Advocate

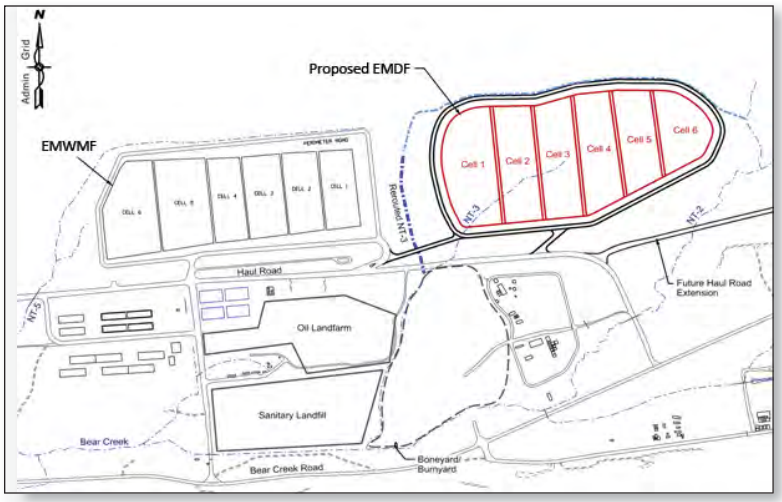
A publication of the Oak Ridge Site Specific Advisory Board – a federally appointed citizens panel providing independent recommendations and advice to DOE's Environmental Management Program

DOE Encourages ORSSAB to Provide Input on a Second Waste Disposal Facility for the ORR

The waste disposal facility on the Oak Ridge Reservation (ORR), commonly known as the Environmental Management Waste Management Facility (EMWMF), is expected to be filled to capacity sometime in FY 2023. But because the Department of Energy's (DOE) Oak Ridge cleanup mission has been expanded since EMWMF was conceived in the mid-1990s, a second disposal facility is needed to take the additional estimated 2.5 million cubic yards of material.

The extra waste will come primarily from cleanup work at Oak Ridge National Lab (ORNL) and Y-12 National Security Complex.

The need for a second waste disposal facility has been discussed at meetings of the Oak Ridge Site Specific Advisory Board (ORSSAB) and its committee meetings for some time, but a formal remedial investigation/feasibility study (RIFS) was submitted to the Environmental Protection Agency (EPA) and the Tennessee Department of Environment and Conservation (TDEC) for review in September 2012. EPA and TDEC provided extensive comments on the document, and DOE submitted a revised version in June 2013 (DOE/OR/01-2535&D2). At the February meeting of ORSSAB's EM & Stewardship Committee, Dave Adler, the board's Alternate Deputy Designated Federal Officer, said there are two major decisions to make. "Should DOE continue with planning assumptions to finish cleanup of the ORR, and if the answer is 'yes' what is the best site for a new waste disposal facility to handle the additional waste?" He said ORSSAB's input on these questions is encouraged. "How to manage waste is the core of our planning for the balance of cleanup," he said.



The preferred site of the EMDF is just east of the EMWMF.

DOE continues to work with EPA and TDEC in resolving comments, and there are enforceable milestones to produce a proposed plan and record of decision about building a second facility.

At the January ORSSAB meeting, Laura Wilkerson, DOE Portfolio Federal Project Director for Y-12 Projects, said the RIFS presents three disposal alternatives for future waste generation:

- No action
- On-site disposal
- Off-site disposal

Under the 'no action' alternative, Wilkerson said there would be no ORR-wide coordinated disposal strategy and waste disposal would be determined on an individual project basis. On-site disposal would be in a new facility similar to EMWMF. Off-site disposal would ship waste to approved facilities like the Nevada National Security Site or Energy Solutions in Utah.

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"'No action' does not support timely and efficient cleanup," said Wilkerson. While she said both on-site and off-site disposal support timely cleanup and are protective of human health and the environment, both have advantages and disadvantages.

On-site

- Permanent commitment of land for waste disposal and some resulting environmental impact
- Lower lifecycle cost - about $817 million
- Requires a record of decision in FY 2016 to have a facility ready by 2023

Off-site

- Could isolate waste more effectively in arid climates with fewer receptors
- Reliance on off-site facilities introduces uncertainty
- Higher transportation costs
- Higher overall cost – about $2.4 billion

While a final decision on whether to build a second facility has not been made, the RIFS evaluates possible sites. When a similar RIFS was done for EMWMF, 35 sites across the ORR where evaluated. Three made the final cut, all in Bear Creek Valley just west of the Y-12 industrial area.

