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# ADVOCATE

## Challenging Times at the Molten Salt Reactor Experiment Site

One of the most technically challenging projects underway on the Oak Ridge Reservation is the defueling of the reactor at the Molten Salt Reactor Experiment (MSRE) site. The record

the planned work has had some technically challenging aspect. This included several unique pieces of equipment that had to be designed, developed, and tested to facilitate the extraction process. DOE was finally ready to begin the pumping on the first of the three molten salt storage tanks when it was discovered that a drain line was clogged. Efforts have been unsuccessful in getting it open again. This tank has yet to be drained, and new extraction procedures are being investigated for removal of the fuel and flush salts from the tank.



*Aerial view of the Molten Salt Reactor Experiment site in Melton Valley.*

In the meantime, attention was shifted to the second tank, and work was progressing until a fluorine leak ground things to halt. Only uranium hexafluoride gas had been removed from the tank before the fluorine leak stopped the work. It was while Bechtel Jacobs, the DOE environmental cleanup contractor, was trying to figure out what had caused the leak and get ready to begin operations again that it was reported that marijuana had been found in an MSRE worker's car. There were also charges that some of the employees had been playing cards and sleeping rather than working. It was reported that one employee was fired on the spot and two others quit rather than undergo drug testing.

Work has been stopped at the site until January to ensure that the work is safe to resume. "It's a difficult job, and we're running into more problems than we thought we would have," stated Steve McCracken, assistant manager for DOE's Oak Ridge environmental cleanup program. McCracken also said it will probably be necessary to do a full operational readiness review before work restarts. It is very

of decision for this activity was signed on July 7, 1998, but the remediation work to address the removal of the salts in the reactor could not be initiated until two other removal actions at the site had been successfully completed.

The reactor had been idle since the late 1960s when experiments using lithium and beryllium salts ended. The reactor used uranium-233 as a fuel, which was cooled by the salts flowing through the reactor chamber. When operations ended, the fuel salt was drained into two of the storage tanks and allowed to cool and solidify. The flush salt was drained into the third tank. The reactor has been under a surveillance and maintenance program ever since.

Work has been underway for almost two years to drain the three storage tanks. Every step of

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The Advocate is a publication of the Oak Ridge Site Specific Advisory Board (ORSSAB)—an independent, nonpartisan, volunteer citizens panel providing recommendations and advice to DOE's Environmental Management Program

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## ORISE to Perform Independent Verification at ETPP

Millions of dollars are being spent at East Tennessee Technology Park (ETTP) to dismantle scores of old buildings and prepare the land for eventual use as a private industrial park.

But how receptive will industry be to locating in a place that generated some pretty scary waste materials? Will companies be willing to invest in a site without assurance that the land and any remaining buildings available for lease are free of radiological and hazardous contaminants?

One way to assuage any concerns is to conduct an independent verification (IV) that cleanup requirements have been met and land and buildings are safe to use.

Two records of decision are in place that spell out cleanup requirements for most soil remediation, buried waste, and subsurface structures at ETPP. A third sitewide record of decision will address remediation of groundwater, surface water, sediments, and remaining soil. Earlier agreements called for cleanup of the three monstrous gaseous diffusion facilities: K-29, K-31, and K-33.

But while cleanup requirements are laid out for contractors, where are the guarantees that those requirements were met? IV goes a long way in confirming that work was done properly.

ORSSAB, through its Environmental Management (EM) committee, investigated the use of IV at ETPP. It turns out that one of the best known IV contractors is located in Oak Ridge. The Oak Ridge Institute of Science and Education (ORISE), associated with Oak Ridge Associated Universities, has conducted IV at more than 600 sites across the country since 1981.

In November 2005, the EM committee invited Eric Abelquist of ORISE to ex-

plain what IV is and provide examples of work ORISE had performed.

Abelquist said IV is a “quality assurance measure to ensure the cleanup contractor has met agreed-upon cleanup requirements. IV increases the probability of complete remediation and documentation, and that enhances credibility in the eyes of the public because it’s an unbiased look at the cleanup process.” He said IV is not a replacement or supplement to the final status survey of a site but simply validates the final status survey.



