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ADVOCATE

Molten Salt Reactor Continues to Test Skills and Patience

Of all the cleanup projects the DOE Oak Ridge Environmental Management (EM) Program is currently dealing with, one of the most troublesome has been the Molten Salt Reactor Experiment (MSRE). Since about 2005, the project has seen an aggravating series

two holding radioactive flush salts. The salts cooled and solidified and sat undisturbed for nearly 40 years.

But there was always concern about a possible release of contamination or a criticality accident. Two removal actions were performed in 1995 and 1996 to address the immediate safety concerns, and a record of decision was signed in 1998 to remove the uranium and the fuel and flush salts to permanent disposal sites.

Since this was a one-of-a-kind reactor, several years were spent planning and developing specialized equipment for use during the remediation. Uranium removal at the site began on the project in 2005, and it's been a struggle ever since. The flush salt in one of the tanks was reheated to a molten state so it could be put in containers and transferred to Building 3019 at Oak Ridge National Laboratory for storage. But the small pipe constructed to drain the material clogged and work was stopped to figure out what to do. Other equipment failures complicated things, as well.

Attention then shifted to draining one of the other tanks when a fluorine leak was discovered and work was stopped again. During the downtime while contractor Bechtel Jacobs, Co., was trying to solve this new problem as well as the clogged drain line, it was learned that some of the employees at the site were playing cards and sleeping on the job. There was even a report of marijuana in a worker's car.

In the meantime, though, preparations continued to restart the work, and a number of operational readiness reviews were conducted to make sure it was safe to resume.



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

of events that has included stops and starts, clogged drain lines, workers behaving badly, and disagreements about how to proceed.

Let's review the story so far.

MSRE was constructed in Melton Valley near Oak Ridge National Laboratory in the mid-1960s to test the concept of using molten beryllium and lithium salts to carry uranium-233 fuel in the reactor cell. The idea was to generate a significant amount of power in a small space, possibly even to propel aircraft. The concept never really worked out, and the project was shut down in 1969.

When work was terminated, the salt mixtures were stored in three tanks – one holding the fuel salts containing the U-233 and the other

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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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But even the operational readiness reviews revealed that not all was well, so in late summer 2007, DOE Oak Ridge manager Gerald Boyd dispatched Steve McCracken, the assistant manager for EM at the time, to head the MSRE restart team full time. After about a month of intense preparatory work, McCracken authorized restart of work to remove the fuel salts. “It was difficult to get where we are,” said McCracken, “but Bechtel Jacobs has the processes and the equipment it needs to do the work.”

For a change, work progressed relatively smoothly, and the last of the U-233 fuel salt was removed from the storage tank on March 25, 2008. The U-233 was separated from the salt and sent to the lab for interim storage with another inventory of U-233 (see page 3).

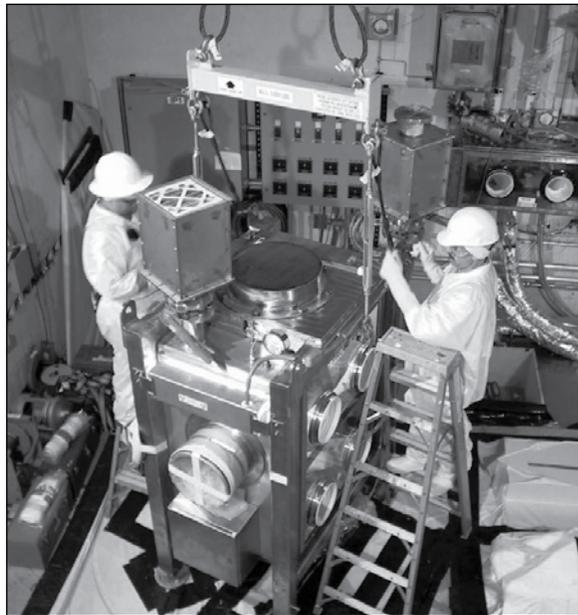
But that still left the flush salts and the salt that carried the U-233. All of it was allowed to cool again and solidify within the reactor.

