

WASTE MANAGEMENT CONFERENCE

Recurring themes: Old and new challenges

The theme of the 39th annual Waste Management Conference (WM2013), held February 24–28 at the Phoenix Convention Center in downtown Phoenix, Ariz., was “International Collaboration and Continuous Improvement.” Presented by WM Symposia, WM2013 featured more than 500 papers and 124 technical sessions and panels. The technical program was complemented by an extensive exhibit showcasing products and services related to the nuclear waste management industry.

The conference opened with a plenary session focusing on current and projected issues facing waste management. The first speaker was Commissioner William Ostendorff, of the U.S. Nuclear Regulatory Commission. One of the biggest challenges the nation faces in managing its nuclear waste is



Ostendorff noted that the NRC is still awaiting a court ruling on a writ of mandamus suit that seeks to compel the NRC to continue its work reviewing the Department of Energy’s license application for a repository at Yucca Mountain.

Ostendorff also discussed the NRC’s ongoing environmental review of its Waste Confidence Decision and rule, which underpin the agency’s regulations for the on-site storage of spent nuclear fuel and high-level waste. The waste confidence rule, which was used to satisfy the NRC’s obligations under the National Environmental Policy Act in the agency’s review of applications for new reactor licenses, license renewals, and independent spent fuel storage

While its theme was international collaboration, the 2013 Waste Management Conference provided the DOE an opportunity to highlight U.S. efforts to address radioactive waste.



Welcoming attendees at the opening plenary session of the 39th annual Waste Management Conference were (from left) WM Symposia President James Gallagher, NRC Commissioner William Ostendorff, Natural Resources Canada’s Uranium and Radioactive Waste Division Director Dave McCauley, EM Senior Advisor Dave Huizenga, and WM Symposia Chairman Fred Sheil.

installation licenses, was vacated by a federal court in June of last year and remanded back to the NRC for review. Ostendorff said that the current incarnation of the rule, which holds that used fuel and high-level waste can be stored on site at nuclear power plants indefinitely, reflects the reality that the establishment of a final waste repository is beyond the control of the NRC.

Following the court order, the NRC suspended any final decisions on licenses that depend on the waste confidence rule and created the Waste Confidence Directorate to oversee the drafting of a new waste confidence environmental impact statement and rule. Ostendorff said that he is pleased with the progress the directorate is making and is confident that it can meet the re-

quirements of the court remand in the two-year time frame designated by the NRC.

Next, Dave McCauley, director of Natural Resources Canada's Uranium and Radioactive Waste Division, discussed Canada's involvement in nuclear energy and waste management, describing the country's nuclear industry as "self-sustaining."

McCauley highlighted the work of Canada's Nuclear Waste Management Organization (NWMO), which was established in accordance with the 2002 Nuclear Fuel Waste Act and tasked with assuming responsibility for the long-term management of the country's used nuclear fuel. In 2007, NWMO developed an adaptive phased management plan that initiated a process for seeking a voluntary community to host a used nuclear fuel repository. McCauley said that NWMO's proposed deep geologic repository facility represents a Can\$16-billion to Can\$24-billion investment in national infrastructure.

McCauley also provided an overview of the challenges posed by Canada's legacy low-level radioactive waste, 90 percent of which is located in the area of Port Hope, Ontario. That waste, the result of past radium and uranium processing, is being remediated by the Port Hope Area Initiative. Meanwhile, Canada's Nuclear Legacy Liabilities program is making progress in the decommissioning and site restoration of the country's nuclear research facilities, McCauley said.

Last to speak was David Huizenga, senior advisor in the DOE's Office of Environmental Management (EM), who began his talk by noting the recent news regarding the Government Accountability Office's removal of the bulk of EM's projects from its list of high-risk projects. Huizenga said that while the department is quite proud of that fact, projects at the DOE's Hanford, Savannah River, and Oak Ridge sites remain on the GAO's high-risk list.



Huizenga

Among the most pressing challenges facing EM, Huizenga said, is the ongoing effort to complete the construction of the Waste Treatment and Immobilization Plant (WTP) at the Hanford Site, which is being built to process and vitrify the majority of the 56 million gallons of radioactive and chemical waste at the site. Huizenga noted that much of the challenge stems from the fact that wastes from different reprocessing methods were combined in underground tanks and were allowed to sit for some 50 years.