The current RIFS is being developed by Pro2Serv, a technical and engineering services firm with corporate offices in Oak Ridge. Susan DePaoli, Pro2Serv's project manager, discussed the RIFS in more detail at the February EM & Stewardship meeting.

The RIFS for the proposed new facility, being called the Environmental Management Disposal Facility (EMDF), reevaluated 14 of the original 35 sites. The selections were narrowed again in the D1 version of the RIFS to two sites in Bear Creek Valley, areas known as the White Wing Scrap Yard and West Bear Creek Valley. In comments on the D1 version of the RIFS, DePaoli said EPA and TDEC requested that East Bear Creek Valley be considered because White Wing Scrapyard and West Bear Creek Valley are in areas designated for future unrestricted use. East Bear Creek Valley is the site of EMWMF and several other old disposal sites and is zoned for controlled industrial use.

The D2 version of the RIFS presents four possible options in East Bear Creek Valley. Options 1, 2, and 4 are between EMWMF and the Bear Creek Burial Grounds, which holds a large amount of depleted uranium. In fact, Option 2 overlaps some of the burial grounds, the main reason that option is not considered viable. Options 1 and 4 are also not recommended because they either require significant ground preparation or do not provide enough space for needed capacity.

Option 3 is the preferred site. It lies just east of EMWMF. The approximately 90 acres is enough space for sufficient capacity and can make use of existing support facilities for EMWMF. It also has favorable topography, no karst (geologic formations characterized by sinkholes, caves, and underground drainage systems), and can be engineered to handle site hydrology.

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ORSSAB and Public Were Involved in the Siting of EMWMF

When discussions were underway about building the EMWMF, ORSSAB was actively involved in the conversation, but that was almost two decades ago. So a brief review of what happened then might be of interest.

One of the board's early recommendations in 1997 was to encourage DOE to provide more opportunities for public participation in remediation decision making. That recommendation likely facilitated significant public discussion about building EMWMF.

Closely following on that recommendation, the board (then known as the ORREMSSAB) recommended that the White Wing Scrap Yard be eliminated as a possible site. The board's reasoning was that it would 'contaminate an un-impacted site,…cause ecological fragmentation of the ORR…, and require expensive characterization.'

EMWMF began receiving waste in May 2002.

In March 1998 the board recommended that 'when planning an ORR waste disposal facility [it] should be located on or adjacent to an area that is contaminated and previously used for long-term waste disposal.' The board felt that East Bear Creek Valley was the most appropriate location.

The lead story of the November *Advocate* said that 'an on-site waste management facility for the ORR was closer to reality with the release of a proposed plan.' It describes the conceptual plan for the facility, very similar to the one for the proposed EMDF. The article mentions that DOE

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Reservation Update

Final Load of Debris Shipped from K-25 Demolition Site

The last truckload of debris from the K-25 Building demolition project was shipped from ETTP on March 11.

Demolition of K-25 was one of the highest priorities of the DOE Oak Ridge EM program.

Wastes that have been hauled from the site include 6,000 compressors, 3,000 converters, 187,000 cubic yards of steel, 3,800 miles of electrical conductors, and 44,445 cubic yards of asbestos insulation.

Jim Kopotic, ETTP Portfolio Federal Project Director, rides in the truck hauling the last load of debris from the K-25 demolition site.

Problems Underground Force WIPP Closure

It has not been a good year so far for the Waste Isolation Pilot Plant (WIPP) in New Mexico. The facility near Carlsbad accepts defense-related transuranic (TRU) waste from DOE installations across the country, including the TRU Waste Processing Center in Oak Ridge.

Contact-handled and remote-handled TRU waste containers are stored in salt caverns 2,150 feet below the surface.

On February 5, a truck that carries salt underground caught fire. The facility was evacuated immediately, although six workers were treated for smoke inhalation.

A few days later a monitor detected levels of radiation underground. DOE began sampling areas on the surface for any indication of radioactivity, but found none at the time.

Then on February 19, trace amounts of americium and plutonium were detected on the surface at a sampling station off the WIPP Access Road.

On February 27 it was announced that 13 workers had been exposed to radiation. DOE later said that the samples taken from the workers came back negative, but the samples were sent to the Centers for Disease Control for verification.

For now WIPP remains closed and waste already received is being stored temporarily above ground. New waste shipments are on hold until the situation is resolved.