While work at MSRE was idle after the successful extraction of U-233, an engineering evaluation was done on the proposed method to remove the residual salts from the tanks. The proposed method was to employ the same equipment used in the uranium removal. Concerns with the characterization of the remaining salt materials within the reactor and its molten temperatures raised questions as to whether this same equipment could be used for the salts removal.

The review of the proposed method showed some concerns that will further delay work at MSRE. Dave Adler, DOE’s EM liaison to ORSSAB, talked about the findings of the study at a recent ORSSAB EM Committee meeting. “The review of the 2008 work plan revealed some concerns at MSRE and recommended that the proposed salt transfer method not be implemented.

“One of the concerns is the structural integrity of the tanks,” he said. “It’s possible there has been some corrosion of the tank walls that occurred during the U-233 extraction. Some of that corrosion may also be causing the drain lines to clog.

“In addition there may have been the creation of other alloys in the tank that could also be responsible for clogged lines because they don’t melt at the temperatures which liquefy the salt.”



MSRE workers during U-233 fuel removal activities.

With those concerns Adler said DOE has proposed a new milestone to complete an evaluation of additional alternatives for extraction of the salt. He said the evaluation would consider three alternatives: grout the tanks and their contents where they are; remove the tanks without emptying them; open the tanks and mine the solidified salts for disposition.

“Leaving the salt in place is not a good option,” said Adler, “because it doesn’t comply with the record of decision. Pulling the tanks out has a couple of problems. There isn’t a shipping container large enough to put them in

for transport by truck, but rail shipping could be an answer. Plus if the tank walls are compromised there could be a real problem.

“Probably the best option is to cut off the tops of the tanks and mine the salt, putting it in smaller shipping containers to truck to New Mexico.”

The immediate problem? The Tennessee Department of Environment and Conservation has not agreed to

let the regulatory milestone for the work slip, as DOE has requested. EPA is also concerned about the effect milestone modification would have on DOE’s funding over the next three years and how it might affect other milestones.

In response DOE has asked for resolution through an informal dispute process to try to agree on a path forward. The informal process will involve the Federal Facility Agreement project managers from the three parties and their supervisors. Failing that, the issue would be elevated to a formal resolution process and kicked up to the next level of management and potentially beyond.

The dispute resolution process notwithstanding, Adler said DOE will go forward with an evaluation to consider new options for getting rid of the salt because DOE will not pursue a project deemed unsafe. The new study will evaluate the alternatives for cost, effectiveness, and implementation. It will be presented to the state, EPA, and the public for comment when completed. The agreed-upon milestone for the completion of the evaluation is January 30, 2011.

SSAB Reviews Uranium-233 Processing Project

Approximately 1.4 metric tons of uranium containing 450 kilograms of uranium-233 (U-233) are stored at Oak Ridge National Laboratory in Building 3019—a deteriorating facility that is over 60 years old. Because of its highly radioactive properties, the U-233 is stored in a shielded location and must be handled in hot cells to protect workers. Since there were no programmatic uses for the material, DOE initiated efforts to dispose of it in 2001. In 2003, however, Congress authorized the extraction of thorium-229, a material used in medical and research isotope production, prior to disposal of the U-233.

In October 2003, the DOE Office of Nuclear Energy awarded a contract to Isotek Systems, LLC, to plan and design the facilities needed to extract the thorium and process the U-233 into a stable form for storage. But in November 2005 Congress changed directions and instructed DOE to terminate thorium extraction and transfer responsibility for disposition of the U-233 to the DOE Environmental Management (EM) Program, thereby ending any potential for obtaining medical isotopes.

EM began managing the project and the Isotek contract, focusing on the processing and subsequent disposal of the U-233 at the DOE Waste Isolation Pilot Plant in New Mexico. EM approved the project's \$384 million performance baseline in May 2007, and authorized long-lead procurements and other activities.

In February 2010, the DOE Inspector General's office released an audit report on the project, stating that the project had encountered a number of design delays, may exceed original cost estimates, and will likely not meet completion milestones. Despite four years of effort by EM and the expenditure of about \$36 million, project planning and design had yet to be completed.