The bad news, Huizenga said, is that there are technical issues concerning the WTP. Issues involving waste mixing and

equipment erosion and corrosion have "been plaguing us for years," he said. The good news is that the department is making progress, he said, referring to the recent ramping up of construction activity at the facility.

Huizenga also mentioned the much-publicized news of the Hanford tanks that have been found to be leaking waste. He said that EM has been tracking the liquid levels in the tanks for some time and that those levels have always been within the DOE's "error bars." But when they looked at the data covering a longer period of time, he said, they found a noticeable downward trend in the liquid levels. The lesson learned, Huizenga said, is that the DOE needs to pay closer attention to all the data that it collects.

The DOE's limited budget, Huizenga said, will make it difficult for EM to carry out its mission, but the department will find ways to work smarter. "Cleaning up the Cold War legacy [material] is a moral imperative," he declared.

Hot topics in EM

The Department of Energy's Office of Environmental Management (EM), which is responsible for the largest environmental cleanup program in the world, is a model for other nations dealing with nuclear waste remediation, so the panel discussion titled "Hot Topics in U.S. DOE Environmental Management" was bound to generate interest. Featuring senior EM managers, the panel covered some of the more pressing issues EM is facing, while also highlighting its recent successes and future goals.



Gilbertson

The first speaker, Mark Gilbertson, deputy assistant secretary for EM's Office of Site Restoration, noted that the overarching challenge EM faces in the post-Recovery Act, sequestration environment is operating with a reduced budget. "That budget is just not where we want it to be overall," Gilbertson said, "so our challenge as we move forward is to continue to reduce the life-cycle costs." The key to that, he said, is using new and innovative technologies, leveraging the work of the national laboratories, and learning from other countries. "The challenge of funding provides us with an opportunity to do things in

a different kind of manner," he said.

As one example of how EM is taking advantage of new technology and leveraging the work of the DOE labs, Gilbertson pointed to its efforts to remediate extensive mercury contamination at the Oak Ridge Site in Tennessee. Partnerships with the DOE's Office of Science and Oak Ridge National Laboratory have led to the identification of the mechanisms by which mercury is metabolized by organisms into the more toxic

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methylmercury, which may lead to new, innovative methods for treating mercury waste, he said.

In addition to working with other areas within the DOE, Gilbertson said, it is important for EM to share lessons learned among its own sites, including conducting peer reviews to see how things are done at each site. "The 'not-invented-here' syndrome is alive and well in our stovepipes of excellence at EM," he said. "That is one of the things we need to work on as we move forward: to try to learn from each other so we can do things more efficiently."

As for EM's recent successes, Gilbertson pointed to the closure last year of Tanks 18 and 19 at the Savannah River Site. The successful closure of those tanks demonstrates that EM can and does close legacy waste tanks, he said.

The subject of waste tanks was taken up next by Ken Picha, deputy assistant secretary for Tank Waste and Nuclear Materials Management, who noted that 40 percent of EM's budget is spent on tank waste and nuclear materials.



Picha

900 000 gallons at the Idaho Site.

Picha said that EM's goal this year is to clean out the waste from five tanks located at the Savannah River and Hanford sites. To expedite the achievement of that goal, he

"We have a big chunk of the pie, and we have a big chunk of the risks," he said, pointing out that there are currently about 36 million to 37 million gallons of tank waste at Savannah River, about 55 million gallons at Hanford, and

noted, EM formed the Tank Waste Corporate Board—similar to EM’s corporate board for transuranic (TRU) waste—which will set high-level strategies for addressing tank waste. According to the DOE, the tank waste board was originally formed in the 1990s and was reconvened last year after EM was reorganized. Picha said the board was to meet again in March at Savannah River.

Regarding the DOE’s inventory of tank waste, Picha said that in general, over 90 percent of the curies are contained in only about 10 percent or less of the waste volume, which will be disposed of in the form of glass or some other material at a geological repository when one becomes available. Approximately 90 percent of the volume of the tank waste—that portion containing less than 10 percent of the curies—will be disposed of on site at Savannah River and Hanford.