The TRU Waste Processing Center continues to process waste containers for eventual shipment to WIPP, but management is evaluating potential impacts.

Oak Ridge Cleanup Budget for FY 2014 Is More Than Expected

The DOE Oak Ridge Office of EM has received its budget appropriation for FY 2014, and it's good news. The President had requested $413 million for Oak Ridge cleanup work. But despite recent trends of declining appropriations, Congress saw fit to provide $430 million, $17 million more than requested and $27 million more than the FY 2013 appropriation.

That figure represents a total for two different funds – defense and D&D (decontamination and decommissioning). Defense funding projects include uranium-233 disposition from ORNL, ORNL/Y-12 waste operations and surveillance and maintenance, and other waste disposition work. The D&D fund is for taking down buildings at ETTP and disposing of debris.

The defense fund totals $234 million, up $31 million from FY 2013. The D&D fund is $4 million less than FY 2013, but that's not necessarily bad. "It's what we requested," said Tammy Blaine, Team Leader of the Science, Research and Environmental Management Team.

Blaine said an increase for ORNL/Y-12 waste operations included a $4.6 million appropriation for the Outfall 200 mercury reduction project at Y-12.

There was also $4 million remaining from Recovery Act funding from 2009, which will be used over the next few months.

In early March, the President submitted his FY 2015 budget request to Congress. The request for Oak Ridge EM funding is $385 million.

Currently work is being done on the FY 2016 budget request, and Blaine said the request could be influenced by the President's FY 15 budget. "Our next big step is evaluating the president's FY 15 budget," she said, "but we are planning another public workshop on the FY 16 budget request."

DOE Awards Contract for Mercury Project at Y-12

DOE Oak Ridge EM has awarded a task order to Strata-G, a Knoxville-based small business, to collect data and perform characterization at Outfall 200, the proposed site for the mercury water treatment facility at Y-12.

The task order is the first project within a five-year, multi-phase contract estimated at $15 million.

Strata-G will collect data about the soil and existing structures near Outfall 200 and provide a sampling and analysis plan to DOE by July 2014.

The information will help determine the number and location of samples and the appropriate removal and disposal actions when cleanup activities begin. Strata-G also will develop a plan to determine the geotechnical properties of the area to aid in the design of the mercury water treatment facility.

DOE Issues Status Report on Historic Preservation Efforts at ETTP

Although the K-25 Building at ETTP is gone, efforts to preserve its historical significance continue.

In early February, DOE provided a status report for historic properties at ETTP. A memorandum of agreement for interpretation of historic properties at ETTP includes a number of stipulations on actions to preserve the history of the K-25 Gaseous Diffusion Plant. The report provides the status of each stipulation. Following are updates on some of the significant provisions:

- Selection of a professional site design team and museum professional – From a field of five bidders, DOE has selected Mark B. Thompson Associates LLC of Philadelphia, Pa., as the site design team and museum professional Steve Feldman Design LLC of Bethesda, Md.
- Retention of the K-25 slab – The slab was retained throughout the demolition. Evaluation of the slab will be done now that debris removal is complete. It's anticipated that some mitigative measures will be required on the portion of the slab where technetium-contaminated sections of K-25 stood.
- Equipment and artifact inventory and review – Previously collected equipment and materials are maintained, but many of the stored items are contaminated or are considered Export Control or Unclassified Controlled Nuclear Material. To determine what equipment may be available for display, the historic preservation project team is working with appropriate classification, property management, and radiological control personnel. The report notes that the use of authentic equipment will be a challenge because of radiological and security concerns.
- K-25 Virtual Museum – The procurement process for a web design firm was put on hold until the selection was made for a professional site design team. Work has restarted on the process and an award is expected to be made in April.
- Grant for the purchase and stabilization of the Alexander Inn – DOE provided a grant of $500,000 toward the purchase and stabilization of the Alexander Inn near Jackson Square in Oak Ridge. In May 2013 Family Pride Corporation purchased the building and began renovating it for use as an assisted living facility. Construction was halted in November 2013 while the National Park Service reviewed modifications to the original proposal. The park service has approved the changes and work is expected to resume soon.

DOE provided a half million dollars to purchase the Alexander Inn, formerly the Guest House, as part of K-25 preservation efforts.

Snapshot in History

Nov. 1942- Feb. 1943

J. Robert Oppenheimer reports from Berkeley that it may take up to twice the amount of fissionable material as originally estimated to produce a bomb. Deuterium (heavy hydrogen) is proposed as an alternative fusion source material due to being relatively more abundant than uranium and plutonium.