At the March 2010 meeting of the Oak Ridge Site Specific Advisory Board, Deputy Federal Project Director Wendy Cain briefed the board on the project, the objectives of which are to:

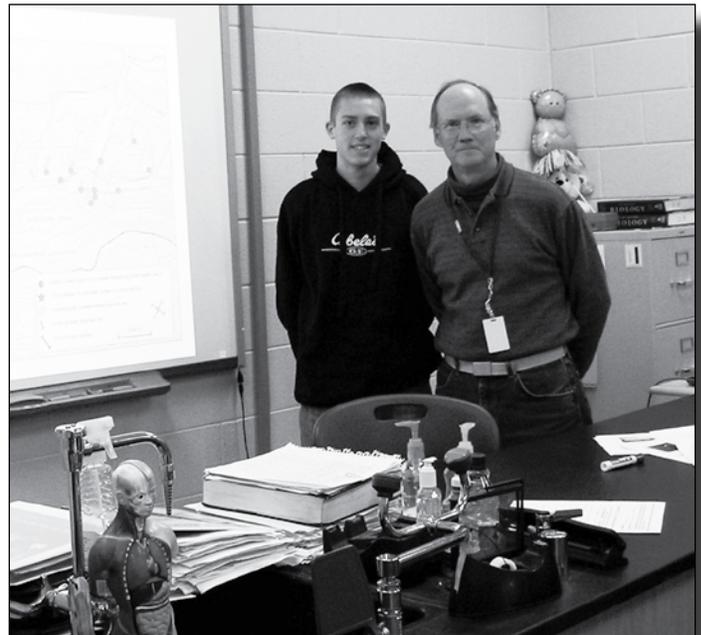
- design and construct modifications to Building 3019,
- design and construct a Building 3019 annex to perform drying and packaging of the final product,
- downblend the U-233 inventory to reduce attractiveness level and to eliminate the potential for nuclear criticality,
- convert the downblended material to a form acceptable for disposal at the Nevada Test Site, and
- place 3019 in a safe and stable shutdown condition in preparation for future decommissioning and demolition by a follow-on project.

About 1,000 cans of material are stored in vaults. They will be removed from the vaults one at a time, handled remotely, and placed in a hot cell. The cans will be cut open, and the U-233 will go into dissolution tanks. From there the material will go into accountability tanks where accurate measurements of the amount of uranium will be made. The U-233 will be mixed with depleted uranium from the Savannah River Site.

When the downblending is complete, the uranium in the product will be less than 1% U-233.

DOE-Oak Ridge Assistant Manager for EM John Eschenberg acknowledged that part of the cost growth in the project is just the high cost of maintaining the operation. "The meter's running on this job. Right now we spend about \$2.5 million a month just in facility operations."

Board member Bob Olson noted that the state of Utah has concerns about receiving depleted uranium from the Savannah River Site because of trace amounts of technetium-99 found in it. About 800 barrels of it will be shipped from Savannah River to Oak Ridge for use as downblending material. Board chair Ron Murphree echoed the concern: "Are you sure we're not going to have any problems getting the trace amounts of technetium out of the piping? After the bad news we've received about K-25, we're sensitive about tech-99."



Hardin Valley Academy senior and ORSSAB student representative Josh Pratt joined board member Tim Myrick for presentations to Academy science classes on February 26. Tim presented five real-life cleanup scenarios to the students, who then had to figure out what cleanup strategy to select for the projects, weighing cost, risk, and other factors.

National Park Study Draws Vocal Reaction

The National Park Service released its long-awaited “Draft Special Resource Study/Environmental Assessment on Manhattan Project Sites” to the public in late November, and the reaction in Oak Ridge was swift and direct: “Don’t rewrite history and leave us out!”

The purpose of the study is to comply with the Manhattan Project National Historical Park Study Act passed by Congress in 2004, which directed the Secretary of the Interior to “conduct a study on the preservation and interpretation of historic sites of the Manhattan Project for potential inclusion in the National Park System.” The act defined the study area specifically to include Los Alamos National Laboratory and town site in New Mexico, Hanford site in Washington, and Oak Ridge Reservation in Tennessee. A fourth site at Dayton, Ohio, was added later.