Turning to the subject of nuclear materials, Picha said that EM’s goal is to process 20 kg of surplus non-pit plutonium to provide feed material for the National Nuclear Security Administration’s MOX Fuel Fabrication Facility at Savannah River. Also, he said, EM hopes to process 1.2 metric tons of sodium reactor experimental fuel and aluminum-clad fuel at Savannah River. “I think we’re on track to do both of those,” he said.

Frank Marcinowski, deputy assistant secretary for Waste Management, was the next to speak, and he focused his talk on the progress EM has made in removing and disposing of waste, particularly TRU waste, from the DOE sites.

Pointing to efforts to remove TRU waste from the Los Alamos National Laboratory site, Marcinowski said that the program there “has really hit its stride.” Following the Las Conchas fire of 2011, which encroached on the lab’s lands, the DOE stepped up its efforts to remove TRU waste from the site. This, Marcinowski said, was the right thing to do. “It’s been really productive,” he said.



Marcinowski

“It’s moving in the right direction, and we’re actually seeing the waste get off the mesa there.” As for dealing with the challenges of disposing of radioactive waste, Marcinowski said that he thinks there are opportunities for maximizing the use of the Waste Isolation Pilot Project facility in New Mexico, as well as the government’s waste facilities at the Nevada National Security Site. “We need to continue to do things safely and certainly compliant with any of the regulation requirements that we have,” he said, “but I think there are opportunities if we just keep looking for them.”

Turning from the nitty-gritty of waste

management to the subject of safety and security, Matthew Moury, deputy assistant



Moury

secretary for Safety, Security and Quality Assurance Programs, talked about EM’s efforts to improve safety, with the goal of zero accidents complex-wide. Noting that safety culture has received a lot of attention lately, Moury said, “The key to a strong safety culture is establishing strong leadership behaviors.” To improve safety at its sites, he said, an EM team has to date trained more than 700 senior DOE and contractor managers. “Not just on a safety-conscious work environment, but on leadership for a safety-conscious work environment, to strengthen the safety culture,” he said.

The challenge of maintaining a strong safety culture, Moury said, is to not be distracted from keeping safety a priority. As an example, Moury related a story of a young U.S. Marine undergoing training. The Marine had to clean a rifle while surrounded by drill sergeants who were yelling at him, trying to distract him from the task. Moury said that such things as budget issues, sequestration, schedule pressures, and leaking tanks are all trying to pressure and distract the department and its contractors. “So we must resist that pressure, to keep safety as our overriding priority.”

Moury also said that EM is paying more attention to security, “and it’s not just been on the NNSA side,” he said. “It’s also been on the EM side.” He added that EM will be doing cybersecurity assist visits at all of its sites.

The DOE in 2020

A theme that permeated the discussion during the panel session “Future Vision: A View of What the U.S. DOE Complex Will Look Like in 2020” was asset revitalization—how the Department of Energy is redeveloping its Cold War legacy sites with the help of local communities, organizations, and the private sector.

The subject of asset revitalization was addressed by the panel’s first speaker, Tania Smith, program manager and task force leader for the DOE’s Asset Revitalization Initiative (ARI). According to Smith, ARI “is a DOE-wide effort to advance the bene-

ficial reuse of our unique and diverse mix of assets.” Those assets include not only DOE land and facilities, she said, but also equipment, technologies, natural resources, and a highly skilled workforce.

Smith gave a number of examples of DOE revitalization initiatives, including a “very robust work-for-others program” at Los Alamos National Laboratory that helps



Smith

move technologies from the lab to the marketplace; a photovoltaic solar project at the Durango mill tailings disposal site in Colorado; and a new National Nuclear Security Administration contract to build an 11.5-MW wind farm at the Pantex Plant in Texas that will provide power to the plant and will also be used for wind energy research. (NN, March 2013, p. 86)

To help sites implement projects such as these, Smith said, the ARI task force was

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established to “identify, prioritize, and resolve issues” affecting revitalization. “One of the goals of the task force is to really look at what’s slowing us down, what’s making it difficult, and trying to solve those issues,” she said. One way the task force is trying to keep things moving is by breaking down stovepipes within the DOE. This means coordinating with other DOE-wide teams, communicating across sites and programs, and sharing lessons learned, Smith said.

As for the future, Smith said, the DOE’s vision for 2020 is to have “about two dozen primary sites that are sufficient to meet our infrastructure requirements and our missions.” That goal, Smith said, includes the completion of the DOE’s major remediation efforts.

