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Focusing on Science and Technology at the Spectrum Conference

Spending early August in Reno, Nevada, is just asking for heat and dust. "Hot Desert Nights" is not just the name of a tourist promotion in the area; it fairly describes the summer Reno atmosphere. But things were cool and comfortable inside the Reno Hilton, where the biennial Spectrum waste management conference was held this August 4-8. More than 500 registrants signed up to hear the latest in waste management and decommissioning progress being made around the world. The American Nuclear Society; the U.S. Department of Energy; the Idaho Section of ANS; and ANS's Fuel Cycle and Waste Management and Decommissioning, Decontamination, and Reutilization (DD&R) Divisions sponsored the meeting. The meeting theme: "Exploring Science-Based Solutions and Technologies."

OPENING PLENARY

Russell Dyer, project manager for the DOE's Yucca Mountain Project, kicked off the meeting by recapping the events of the first seven months of this year, from Energy Secretary Abraham's recommendation to the president that Yucca Mountain be the

site of the nation's high-level waste/spent nuclear fuel repository, to the July 9 Senate vote overriding the state of Nevada's veto of the selection, to President Bush's July 23 signing of the Congressional Resolution allowing the project to proceed to the next phase: license preparation. The license must be submitted by December 2004.

has been marked down in Senate subcommittee (chaired by a Nevada senator). Dyer's great hope, he said, is that since Congress has seen fit to underwrite the project, they will carry that forward with adequate funding.

The path forward also includes transportation, Dyer noted. In this country, the U.S. Nuclear Regulatory Commission and the U.S. Depart-

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The project's near-term concern is fiscal 2003 funding. "Aggressive progress is dependent on funding," Dyer noted. The administration's request of \$527 million for the project

ment of Transportation regulate transport. There has never been a release of radioactive materials to personnel or the environment during any past shipment of spent fuel, Dyer

noted. And the DOE is confident that it can achieve a safety record during future shipments that is comparable to that in Europe, where some 70 000 metric tons of spent fuel (equal to the amount that will be going to Yucca Mountain) have been safely shipped over the past 25 years.

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Gerald Boyd, assistant manager for environmental management at Oak Ridge, began his presentation by making what he stated were “a couple of very important points.” One, he said, an accelerated cleanup strategy is very much needed in this country. The citizens are not going to stand still if the DOE tries to walk away from the waste. Second, accelerated cleanup as we know it today would not be possible without the investments the DOE and others have made in science and technology. Many of the technologies being used today did not exist even a few years ago. But we need to take advantage of those innovations, and we need to *continue* to invest in additional research, he urged.

Then, moving to a discussion of problems at the Oak Ridge site, he noted that the site consists of 35 000 acres in a water-rich environment. Three major projects are in the accelerated cleanup program: the Y-12 area, which is 8000 acres; the Oak Ridge National Laboratory, which is 7000 acres; and the Gaseous Diffusion Plant (GDP) site, which is 5000 acres. (You could put Rocky Flats in any of these three sites and have room to spare, he noted.) Among the cleanup problems: 40 million pounds of buried uranium in the Y-12 area; 2 million curies of radioactivity buried in the Melton Valley area; 5000 uranium enrichment converters at the GDP, some with residual uranium in them, plus a large legacy of low-level waste and mixed LLW.

In the future, Boyd said, the DOE must deal with the following issues:

- There must be a closer relationship between site “owners” and cleanup contractors. In tandem with that, the DOE needs a better contracting approach to get the best “bang for the buck” for taxpayers.

- The DOE must renew efforts to work with stakeholders and the general public, who have a concern that “accelerated cleanup” means leaving the contamination in the ground and walking away.

- The DOE needs a “corporate approach” to bring new technological solutions to the sites. Without that effort, people just tend to do things in the same old way.

These points were echoed by the next speaker, Jim Owendoff, deputy assistant secretary for Science and Technology (S&T) at the DOE. The function of the science program, he said, is to try to understand *when*

new technologies will be needed, while the technology program then tries to develop technologies to meet those needs. The problem today, he noted, is that the accelerated cleanup program got some of the S&T funding in the last budget. Without the funding, it will be much harder to meet technology needs.

Wrapping up the session was John McKeown, from the United Kingdom Atomic Energy Authority (UKAEA). The main focus of the

UKAEA today is environmental restoration, he explained. “Restoring Our Environment” is now a part of the UKAEA logo, and while that might be a “people thing,” he said, people things will control the future. However, he cautioned, good public relations doesn’t get the cleanup job done. The engineers must “deliver the goods,” or the projects won’t get the funding they need.

He noted that the United Kingdom “envies” the U.S. for having the WIPP facility [the Waste Isolation Pilot Plant for transuranic waste] and for the progress the country has made in siting an HLW repository.

They may envy us also for another reason. In response to a question from the audience, he acknowledged that the U.K. does not have a cleanup standard (such as the NRC’s 25-millirem cleanup standard). Rather, he said, they work to the same standards that apply to operations. That means they must constantly interpret regulations meant for operations and try to apply them to cleanup.