Initially, the Park Service planning team considered a national historical park comprising resources at all four sites. This was determined to be infeasible due to its large size involving four states, complex land ownership patterns, and potential to be extremely difficult to manage in an efficient way. The planning team also considered designation as a national monument under Department of Energy (DOE) administration. However, preservation and interpretation are not part of the DOE core mission, and DOE has not officially expressed an interest in administering such a monument without direct Park

Service participation. Consequently, the planning team dismissed this alternative.

After studying several other alternatives, the Park Service’s preference is apparently to create a new Manhattan Project National Historical Park at Los Alamos. The three other Manhattan Project sites—resources and historic districts located in Hanford, Oak Ridge, and Dayton—would be considered associated with, but not operationally part of, the Los Alamos-based National Historical Park.

Governor Bredesen responded to the study in a February 4 letter to Carla McConnell, project manager for the study: “By placing a single site park at Los Alamos, Congress would be

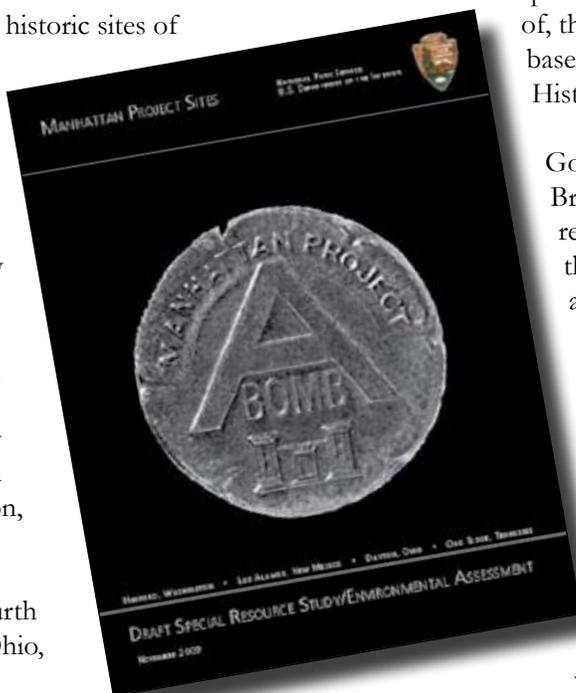
ignoring the history of the Manhattan project and trivializing the enormous contributions made in Oak Ridge, Tennessee. Only a very small fraction of the work was done in New Mexico, and the historical buildings and artifacts available at Los Alamos are trivial compared to the first nuclear reactor, enormous chemical processing facilities, and other apparatus available for public viewing in Oak Ridge. The headquarters for managing the Manhattan Project across the nation was located in Oak Ridge. In today’s dollars, over \$6 billion was spent in Tennessee compared to only \$15 million in New Mexico.”

Community leaders in Oak Ridge were similarly disappointed with the Park Service’s plan. In a joint letter to McConnell, a dozen community leaders, including the Oak Ridge City Mayor, decried the shortcomings of the Park Service’s choice. “Oak Ridge community leaders...were dismayed and puzzled by the fact that Oak Ridge’s prime role in the Manhattan Project was dismissed as not worth including in your MPNHP (Manhattan Project National Historical Park). If the people of future generations were to come away from that with an understanding that the main feature of this seminal 20th Century Project is the story of a few brilliant scientists building two bombs, it would be a distortion of the Manhattan Project’s history not in the tradition of the National Park Service whom the American public has come to trust to get our history straight.”

The letter goes on to say that: “To trivialize the accomplishments in Oak Ridge where several of the major Project mega buildings were built is unacceptable. In summary we believe that the National Park Service’s recommendation to the Congress that a single site park be established in Los Alamos is unacceptable and historically incorrect.”

These and many other comments from local citizens and Oak Ridge Site Specific Advisory Board members were aired during two open houses the Park Service held in Oak Ridge on January 26. Similar meetings were held at the other three study sites.

With closure of the public comment on March 1, the Park Service is now considering comments. No date has been set for a decision on how it will proceed. The study is still available on the Park Service’s website at <http://parkplanning.nps.gov/document.cfm?parkID=482&projectId=14946&documentID=30977>.