In December, Enrico Fermi's massive lattice pile of graphite and uranium achieves the first self-sustaining chain reaction, operating initially at a one-half watt power level; 200 watts is achieved 10 days later.

President Roosevelt authorizes building full-scale gaseous diffusion and plutonium plants, a small electromagnetic plant and a heavy water production facility. The goal is to produce a bomb in early 1945.

In February, groundbreaking for the X-10 plutonium pilot plant takes place and construction of the Y-12 electromagnetic plant begins.

Board Member Files Report on the Waste Management Symposia 2014 in Arizona

by Belinda Price

In early March I attended the 2014 Waste Management Symposia in Phoenix, Ariz. The conference focuses on the management of radioactive materials and related topics.

The keynote speaker for the opening luncheon was Kazuhiro Suzuki, Executive Director of Japan's International Research Institute for Nuclear Decommissioning. He provided an update on the status of the Fukushima Daiichi cleanup program, saying it will take 30-40 years to complete the decommissioning. Major challenges include:

- Handling, containing, storing and treating contaminated wastewater,
- Managing groundwater to prevent it from flowing under the site and becoming contaminated,
- Safe removal of the spent fuel rods and contaminated debris, and
- Demolition and disposal of the damaged reactor buildings.

Suzuki noted that in addition to the environmental and human/social impacts, the incident at Fukushima has contributed to an increase in anti-nuclear sentiment in Japan which is affecting the political landscape.

Over the next few days I attended sessions on a variety of topics. I have highlighted a few that I think are potentially relevant or interesting to the ORR community.

Engaging Citizens - Lessons Learned from Around the World focused on waste management from nuclear power generation. The speakers came from Sweden, the United Kingdom, France, Canada, and Slovenia. One paper discussed improving the credibility and confidence with the public of using deep "hard rock" geological disposal facilities for spent nuclear fuel.

Another paper focused on the ethical principles of management of high-level spent nuclear fuel and noted that a permit application for a geological repository in Sweden recently submitted was 10,000 pages long.

The speaker discussed the problem of providing the information accurately and in a manner that municipalities and citizens can properly evaluate and provide informed consent.

Innovative Field Monitoring for Environmental Remediation included one paper that addressed the question of "how many samples are needed, from where, and what level of analytical quality is needed." The paper noted that field analytical instruments provide quick results and provide cheaper data than taking samples and sending them to a laboratory. As a result, more samples can be gathered with lower quality control or fewer samples with higher quality control. The speaker concluded that insufficient sampling has the most risk.

Another session that I particularly enjoyed was on *Groundwater Remediation Projects*. Several papers presented work being performed at the Hanford site, in particular successful efforts to protect the surface water of the Columbia River. One paper discussed identifying the specific contaminants that are risk drivers so that appropriate analytical methods are used to ensure comparison with regulatory limits.

Another paper identified optimization efforts of a waste water treatment plant where a change in the resin used to remove hexavalent chromium has resulted in saving the program $6 million since 2010.

The last paper discussed the involvement of two communities in the Port Hope area, Ontario, Canada, in determining a solution to disposing of waste materials from the processing of radium and uranium from the 1930s through the 1940s.

A final disposal location was needed, and, because of community resistance elsewhere, it was determined that local encapsulation was the appropriate disposal method.

The design concept included substantial involvement with the two affected communities. One community is rural, and it opted for an encapsulation facility that blended into the background. The second community is urban, and it opted for the facility to be visible to show pride in being part of the solution. Construction is ongoing at both facilities.

I attended the panel discussion on *U.S. DOE Office of Legacy Management (LM) - A Vision*. This discussion was relevant because sometime in the future when the environmental cleanup is completed in Oak Ridge, LM will be in charge of the long-term stewardship.

The panel presented a historical perspective and future direction of the mission LM was given. The program has five goals:

1. Protect human health and environment;
2. Preserve, protect, and share records and information;
3. Meet commitments to the contractor workforce;
4. Optimize the use of land and assets and;
5. Sustain management excellence.

It was noted that LM's responsibility is increasing as remediation is completed at DOE sites and they move to long-term stewardship.

Board Member Scott McKinney Appreciates Work of Early Boards

ORSSAB member Scott McKinney's interest in the board is the result of growing up in Oak Ridge and knowing its history. "My grandfather retired from K-25 and my dad was a glassblower at X-10 (now ORNL)," he said. "So being born and raised here I was aware of the important work being done at the plants and the unique challenges that are faced.