*ORISE Survey Projects Manager Scott Kirk discusses independent verification of cleanup at ETPP at the January 10 ORSSAB meeting.*

At the meeting Abelquist talked about DOE’s cleanup of the Rocky Flats, Colo., site, describing it as DOE’s most successful cleanup project at the time.

DOE worked closely with the Rocky Flats Citizens Advisory Board and the Rocky Flats Coalition of Local Governments, empowering local stakeholders to direct ORISE where to work. “Initially there was some skepticism as to whether ORISE could be independent since it was contracted by DOE,”

said Abelquist. “Rocky Flats even sent a group to Oak Ridge to check out its processes. That group determined that ORISE was working independently.”

Abelquist said ORISE found some hot spots the contractor had missed. “While that helped DOE’s credibility, it also raised questions about the work being done at Rocky Flats.” Abelquist said one of the lessons learned was that DOE needed to effectively communicate what the final cleanup goals were to the contractor.

As a result of that November presentation, ORSSAB crafted a recommendation to DOE-Oak Ridge to conduct IV at ETPP. DOE accepted that recommendation and contracted ORISE to do the work. DOE has recently approved ORISE’s statement of work, as well as funding of \$234,000 per year for three years, the amount of time DOE forecasts it will take to finish cleanup of ETPP.

At the January 2007 ORSSAB monthly meeting, ORISE Survey Projects Manager Scott Kirk presented an overview of the work plan being developed by ORISE for IV at ETPP.

Kirk said the plan calls for in-process inspections of the contractor’s laboratory data to make sure it conforms to survey procedures. He said the in-process inspections are useful in identifying issues early on and not when the project is finished when the cleanup contractor would be reluctant to go back and fix a problem.

Kirk said ORISE will do some surveys of its own to substantiate the effectiveness of remedial actions, and it will provide letter reports after each phase of work and a final comprehensive report. He added that the entire site would not be surveyed. “We would take random, as well as biased surveys

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## Accelerated Closure: Much Done, Much Remains

Two major milestones have been reached in DOE's plans to accelerate the cleanup and closure of environmentally contaminated sites on the Oak Ridge Reservation. In September 2005 Bechtel Jacobs finished the disposition of all legacy low-level and mixed low-level waste, and one year later the



*K-29 was demolished in mid-2006 as part of the Accelerated Closure Project.*

company finished most of the remediation of Melton Valley.

But two other milestones remain to be addressed: cleanup of the East Tennessee Technology Park (ETTP) and a bundle of jobs known as Balance of Reservation, which includes work at Y-12 National Security Complex, Oak Ridge National Laboratory, and the two David Witherspoon sites in Knoxville. ETTP is currently scheduled for completion in 2008 and the Balance of the Reservation in 2015.

Mike Hughes, president and general manager of Bechtel Jacobs, gave an update on the cleanup story thus far at the November ORSSAB meeting.

Most of the company's work is being done at ETTP, where the landscape has changed dramatically in just a couple of years. Hughes said almost 200 buildings have been demolished, and another 274 have been deactivated. Notably, two huge gaseous diffusion plants, K-31 and K-33, have been decontami-

nated and decommissioned. Efforts are underway to find companies to lease the buildings under the DOE reindustrialization program. Another large structure, K-29, was demolished; its rubble and contents were carted off to DOE's Environmental Management Waste Management Facility (EMWMF) near Y-12.

The last two major buildings that will be coming down, K-25 and K-27, are being prepared for demolition. The schedule to demolish

K-25 was thrown off as a result of a worker accident in January 2006, which led DOE to revise its method of demolishing K-25 and K-27 to better

protect workers. Rather than removing the thousands of compressors and converters prior to the structures' demolition, the buildings will be taken down around the contents using heavy equipment. Building debris and process equipment will then be sorted and disposed at EMWMF.

There has been steady progress in some other areas at ETTP. For instance, more than 32,000 tons of scrap were shipped from the 7841 Scrap Yard to EMWMF. And almost all of the waste generated from decontamination and decommissioning activities at ETTP has been transported over the new haul road that was built between ETTP and EMWMF.