DOE, Regulators Wrangle Over Oak Ridge EM Budget, Milestones, and Priorities

Estimates to raze the K-25 Building nearing \$1 billion... a \$470-million-plus unfunded mandate from DOE-Headquarters for U-233 disposition... disputes with the state and EPA over regulatory milestones... a projected Environmental Management (EM) program FY 2011 funding level smaller than anyone would like to see. All are fueling intense discussions among DOE, its regulators, and the public.

With the \$755 million in American Recovery and Reinvestment Act (ARRA) funding earmarked for EM in Oak Ridge to be expended by the end of FY 2011, budget discussions have shifted from what can be done with that money to what should be done with the regular appropriations for FY 2011 and beyond.

Art Haugh, Director of the DOE Project Controls and Administration Office in Oak Ridge, briefed the Oak Ridge Site Specific Advisory Board at its February 10 meeting and prompted a lot of discussion.

According to Haugh, projected funding levels for Oak Ridge EM are \$436 million in FY 2010 and \$450 million in FY 2011. But general local sentiment is that Oak Ridge’s target funding should be at minimum \$500 million. This level of funding is needed to ensure consistent progress and allow DOE to achieve its regulatory milestones.

At current and projected budgets, the impacts on DOE projects will include a delay in K-25/K-27 project work, an additional three years delay in completion of work at East Tennessee Technology Park (ETTP) until 2018, and a delay in cleanup of soils and groundwater at Oak Ridge National Laboratory and Y-12 until 2018.

DOE is currently in an informal dispute with the state and EPA over its inability to meet its milestones associated with these and other projects, and the state has denied multiple requests to modify milestones associated with cleanup projects.

According to DOE’s Dave Adler, EM is engaged in dispute with the state and EPA on three projects: the K-1070-B Burial Grounds and the groundwater treatability study work plan at ETTP, and removal of the fuel salts from the Molten Salt Reactor Experiment.

John Owsley, who is the head of the DOE Oversight Division in Oak Ridge, explained the state’s position. “It was EM Headquarters that decided to give the U-233 project to Oak Ridge without funding, and the state considers its agreements with DOE to include DOE Headquarters. We signed up to a dispute resolution agreement in 2008 that said we would have a consistent level of funding for completion of cleanup of the Oak Ridge Reservation

(ORR). It is the state’s position that DOE is not complying with that particular dispute resolution agreement. Therefore the 2010 and proposed 2011 funding levels are not in agreement with dispute resolution.”

Further, he added, national funding for EM has risen since 2008 but not so for Oak Ridge, where funding has declined dramatically.

Owsley said that the state and EPA signed up to an accelerated closure agreement with DOE in 2002 that was to hasten the closure of ETTP at the expense of cleanup at Oak Ridge National Laboratory and Y-12, but yet now they’re being asked to do it again.

“History has shown that DOE has not utilized savings that have occurred by closing sites in the past to continue cleanup at other sites,” Owsley said. “The accelerated cleanup plan was based in part on the accelerated activity at Rocky Flats with the intention that those dollars from Rocky Flats would be spread among the other sites. That did not occur.”

Funding under ARRA prevented FY 2010 from being a financial disaster for the site, but much of this funding has been designated for use on projects that are not necessarily high priority cleanup in the opinion of the state and EPA. For example, instead of prepar-

ing the high-risk K-27 building for demolition, ARRA funding is being shifted to demolition of the lightly contaminated K-33 building.

Additionally, Oak Ridge’s EM budget

	National DOE-EM Budget	DOE-Oak Ridge EM Funding	Proposed DOE EM Budget for Oak Ridge	Difference from 2008
FY 2008	\$5.78 B	\$493 M		
FY 2009	\$6.016 B	\$499 M		+ \$6 M
FY 2010	\$6.047 B	\$436 M		- \$57 M
FY 2011	\$6.05 B		\$450 M	- \$43 M

A comparison of the DOE EM budget nationally and locally shows that the total EM budget has increased while the local budget has declined.

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Reservation Update

9735 Demolished at Y-12

Building 9735 at the Y-12 National Security Complex became the first building to be torn down at the plant employing funds from the American Recovery and Reinvestment Act (ARRA). Used as an engineering laboratory, 9735 was built in 1946 but hasn't been used since the 1990s. The 9735 site will be turned into a parking lot.