"Many of my research reports in high school and college were about nuclear reactors. As I worked my way through engineering at the University of Tennessee, I became interested in environmental issues, so I decided to pursue a bachelor of science in civil engineering with a concentration in environmental science.

"When I moved back to Knoxville I thought serving on the board would be a good way to re-engage with what's going on in the community." Scott joined the board in 2011 and currently serves as the chair of the Public Outreach Committee.

After graduation from college, Scott worked six years for IT Corporation. He then moved to Annapolis, Md., and founded his own company, Quality Environmental Solutions. "We did oil and gas compliance work, assessments, and remediation." His company had a large contract to remediate the areas around the Baltimore Harbor. "That was the primary departure point for fuel and oil to supply the European Theater in World War II," he said. "That left quite a legacy of waste to clean up."

While at Quality Environmental Solutions he pioneered a technology using bar coding to locate monitoring

wells in the field. "In those days before GPS it was sometimes difficult to accurately identify monitoring wells using maps. We'd put bar codes on them and then the bar code reader would identify the well and provide other important details."

Scott sold his company after two years and went to work for Groundwater & Environmental Services, Inc., where he's been employed for 20 years. His work takes him all over the world. "I travel about 50 percent of the time. Mostly I do corporate-type work, but I still manage to stay closely engaged with a few global oil and gas clients."

Scott places much importance on the early work of the board and the responsibility subsequent boards have in maintaining that foundation. "I think the heyday of the board was in the early years," he said. "What we're doing now is a lot of maintenance of what was done before us. There was a lot of impressive work done by those early boards, and that has put us in a stewardship-type mode. I think that is appropriate, but there is still a lot of work to do," he says.

"Stewardship is going to be our legacy to make sure DOE continues to do what it is supposed to do," he says. "Priorities change and we need to be here as a constant reminder. It's healthy to have citizen balance of what's being done."

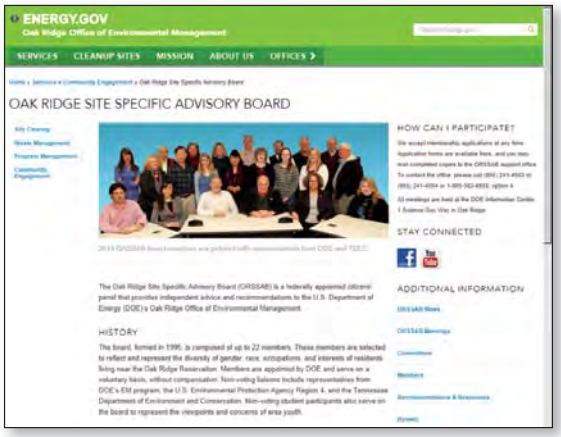
Scott and his wife Debby live in Farragut with their daughters Carsen, 17, and Bailey, 16.

ORSSAB Website Changes Look/Location

ORSSAB's website has a new look and a new location.

During the last few months, ORSSAB support staff has been working with the DOE Oak Ridge Public Affairs Office to migrate ORSSAB's current website.

The move and new appearance is more consistent with other DOE-related web pages, and it allows greater collaboration and sharing with the new Oak Ridge Office of EM website http://energy.gov/orem.



You can access the new ORSSAB site by typing http://energy.gov/ORSSAB in your internet browser. From there, you can access news, social media, calendar events, presentations, meeting minutes, board member information, and recommendations.

Public Environmental Survey Gathers Input on Cleanup Issues

Each year ORSSAB conducts a survey of people who live in communities surrounding the ORR to hear their concerns about ongoing environmental cleanup projects and activities that will need to be addressed by the DOE EM program in the future.

This year's survey was conducted in January, and the results were provided to the board's Executive Committee and DOE.

The table below shows the ranking of responses to the question of which cleanup issues are most important (the lower the Average Rating score, the more important the issue is). A large number of comments were also supplied by survey respondents regarding other issues they think the EM program should look into.

The survey is available and can be submitted any time through the SurveyMonkey website at www.surveymonkey.com/s/WDFWPHS.