Picking up on the subject of environmental remediation, Mark Gilbertson, deputy assistant secretary for site restoration in the DOE’s Office of Environmental Management (EM), who also spoke earlier at the “Hot Topics” panel session, provided

a “macro perspective” on the DOE’s cleanup efforts.

Decontamination and decommissioning (D&D) will be a possible growth area for the DOE, which has “a lot of facilities in the pipeline that we haven’t even accepted into the EM program,” Gilbertson said. For example, he noted that as the NNSA streamlines the management and stewardship of the nation’s defense nuclear material, more national laboratory facilities will become obsolete.

The government’s D&D work also coincides with what is going on in industry as nuclear facilities and power plants are reaching retirement age, Gilbertson said. “They can’t go on forever, so that’s going to be a big workload that we need to pin up, not only in the EM program, but for the country.”

As for the future, Gilbertson said, “sustainable remediation is going to be the mantra.” That will mean having discussions with local communities as to what they wish the site to ultimately become—either returned to nature, like Rocky Flats in Colorado or the Energy Technology Engineering Center in California, or retaining a physical presence on the site, such as at Idaho National Laboratory or the Savannah River Site (SRS).

Dave Moody, manager of the SRS Operations Office, provided some insight into



Moody

what the South Carolina site may look like in seven to 10 years. “We believe that Savannah River will be the poster child for asset revitalization,” he said.

SRS, Moody said, is an integrated nuclear materials site, with assets that can be leveraged. These include the MOX Fuel Fabrication Facility, which is currently under construction, the stewardship of nationally and internationally received used research reactor fuel, the consolidated storage of the nation’s non-pit plutonium, and the nation’s only hardened used fuel processing facility, he said.

While SRS’s current primary function is environmental and nuclear materials management, Moody said, preparations are being made for operations that will reutilize the site’s facilities and materials. “We are about taking materials that are liabilities and turning them into assets,” he said.

By 2020, Moody said, SRS will be capturing americium from the MOX facility and providing it to the oil and gas industry at the rate of 2 to 3 kg a year, as well as providing all of the nation’s He-3 from the site’s tritium works, and U-238 for space exploration. In addition, Moody said, the site will be a year or two away from operating small modular

reactors and will host a regional nuclear medicine facility to take advantage of isotope production at SRS.

The future success of SRS will be measured by partnerships with the private sector, Moody said. “If you look at our budgets, I believe we’re going to be looking at partnering with industry, where industry takes some risk in building facilities and we procure services,” he said.

Sue Cange, deputy manager of the DOE’s Oak Ridge Office of Environmental Management, said that strong partnerships are necessary for the success of the Oak Ridge site as well. Speaking on the future of Oak Ridge, which includes the East Tennessee Technology Park (ETTP), Oak Ridge National Laboratory, and the Y-12 National Security Complex, Cange said the DOE’s vision is that the site “be remediated, modernized, and reindustrialized.”



Cange

Cange said that site cleanup is the cornerstone of Oak Ridge’s future. “We will not be fully successful with our revitalization efforts at all of the sites until we’re able to complete our cleanup,” she said.

Cange said she doesn’t anticipate that all of the remediation work at Oak Ridge will be completed within the next 30 years. Therefore, she said, it is important that redevelopment efforts coincide with cleanup work. In the case of the ETTP, which is the site of the former K-25 plant, Cange said it is estimated that cleanup will be completed by 2024. Reindustrialization work, however, was started in 1996, she said. To date at the ETTP, the DOE has transferred title to 700 acres of land and 14 buildings, leased an additional 20 facilities, and brought in 18 private companies, according to Cange.

Along with building strong partnerships and moving forward with redevelopment at the same time that cleanup is being done, Cange said, one of the keys to site development is to achieve early successes that can be built upon. “It’s very important to do something quickly,” she said, “something positive, something feasible that people can look at and see, and not just hear about or talk about.”

Craig Rieman, deputy director of the West Valley Demonstration Project, noted

that the title of the panel session fit in nicely with the project’s goals, as the site has a 2020 strategy.

