Bob Hatcher was on the board. They have known each other for many years, and he encouraged her to apply for a seat.

Being an ORSSAB member is a way for her to contribute to the community. “Everyone should do something that makes them feel like they contribute. ORSSAB allows me to do that in an area where I have some technical understanding and can give meaningful feedback.” Her area of expertise is geology and hydrogeology, which is particularly useful in issues related to *in situ* waste disposal and groundwater.

Belinda’s journey began ‘across the pond.’ Originally from South Wales, she grew up in London and attended the University of Bristol where she received her bachelor’s degree in geology. Earning high honors in her bachelor’s qualified her for government funding to pursue an advanced degree. She attended University College London earning a master’s degree in hydrogeology, the only woman in a class of more than 20 students.

While at Bristol she met an American working on his doctorate, Bill Dunne. They moved to Morgantown, W. Va., where he was a professor of structural geology at West Virginia University, and married.

She began her career working with the West Virginia Geological Survey in the oil and gas division. She then went to work for IT Corp., in Pittsburgh, to make better use of her hydrogeology degree. In the meantime she became an American citizen.

After a time Bill was accepted for a position at the University of Tennessee Knoxville, and Belinda was able to transfer to IT’s Knoxville office. She stayed with IT and its subsequent transitions for 25 years, primarily working on environmental restoration work on government contracts. Some standout projects for her include setting up a disaster recovery center for FEMA at Kelly USA, San Antonio, after hurricane Katrina and helping to scope offsite surface water restoration projects at the Paducah Gaseous Diffusion site for a DOE contractor. She now works part-time for Alliant Corp. as a project manager on environmental restoration

projects for the U.S. Army Corps of Engineers. Belinda enjoys the freedom and lower stress associated with part-time work.


Now as ORSSAB chair she has a perspective on DOE cleanup challenges across the nation. “It’s given me the opportunity to interact with the chairs and vice chairs of the other advisory boards. It’s eye opening to learn what’s going on at the other sites and see what’s common among all sites. However bad we think our problems are, other sites have similar or worse problems.”

Working with the other chairs, Belinda is particularly proud of a white paper they developed at the fall 2016 Chairs’ meeting. “It was a transitional document for the new administration that addresses near-term priorities and future cleanup challenges at EM sites,” she said. “It’s good it came from a group representing the public.”

Belinda likes the changes the board has made recently to its processes. “We now go more in depth on fewer subjects. That has served us well, and we’ve been able to write some good recommendations.”

For fun she likes to sing. “I’ve been singing since high school,” she says. These days she sings with Sweet Adelines International, although participating takes a bit of effort. “We rehearse every Monday night in Chattanooga with the Scenic City Chorus, so several of us from this area load up and make the drive.”

The chorus presents a diversity of music in the barbershop style, which is four-part harmony in an a cappella (unaccompanied) format. Belinda sings lead (the melody part) in the chorus and has also sung tenor (high harmony) in quartet. “It’s very challenging but definitely enjoyable,” she says.

Belinda and Bill have a daughter, Beth, who is a senior at American University in Washington, D.C. They live in Knoxville with their cat, Oliver. Perhaps they named him after a musical since they all enjoy the theatre. 

Student Representatives Finish Their Year on the Board in April

Each year ORSSAB seats two student representatives from area high schools to engage the perspectives of local students on environmental issues. One is from Oak Ridge High School, and the other is from Hardin Valley Academy in West Knoxville.

This marked the 19th year of the student representative program, which was started in 1999 when the board was very involved in long-term stewardship and was concerned that the next crop of stewards be prepared for their role in making sure the Oak Ridge Reservation cleanup continued.

This year, Lara Manning and Gabrielle McAllister were selected by their schools to serve on the board for one-year terms, which end in April.

Lara Manning is a senior at Oak Ridge High School. Her love of



Gabrielle McAllister, Hardin Valley Academy



Lara Manning, Oak Ridge High School

the outdoors as well as her studies in advanced placement environmental science led to her interest in serving on the board and learning more

about DOE's cleanup efforts in the Oak Ridge community.