Issue	Average Rating
Reduction of contamination being able to leave DOE property via groundwater	2.07
Long-term care (stewardship) of radioactive contamination left in place, and waste placed in the DOE environmental cleanup program's disposal facility	2.54
Demolition of buildings and facilities at Oak Ridge National Laboratory and Y-12 that are no longer necessary	4.37
Cleanup of Bear Creek Burial Grounds	4.57
Economic development at East Tennessee Technology Park (re-industrialization of the site)	5.02
Transportation of radioactive and chemically contaminated waste on public roads and highways	5.24
Historic preservation at the U.S. National Security Complex (Y-12), Oak Ridge National Laboratory, and/or the East Tennessee Technology Park	5.36
Educating area students and the public at-large about the history of the DOE Oak Ridge Reservation and contamination that exists and may remain at the site	5.64

ORSSAB/Public Involved in Siting EMWMF

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had sponsored a number of public workshops on waste disposal options, just as the board had recommended.

In March 1999, the board issued its recommendation supporting the construction of a facility in East Bear Creek Valley, but made some specific recommendations on the waste acceptance criteria.

Finally in July 1999, the board issued its comments on the D1 version of the record of decision that authorized building the EMWMF.

Construction began in January 2001, and the first load of waste was delivered in May 2002.

The July 2003 edition of the *Advocate* reported on groundwater challenges at the site. That year 80 inches of rainfall had been recorded to date, 60 percent above average. As a result, groundwater levels were getting much too close to the base of the liner. A decision was made to install an underdrain at Cell 3 to alleviate the problem. The proposed EMDF has an engineered underdrain system as part of the preliminary design.

In May 2005 construction began on a haul road from East Tennessee Technology Park (ETTP) to EMWMF. The project was prompted by accidental leakage of radioactive material from a truck on Highway 95, resulting in decontamination and repaving of sections of the highway. The haul road was completed in early 2006.

Over the years EMWMF has been expanded to meet its maximum allowable capacity. Completion of Cells 3 and 4 in 2005 increased disposal capacity to 1.2 million cubic yards. Construction of Cell 5 was completed in May 2010 that expanded EMWMF to 1.7 million cubic yards. The final expansion was completed in early 2011 bringing total capacity that can be disposed at that location to 2.2 million cubic yards.

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EMDF

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DePaoli said no matter where EMDF may be built in any of the four option areas, an underdrain system must be built to handle discharges from seeps, springs, and surface water. She said the underdrain system will require a waiver of a TDEC rule that prohibits the discharge of groundwater to the surface in a disposal area.

But a designed underdrain system would be consistent with what was done at EMWMF after that facility was built. The plan also calls for a French drain around the north side of EMDF that would channel water coming from Pine Ridge to the north.

The overall conceptual design for the EMDF calls for it to consist of six cells, each one going a bit higher in elevation and separated by berms. There would be a geologic buffer of native compacted clay soil 5 to 10 feet thick, which would help suppress the groundwater table below the EMDF. The buffer would be covered by a 3-foot thick liner of multiple layers of synthetic and natural materials and include a leachate collection drainage layer.

Waste would go over the liner, and, when filled, the EMDF would be capped with a 13-foot cover consisting of several natural and synthetic layers to prevent infiltration and erosion. The top 5-foot erosion control layer would be a soil/rock mix that would provide a medium for plants and grasses.

What will go in EMDF? Much the same type of material that goes in EMWMF – old equipment with low levels of contamination and demolition debris.

Adler said waste material will be reused or recycled where possible to reduce the volume of waste going in EMDF. "There is a possibility some so-called 'clean' waste could go in the sanitary landfills on Chestnut Ridge just south of Y-12," he said. "Any waste that doesn't meet the waste acceptance criteria for any of the ORR disposal sites will be shipped off site to Nevada or Utah."

The next steps are for DOE to work out comments on the RIFS with EPA and TDEC, receive input on the proposed EMDF from ORSSAB, and then develop a proposed plan, which will lead to a record of decision to build a second disposal facility, if that is what all interested parties agree is the thing to do.

Oak Ridge Site Specific Advisory Board
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ABBREVIATIONS

DOE — Department of Energy
EM — Environmental Management
EMDF — EM Disposal Facility
EMWMF — EM Waste Management Facility
ETTP — East Tennessee Technology Park
ORNL — Oak Ridge National Lab
ORR — Oak Ridge Reservation
ORSSAB — Oak Ridge Site Specific Advisory Board
Y-12 — Y-12 National Security Complex

UPCOMING MEETINGS

All meetings are held at the DOE Information Center, 1 Science.gov Way, Oak Ridge, Tenn.

Board meeting
April 9, 6 p.m., topic: Mercury Strategy for the Oak Ridge Reservation.

Committee Meetings

EM & Stewardship — April 16, 6 p.m., topic: Review of the Remediation Effectiveness Report

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