The major accomplishment of the Balance of Reservation Project is the remediation and restoration of the 901 David Witherspoon site in Knoxville. More than 80,000 cubic yards of material were shipped over 500,000 truck miles to the EMWMF for disposal.

## Another Key Milestone Met in December

Acres of storage yards at ETTP that once held cylinders containing uranium hexafluoride are now empty. In December the last of more than 6,000 cylinders were moved to Ohio, where their contents will be processed for reuse or disposal.

Almost 5,000 separate shipments of cylinders of various sizes have been made by DOE and its cleanup contractor, Bechtel Jacobs, to Portsmouth,

Ohio. The shipments traveled a total of 3.6 million miles without a release or major traffic accident and were completed three years ahead of schedule.



*The last shipment of cylinders departs Oak Ridge.*

# Three New Members Appointed to ORSSAB

DOE has announced the appointment of Mike Haygood, Ted Lundy, and Jan Teague to the Oak Ridge Site Specific Advisory Board (ORSSAB).

“The work this board does is hugely important to the community and to DOE, and we appreciate your interest in working on the board,” Steve McCracken, DOE-Oak Ridge assistant manager for Environmental Management, told the new members at the board’s January meeting.

Mike Haygood is a resource teacher at Jefferson Middle School in Oak Ridge and has served as president of the Oak Ridge Education Association for five years. He has a bachelor of science degree in health and special education from East Tennessee State University and a master’s degree in special education from the University of Tennessee. Haygood is a Knoxville resident.

Ted Lundy is a retired metallurgical engineer. He holds a bachelor’s degree in physics, a master’s degree in metallurgy, and a doctorate in metallurgical engineering from the

University of Tennessee. He is also a 1958 graduate of the Oak Ridge School of Reactor Technology.



*New members, left to right: Jan Teague, Ted Lundy, and Mike Haygood.*

Lundy taught at the University of Tennessee College of Engineering before joining the metallurgy division at Oak Ridge National Laboratory in 1957. During 1965-66, he was at the United Kingdom Atomic Energy Research Establishment, Harwell, Solid State Physics Division.

He retired from Oak Ridge National Laboratory in 1988 but soon after joined the Tennessee Tech Center for

Manufacturing, becoming its director in 1989 and retiring from that position in 2000.

Lundy is a Knoxville resident. In the 1970s he was twice elected to the Knox County Court representing the Cedar Bluff/Farragut area.

Jan Teague is an active member of the Oak Ridge community, with an interest in balancing industry and environmental concerns. She is a member of the Tennessee Trail Association and the

Sierra Club, and is a former board member of the Knoxville/Knox County Central Business Improvement District.

Teague holds a degree in business from Indiana University. She worked 30 years in the tourism industry and with various community boards as an industry representative.

## ORSSAB 2006 Annual Report Now Available



To receive a copy of the annual report by mail, call the ORSSAB support office at (865) 241-4583 or 241-

4584, or send an

email to [osbornepl@oro.doe.gov](mailto:osbornepl@oro.doe.gov). The report is also available on the Internet at [www.oakridge.doe.gov/em/ssab/publications/annreports.htm](http://www.oakridge.doe.gov/em/ssab/publications/annreports.htm).

## Independent Verification at ETPP

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at points that might be suspect, such as at the base of a hill or discharge points, because that’s where materials tend to accumulate.”

Kirk said work is scheduled to begin at ETPP in mid-January. He noted that IV is being used at the David Wither- spoon site in South Knoxville and was used during the cleanup of Buildings K-29, K-31, and K-33 at ETPP.

At the November 2005 EM committee meeting when IV was

first discussed, former ORSSAB chair and current EM committee member Kerry Trammell said, “The key factor at ETPP is the plan for reindustrialization. But the community and potential businesses locating in the area must be assured that there is no residual contamination that would be a danger to employees. When looking at the scope and cost of the work being done at ETPP to bring in business, IV would be a small price to pay for assurances of safety.”