According to Rieman, the 2020 vision for the former Nuclear Fuel Services reprocessing plant at West Valley includes the removal of the main plant and all supporting ancillary facilities and leaving in place a permeable treatment wall to control groundwater contamination, a high-level waste tank farm, and two disposal areas—the state disposal area and the Nuclear Regulatory Commission–licensed disposal area.

Challenges the project faces, Rieman said, include packaging high-level waste and spent nuclear fuel from the main plant and moving it onto a concrete interim storage pad that will be built this summer, as well as disposing of “a considerable inventory” of TRU waste. “We’re working hard to get approval to [move the TRU waste] to WIPP,” Rieman said.

Finally, an overview of the cleanup work being done at the gaseous diffusion plants in Ohio and Kentucky was provided by William Murphie, manager of the Portsmouth/Paducah Project Office, who compared EM’s program to what Michelangelo supposedly said about sculpting David: It’s just a matter of removing everything that doesn’t look like David. EM is removing the “bad pieces” that it doesn’t want in order to create something of value, Murphie said. “We want to leave a work of art behind.”

In line with what the previous panel members discussed, Murphie highlighted the importance of working with local com-

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munities to come to a conclusion as to what the site should finally look like. At both Portsmouth and Paducah, polling of area residents has shown a broad spectrum of support for different outcomes, he said, with a “significantly large number of people” wanting the sites to be redeveloped for industrial use, while others support having the sites returned to a natural, nonindustrialized state. “At both sites, jobs are clearly the number-one priority,” he said, noting that the areas surrounding the sites are economically depressed.

Continued

Back to the future repository

An old but novel potential solution to the problem of what to do with the nation's inventory of used nuclear fuel was discussed during a panel session titled "Worldwide Perspectives of Radioactive Waste Management: Challenges and Solutions." Keith McAllister, engineer and manager of warship production for the U.S. Navy, presented a proposal for a sub-seabed repository for high-level radioactive waste similar to

repositories and within the 200-mile boundary of the country's exclusive economic zone. While U.S. Pacific islands would be considered for the site, the repository itself would be in deep water, below 3000 feet and some 200 nautical miles offshore, McAllister said, noting that Baker Island, Howland Island, Jarvis Island, Johnson Atoll, Kingman Reef, Midway Island, Palmyra Atoll, and Wake Island could be potential candidates.

To bury the material, McAllister suggested drilling deepwater boreholes using equipment currently being employed in the oil and gas industry. For the pilot program, used fuel and waste would be packaged into retrievable canisters and inserted into the boreholes. Based on the success of the pi-

lot program, one or more permanent disposal repositories would be proposed, he said.

The legal challenge to such a repository, McAllister said, is the London Convention, which in 1972 outlawed the dumping of hazardous material into the ocean. McAllister noted that a 1996 update to the convention equates controlled, sub-seabed dis-

posal with dumping. However, the 1996 protocol has not been ratified by the U.S. Senate, which means that as far as the United States is concerned, it is not law, according to McAllister.

"The proposed pilot project that I'm suggesting here is a controlled experiment within the U.S. economic zone," McAllister said. "The materials for the duration of the project are retrievable. It is not considered dumping." He added that the evidence and knowledge gained from implementing the pilot program could be used to "reengage the London Convention," which is expected to reconvene sometime around 2020.

When asked about the project's cost, McAllister said he hasn't done "sufficient estimating," but put the price of the pilot program at around \$50 million to \$100 million.

While McAllister's proposal was well received by the audience, one session attendee noted that while such a repository is theoretically feasible, it contains many uncertainties, and that "every time you throw something over the side of a ship, all kinds of stuff happens that you can't anticipate." In addition to the challenges of deepwater drilling, highlighted by the recent Deepwater Horizon oil spill, and the discovery of deepwater flora and fauna, the audience member said that the United Nations Convention on the Law of the Sea "is going to be the real show-stopper." — *Tim Gregoire* **N**

McAllister proposed a pilot program to inter radioactive waste and used nuclear fuel in tectonically stable deep ocean clay sediments.

ocean disposal projects studied in the past. It was, as session cochair Roger Nelson said, a proposal for "how to get back to the future."

McAllister proposed a pilot program to inter radioactive waste and used nuclear fuel in tectonically stable deep ocean clay sediments. Potential disposal sites would be located near the United States' mid-Pacific ter-