Building 9735 demolition at the Y-12 National Security Complex.

Demolition of 9735 completes the removal of a string of buildings in the area called Engineering Row. Six other units were taken down in 2008.

More than 1,900 cubic meters of waste were sent to the Y-12 sanitary and industrial waste landfills on Chestnut Ridge. About 31 cubic meters were sent to Nevada Test Site. The building contained asbestos and some minimal radiological contamination.

Work to come using ARRA money includes demolition of four Biology Complex buildings and the 9206 Filter House, disposition of legacy materials from Alpha 5 and Beta 4, cleanup of the Old Salvage Yard, and remediation of the West End Mercury Area.

K-33 Proposals Requested

DOE is requesting proposals to demolish the K-33 building at East Tennessee

Technology Park. ARRA money that was originally earmarked for pre-demolition work at the K-27 building will be used to take down K-33 to its slab. About \$90 million is available for demolition of the 2.8 million square-foot K-33. Some work continues at K-27 but with a shift in focus.

K-33 was decontaminated and emptied of its contents in 2005, and the hope was to find another use for the huge building, but that has not worked out. Proposals to demolish the building were due in March. A contract should be awarded in early April, with project completion set for September 2011.

Demolition of K-25 West Wing Complete

The west wing of the K-25 building at East Tennessee Technology Park is no more. The last part of that section of the building was pulled to the ground on January 20. "We are extremely



The last portion of the K-25 building west wing comes crashing down.

pleased to have gotten this portion of the project done," said Gerald Boyd, DOE-Oak Ridge manager. "The workforce has done a remarkable job."

The west wing made up 844,000 square feet of the 1.64 million square-foot behemoth. About 9,200 loads of demolition debris, 2,100 compressors, and 1,300 converters were shipped to the Environmental Management Waste Management Facility in Bear Creek Valley since demolition began in December 2008.

Pre-demolition work continues on the north and east wings, which includes removal of high-risk equipment; vent, purge, drain, and inspection activities; asbestos removal; and draining of lube oil and coolant.

Building 3026 Wooden Structure Demo Complete

One of the first facilities, if not the first, built to process radioactive materials at the X-10 Plant, now known as Oak Ridge National Laboratory, has been torn down. The 3026 building, constructed in the early 1940s, was built for processing radioactive products from the nearby Graphite Reactor.

The building was in poor condition and was collapsing on its own. ARRA money was used to take down the wooden structure and ship the debris to the Environmental Management Waste Management Facility. The remaining hot cells have been sealed and are awaiting final dismantlement and removal.

Recent Recommendations & Comments

The first months of 2010 were busy ones for the board as it finished studying three important issues and generated recommendations on them to DOE:

- Recommendation on the Preferred Alternative for the Removal of Hexavalent Chromium in Mitchell Branch at East Tennessee Technology Park (ETTP)
- Recommendation to Establish a Procedure for Specially Called Public Meetings
- Recommendations on the Environmental Assessment for the Transfer of Land and Facilities within ETTP and Surrounding Area

At its January meeting the board endorsed a plan by DOE to reduce the concentration of chromium contamination in Mitchell Branch, a stream that runs through the northern portion of ETTP. The stream has been impacted by hexavalent chromium, the source of which is unknown.

At its February meeting the board approved a recommendation to establish a procedure for specially called public meetings. Some members had felt that the board should play a more active role when special instances arise related to the Environmental Management (EM) Program, such as the strontium-90 spill on Highway 95 in 2004.

To address this concern, the board formulated a plan for calling special meetings of the board to provide a forum for public information and input when such instances arise.

The board considers DOE to have primary responsibility for notifying the public about such issues, and the procedure is not intended to replace that notification. Rather, it is intended as a supplemental process to provide an additional avenue for the public to learn

about the issue of concern, ask questions of appropriate DOE personnel, and express their views and opinions.

The board also weighed in at its February meeting on a proposed action for the conveyance of property located in and around ETTP.

DOE had prepared an environmental assessment to study the possible transfer of about 1,800 acres at ETTP for private use. The property includes the majority of the main ETTP plant area, Duct Island, Parcel ED-3, and several other areas. Potential uses for the land could include light to heavy manufacturing, storage, distribution, professional offices, and retail businesses.