# Recent Recommendations & Comments

*Complete recommendation text can be found on the ORSSAB web site at [www.oakridge.doe.gov/em/ssab/recc.htm](http://www.oakridge.doe.gov/em/ssab/recc.htm).*

## Notice of Contamination and Future Land Use Limitations in Melton Valley

The “Record of Decision for Interim Actions for the Melton Valley Watershed” requires that notations on ownership records and property record notices be filed in county records for land that is restricted for use because of the presence of hazardous substances.

In preparation of completing cleanup of Melton Valley, DOE submitted a draft notice of contamination to the ORSSAB Stewardship Committee for review and comment.

The committee revised the draft into a form it felt was more ‘user friendly’ and recommended that DOE consider using the style and format of the committee’s revision. The recommendation also asked DOE to publish a version of the notice in local newspapers that would be easily understood by the public.

## Remediation Effectiveness Report/Five-Year Review

The DOE Remediation Effectiveness Report (RER) is an annual document that assesses the performance of completed remedial actions on and around the Oak Ridge Reservation. Every fifth year the RER is expanded to include the Comprehensive Environmental Restoration, Compensation, and Liability Act (CERCLA) Five-Year Review.

CERCLA requires DOE to provide public notice and access to RER/Five Year Review results. While a public meeting is not required, DOE, EPA, the Tennessee Department of Environment and Conservation, and ORSSAB agreed that a public meeting

is the best way to meet the public notice requirement. As a result, DOE asked the board for guidance on how to conduct the public meeting.

The board made several general recommendations about conducting the meeting, as well as specific recommendations concerning the agenda and publicity. The primary suggestion was to use a board meeting at the DOE Information Center sometime after the first of the year as a forum for the RER/Five-Year Review public meeting.

DOE agreed to hold a public meeting soon after EPA and state comments on the RER are resolved.

## Proposed Changes to Method of Demolishing Buildings K-25 and K-27

When a worker was seriously injured at the K-25 building at East Tennessee Technology Park, DOE decided to change the method by which it will decontaminate and decommission K-25 and K-27 to better protect workers. In July 2006, DOE used the ORSSAB Environmental Management (EM) committee’s monthly meeting as a public forum to explain the new plan for accomplishing the work.

The plan calls for reducing the amount of time workers spend inside the buildings dismantling and removing equipment and instead use heavy equipment to bring the buildings down around the buildings’ contents. The equipment, materials, and debris would all be sorted and disposed at DOE’s waste management facility near Y-12.

In October the board recommended that DOE implement the new strategy. However, recognizing that when strategies change new problems can arise, the board encouraged DOE to use independent experts to review safety planning and waste disposition

documents. It also asked for monthly updates on the new strategy, including quarterly costs.

DOE responded quickly to the recommendation in late October with a status update on the two buildings. The update did not include any cost information, however. DOE also said that it had established an independent review team to study the processes for establishing criticality safety measures and waste characterization.

The EM committee reviewed DOE’s response at its December 2006 meeting and asked for additional information in subsequent monthly updates.

At the January EM committee meeting, representatives of Bechtel Jacobs provided more detailed information on efforts to prevent a criticality event during the dismantling of K-25, as well as an overall project status, including revised cost estimates.

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## Molten Salt Reactor Experiment

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important to complete this work and decrease the surveillance and maintenance activities necessary at a shutdown reactor.

In addition to being behind schedule, the project is about \$10 million over budget, and there’s still plenty to do. While some small amount of the fuel and flush salt material has been removed, several tons of the original 9 metric tons are still in the tanks. After the salts are removed, currently scheduled to be completed by the end of September 2007, there is still the facility itself that will require decontamination and demolition. That is not currently scheduled to happen for several years.

# Reservation Update

## New Mexico OKs Disposal of Remote-handled TRU at Waste Isolation Pilot Plant

On October 16, 2006, the state of New Mexico approved the permit modification for the Waste Isolation Pilot Plant to receive remote-handled transuranic waste (RH TRU). That was good news for DOE-Oak Ridge because it currently holds the largest inventory of RH TRU in the DOE complex nationwide.