Gabrielle McAllister is a senior at Hardin Valley Academy. Also a student in advanced placement environmental science, Gabrielle has participated in two internships with Tremont and UT related to environmental research in East Tennessee. One involved collecting data on insects to study phenology and another used environmental DNA to detect salamander species in the Great Smoky Mountains National Park.

Both students participated in the monthly board and committee meetings and assisted in managing the public comment periods during the board meeting.

Two new students will join the board in May as representatives for 2017–2018. 🌱

ORSSAB Says Goodbye to Elizabeth Ross

Sometimes life gets in the way of a member's participating on ORSSAB, and that's what happened this year to one of the board's newest members, Elizabeth Ross.

Appointed to the board in February

2016, Elizabeth was an active member of the board and will be missed. She changed positions with her company in January 2017 and no longer had the flexibility in her new position to allow for participation on the board.

Elizabeth had been serving as the vice president/branch manager for Knoxville at ECS Central, PLLC, which provides geotechnical engineering, environmental consulting, construction materials testing, and facilities engineering services. She is also a former OSHA Health Compliance Officer and served as the lead Environmental Principal for Indoor Air Quality services for ECS Carolinas and ECS Central. 🌱



Elizabeth participated in the June 2016 ORSSAB tour of the Aquatics Lab at ORNL.

New Members Drive Nets Numerous Applications

—
DOE Now Reviewing Applications
—

The January 2017 membership drive to fill current and upcoming vacancies on ORSSAB was a resounding success. The problem for DOE now is how to fill the two current vacancies on the board and five others that will come open when several long-serving members retire at the end of June.

DOE is evaluating the applications, and all applicants will be notified regarding the disposition of their application. Those not appointed will form a pool of candidates from which appointments can be made in the future as vacancies on the board arise.

DOE EM Launches New Strategic Planning Initiative

EM is moving forward with a new strategic planning initiative to better tackle the longer-term challenges the DOE cleanup program faces. Acting EM Assistant Secretary Sue Cange talked about the plan at the 2017 Waste Management Symposium.

Cange said that EM will be “assessing cross-cutting program and site-specific strategies that present opportunities to reduce life-cycle costs, address high risks early and/or achieve other tangible benefits.” She said the initiative will be “driven by the priorities of the new administration.”

“We have just begun this strategic planning process, and going forward we plan to incorporate each of our site’s multi-year budget profiles into


a comprehensive set of goals and outcomes for the program,” she said.

Explaining the anticipated benefits of the initiative, Cange said, “This overall effort maps out incremental targets, aids in proper prioritization, and better informs decision-making.” EM will also be better able to adapt to shifts in annual funding levels, she said.

EM’s efforts are intended to help harness the momentum generated by recent successes to continue to make progress across the entire DOE cleanup program, Cange said. Among the goals EM is working hard to complete this year are:

- completing the design of a planned mercury treatment facility at Oak Ridge,

- completing the demolition of the Hanford Plutonium Finishing Plant to slab-on-grade,
- continuing with startup activities at the Idaho Integrated Waste Treatment Unit and the Savannah River Salt Waste Processing Facility, and
- making significant progress in removing contaminated piping and equipment at the Portsmouth and Paducah gaseous diffusion plants.

Integral to helping EM realize such accomplishments, Cange said, is the workforce at EM headquarters and across the field. “Our strength starts with our people. Collectively, this ‘EM Team’ is without question our biggest asset,” she said. 



Oak Ridge Site Specific Advisory Board

www.energy.gov/ORSSAB

P.O. Box 2001, EM-942

Oak Ridge, Tennessee 37831

UPCOMING MEETINGS

Monthly Board Meetings:

- No meeting in April
- Wednesday, May 10, 6 p.m.

EM & Stewardship Committee Meetings:

- No meeting in April
- Wednesday, May 24, 6 p.m.

Unless otherwise noted, all meetings are held at the DOE Information Center, 1 Science.gov Way, Oak Ridge, TN

ABBREVIATIONS

DOE — Department of Energy
EM — Environmental Management
EPA — Environmental Protection Agency
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 Dept. of Environment & Conservation
Y-12 — Y-12 National Security Complex