In general the board agreed with the proposed transfer, with the exception of ED-3. The board felt that area should remain undeveloped.

Complete text of all recommendations can be found on the ORSSAB website at <http://www.oakridge.doe.gov/em/ssab/recc.htm>.

Two Positive Responses Received from DOE

During the first months of 2010 the board received positive responses from DOE on two previous recommendations: “Recommendation on the Fact Sheet for the Explanation of Significant Differences for the Record of Decision of CERCLA Waste” and “Recommendation to Endorse and Support a Stewardship Workshop.”

The positive response to the stewardship workshop recommendation was especially important to the board, as it has been ten years since the last national stewardship workshop was held.

When the mission of the DOE EM program is complete, it is imperative that perpetual stewardship plans and funding are in place to protect remediated waste-in-place sites basically forever. So in its recommendation to DOE the board asked that DOE endorse and support a stewardship workshop through active participation that includes representatives from EM and the Office of Legacy Management, the Site Specific Advisory Boards, and where possible, state and local governmental officials.

The response, which came from Assistant Secretary for EM Inés Triay, states: “I am pleased to report that DOE’s Office of Legacy Management plans to conduct a national stewardship conference in early November 2010 in Grand Junction, Colorado.

“Although the original focus of this conference was on closed DOE sites, the scope has been expanded to include long-term surveillance and maintenance issues at ongoing mission sites, including Oak Ridge. As such, this conference will now address issues of interest to members of the Environmental Management Site-Specific Advisory Board from across the complex.

“In addition to the Office of Environmental Management, the Office of Science and the National Nuclear Security Administration are expected to participate.”

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Join Us for the National SSAB Chairs Meeting

Wed., April 28, 8 am - 5:30 pm
Thurs., April 29, 8 am - 1 pm
DoubleTree Hotel in Oak Ridge

Joins us as representatives from the eight SSABs around the country meet with DOE officials to discuss common issues and concerns. Invited presenters include DOE Assistant Secretary for Environmental Management Inés Triay and other DOE officials. The draft meeting agenda is available on the Oak Ridge SSAB's website at www.oakridge.doe.gov/em/ssab. The meeting is open to all, and a public comment period will be provided on both days.

EM Program Budget *continued from page 5*

typically uses the prior fiscal year's appropriation as a starting point for calculating the site's needs. Hence, a low number tends to be perpetuated through following fiscal years, leading to non-compliant out-year budgets.

The state would also like to see more balance between demolition work and cleanup of environmental media, and EPA agrees. In a letter to DOE, the Director of EPA's Superfund Division in Atlanta wrote: "EPA is concerned that DOE ORR is placing too much emphasis on building demolition activities in lieu of contaminated environmental media cleanup. Significant levels of contamination in environmental media continue to migrate uncontrolled in groundwater and surface water, and in some cases beyond the boundaries of the ORR. This is viewed as a significant risk and should be addressed earlier than

what DOE Oak Ridge has recently indicated."

SSAB member Tim Myrick expressed a frustration common among the board members—that focusing EM work on ETTP leaves cleanup at the lab and Y-12 underfunded.

"To me," he said, "the real issue for the board is do we believe it's the right investment? If it's going to take ten more years to finish ETTP, can we wait that long to get at some of the other problems when all we're going to do in the meantime is tear down these old buildings?"

DOE-Oak Ridge will submit its FY 2012 budget request to Headquarters in mid-April. The SSAB intends to draft a recommendation on that request at its April meeting.

Oak Ridge Site Specific Advisory Board
P.O. Box 2001, MS-7604
Oak Ridge, Tennessee 37831

UPCOMING MEETINGS

Meetings are held at the DOE Information Center, 475 Oak Ridge Turnpike, Oak Ridge

Board Meetings

- April 14, 6:00 pm – Remediation Effectiveness Report
- May 12, 6:00 pm – Cumulative Aspects of Waste Processors

Committee Meetings

- April 20, 5:30 pm – Stewardship
- May 18, 5:30 pm – Stewardship
- May 19, 5:30 pm – Environmental Mgmt.