The Foster Wheeler TRU Waste Processing Facility is scheduled to begin processing RH TRU in October 2007, with the first shipment going to Waste Isolation Pilot Plant in 2008.



*Workers package material at the Foster Wheeler TRU waste processing facility in Melton Valley.*

## EM Program Position on U-233 Disposition Clarified

In January 2006, DOE announced it had been directed by Congress to cease the extraction of medical isotopes from a stockpile of uranium-233 (U-233) stored at Building 3019 at Oak Ridge National Laboratory. With the canceling of the isotope extraction,

responsibility of disposing of the U-233 fell to the DOE Environmental Management (EM) program. But a number of people came to the September and October 2006 ORSSAB meetings voicing opposition to the plan, saying there was no viable alternative for obtaining the isotopes.

At the November board meeting, Steve McCracken, manager of the DOE-Oak Ridge EM program, said if extracting the isotopes would facilitate the disposition of the uranium he could perhaps argue that isotope extraction would be advantageous. But he said extraction does not benefit the overall mission need of disposing of the uranium and actually adds risk to the process.

Plans are to downblend the U-233 with U-238 to eliminate the possibility of nuclear criticality. Once the U-233 is downblended it will be put in safe storage, and the building will be prepared for eventual demolition.

In December 2006 DOE issued a draft environmental assessment that evaluates the potential environmental impacts of processing U-233 and Building 3019 Complex shutdown. The draft assessment is available at the DOE Information Center in Oak Ridge, (865) 241-4780. An electronic copy of the document is also available on the DOE Information Center Internet site at [www.oakridge.doe.gov/info\\_cnr/index.html](http://www.oakridge.doe.gov/info_cnr/index.html).

## Reservation Site Being Considered for Nuclear Recycling Projects

A spot near Oak Ridge National Laboratory is being evaluated as a possible place to process radioactive spent fuel. The site is among 11 nationwide being considered by DOE.

Two types of processing plants are being considered. One would extract useful products from spent nuclear fuel. The other is a burner reactor that would generate electricity as the plant changes the long-lived radioactive elements of the spent fuel into fission products that decay more quickly.

The plants are intended to support the use of nuclear energy and reduce the availability of materials that could be used in weapons.

Other sites being evaluated are in Idaho, Kentucky, New Mexico, Ohio, South Carolina, and Washington state.

## Nickel from K-25/K-27 to be Disposed

When the thousands of converters were built to separate U-235 from U-238 in the gaseous diffusion process, an element of the barrier used to achieve separation was made of nickel.

Now that the plants have been shut down and the converters are to be removed and disposed, some people think the nickel should be recovered and recycled.

DOE's Steve McCracken says that's not feasible. "It is our belief that the value of the nickel is not worth the risk and cost to cut open 3,000 converters to extract it," he said at the November ORSSAB meeting. He said the converters, with the nickel inside, will be disposed at the DOE EM waste management facility near Y-12.

He noted, however, that nickel was removed from converters that came out of buildings K-29, K-31, and K-33. Those converters were larger and had to be cut open anyway for transport and disposal. That nickel has been put in storage for eventual recycling.

# Board Member's Interest in the Environment Is a Long-Standing Commitment



*Heather Cothron*

Involvement in environmental issues is a personal and professional commitment to board member Heather Cothron.

Her interest was sparked as a high school student in Washington, D.C., when she participated in the first Earth Day observance in 1970.

She has maintained that commitment over the years, from her days as a college student to her current work in environmental compliance at Oak Ridge National Laboratory, where she manages hazardous and industrial wastes, working with 'green' chemicals and processes that reduce environmental and health impacts.

That same commitment led her to seek appointment to the ORSSAB in 2001. "I wanted to get more involved in the community, but at the time I didn't know much about DOE activities on the Oak Ridge Reservation," she said. "I've learned a great deal about the local community and the large role DOE has played through the years.

"As a board member I've interacted with a wide variety of people, and I've been routinely impressed by the caliber of these individuals. The professionalism of our board members has led to a reputation of thoughtful consideration and lively discussion that has resulted in beneficial recommendations for the community."

Heather was born in Monterey, Calif., but her military (Navy) father was soon reassigned and she began her life as a "military brat," which included three

years in the Philippines. "Returning to the states as a teenager was an enormous culture shock," she says.

She attended Old Dominion University in Virginia, earning a bachelor of science degree in biology. In 1983, after receiving a full scholarship to Vanderbilt, she was the first woman from the university to receive an advanced degree in chemical engineering.

After graduation she worked in Nashville as a regulator and with the space program in Florida before coming to Oak Ridge in 1992.

As a member of the board, she has been instrumental in developing the ORSSAB exhibit at the American Museum of Science and Energy, the Stewardship Education Resource Kit, and the two-day workshop to instruct local teachers on how to use the kit. "As a project manager my greatest sense of accomplishment comes from completion of a project. The challenge of providing information to the public using new and creative approaches has been fun and motivating."

Heather believes the greatest accomplishment of the board has been the leadership role it has taken on behalf of the community. "Board members have a strong sense of responsibility for the actions that are taken and for the future of the community. I believe we have earned the respect of the public, the regulators and DOE. We are able to facilitate dialog and help resolve issues that would otherwise be contentious." She hopes the board will continue its leadership, especially in the area of stewardship.

Heather and her husband live on 13 acres of land near Oliver Springs,

where on any given day they can enjoy watching a variety of wildlife. They share three children and two grandchildren. Heather enjoys staying active by working out in the gym, biking, and gardening.

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## Snapshots in Oak Ridge Cleanup History

### 10 years ago...

On February 13, 1997, DOE held a public meeting to discuss disposal alternatives for waste generated from cleanup operations on the Oak Ridge Reservation. As a result of the meeting, DOE decided to postpone any further workshops until it received input from the End Use Working Group on evaluation of community values and development of guidelines for cleanup decisions on the reservation.

On February 15, 1997, ORSSAB sponsored a workshop on K-25 worker health concerns at the Robertsville Middle School cafeteria in Oak Ridge.

### 5 years ago...

DOE was considering whether to continue operation of the Toxic Substances Control Act Incinerator beyond September 2003. In early 2002, ORSSAB issued a recommendation asking DOE to conduct a full evaluation of the impact of closure on wastes scheduled for incineration before the facility was shut down.

The incinerator continues to operate today and may remain open for an indefinite amount of time.

# Members Talk to LMU Students About Stewardship Kit

Board members Donna Campbell and Steve Douglas spoke to a class of Lincoln Memorial University students in November about the Stewardship Education Resource Kit.

The class of about 30 students was part of the university's post-baccalaureate teacher certification program.

Campbell and Douglas explained the content and purpose of the kit and how it meets the state's classroom performance standards.

The students were particularly interested in how the subject of stewardship could be presented to different age groups.

Class instructor Dr. Richard Chandler said he was

impressed with the kit and how well it presents the historical aspects of stewardship issues affecting the Oak Ridge Reservation.

The Stewardship Education Resource Kit is a comprehensive collection of

lesson plans and support materials developed by ORSSAB in 2005 to teach students about environmental cleanup and long-term stewardship issues. It was recognized recently by EPA for outstanding achievement in the field of environmental

protection and was a principal component of the board's receipt of EPA's Excellence in Community Involvement Award.

Information about the kit is available on the ORSSAB website at [www.oakridge.doe.gov/em/ssab/Stewardship-Kit/kit.htm](http://www.oakridge.doe.gov/em/ssab/Stewardship-Kit/kit.htm).



*ORSSAB member Donna Campbell at the LMU presentation.*

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## JOIN US FOR OUR PUBLIC MEETINGS

### Board Meetings

- **Feb. 14, 6:00 pm – DOE National Low-Level Waste/Mixed Low-Level Waste Disposition Strategy**
- **March 14, 6:00 pm – Presentation to be determined**

### Committee Meetings

- **Feb. 20, 5:30 pm – Stewardship**
- **Feb. 21, 5:30 pm – Environmental Mgmt.**
- **Mar. 20, 5:30 pm – Stewardship**
- **Mar. 21, 5:30 pm – Environmental Mgmt.**

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