WASTE MANAGEMENT

As Session Chair Russ Mellor, president and CEO of both Connecticut Yankee and Yankee Atomic Power Co., noted in his introduction to the “DD&R Executive Session: Waste Management,” more than 50 percent of decommissioning costs are related to waste disposal and waste

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management. Thus, among other issues, the session focused on efforts at both government and commercial levels to drive down waste disposal costs, particularly at decommissioning projects.

Richard Meservey, manager of decommissioning technologies at the Idaho National Engineering and Environmental Laboratory (INEEL), began his presentation by stating, “Waste disposal is becoming increasingly difficult, complex, and expen-

sive.” But, he continued, proper planning and the use of modern technologies can reduce the impact of these characteristics.

these pages) and then focused more specifically on the review’s analysis of the LLW situation. In that area, he said, the review has resulted in the

would be sent to the Nevada Test Site).

On the issue of recycling, he said the DOE still has a moratorium on the recycling of volumetrically contaminated materials, but a preliminary environmental impact statement (EIS) was due to be issued in late September 2002, and he thought a final EIS might be available by the end of the year.

During a question-and-answer session, Fiore was asked if the DOE might open its LLW disposal sites to utilities. His answer was that Jessie Roberson, director of the Environmental Management (EM) Division at DOE, would immediately wonder what would be in it for EM. Cooperation for the sake of cooperation is not in her plans, Fiore said. A question on whether the DOE is working with the NRC on the solid materials release issue drew the interesting answer of “yes and no.” The DOE is aware of NRC activities, Fiore observed, but the two agencies do not want to be seen as working hand in hand on this issue, because of the fear of a perception of “collusion” by the public.

Lynne Goodman, manager of decommissioning for Detroit Edison’s Fermi-1 plant, noted that sometimes you must stop decommissioning work and reevaluate your methods if you find you are generating too much waste. And with a decommissioning plant, the “whole plant is waste.”

Goodman then told the session “a

Three major projects at Oak Ridge are in the accelerated cleanup program: the Y-12 area, which is 8000 acres; the Oak Ridge National Laboratory, which is 7000 acres; and the gaseous diffusion plant (GDP) site, which is 5000 acres. You could put Rocky Flats in any of these three sites and have room to spare.

One perception in the industry, he said, is that the DOE has low-cost disposal options. This might be true for INEEL, he noted, which has its own LLW disposal site, but it is not true for other sites; not everyone has access to “free” disposal, he pointed out. And, he cautioned, if you think disposal is free, then you will never consider recycle and reuse, you will have no incentive to reduce waste volumes, and you will see no need for new D&D technologies.

According to Meservey, the goals of any waste management program, whether at a government or a commercial facility, should be as follows:

- Prevent unauthorized release of radioactive materials.
- Create a system to handle both radioactive and nonradioactive waste.
- Reduce waste volume—because “it’s the right thing to do.”
- Segregate waste into categories for processing, transport, and disposition.
- Ensure compliance with your license.
- Work under ALARA (as-low-as-reasonably-achievable) principles.
- Ensure that final waste products meet requirements for offsite treatment, transport, and ultimate disposition.

Jim Fiore, recently named director of the Richland Office at DOE headquarters, spoke in general on the recent DOE top-to-bottom review (which has been well-covered in

following recommendations and changes:

- There should be a greater emphasis on life-cycle cost analysis (do not just assume that the status quo is best).
- There have been changes in the DOE order to eliminate a preference for use of DOE facilities for waste disposal. Therefore, if a commercial site is cheaper to use, a DOE waste generator has the option to use it.
- The DOE is making continual efforts to drive down both predisposal and disposal costs. Among other changes, Fiore noted, the DOE now

has a new relationship with LLW disposal site operator Envirocare of Utah. The company is a competitor in some instances but a partner in others, he explained. Right now, he said, the “Nevada folks” and Envirocare are talking with the Savannah River Site (SRS) about how to deal with SRS waste (which otherwise

tale of two wastes” at the plant. One waste is paint that is contaminated with radiological compounds, lead, and polychlorinated biphenyls (PCBs). As a result of initial testing, plant staff felt that PCBs were limited to the blue paint at the site. Fermi-2 staffers, however, queried if enough paint had been tested. As a result of

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retesting, it was discovered that most of the paint onsite has PCBs, and PCB content could not be eliminated by either color or location.

This discovery led to a work stoppage, which affected worker morale. The plant created a Hazard Assessment Program and worked to make arrangements for waste disposal be-

evaluations of the plant indicate that there have been releases, and monitoring has found evidence of tritium and strontium-90. The groundwater issue is one that operating plants need to look at closely, he suggested. Right now the trend is to clean up contaminated soil from spills only to the level needed to protect the public and

loading was scheduled to start in mid-August, he said, and the reactor vessel was to be moved out of the containment in September. Four canisters of greater-than-Class-C waste from the reactor vessel segmentation project have already been loaded and are on the ISFSI site. He had warm words of praise for the job done by Framatome ANP in the segmentation project.

A new challenge for decommissioning plants, he noted, is plant security. Providing additional security for the ISFSI will lead to greater, unknowable costs in the future, he said, making accurate budgeting difficult.

Tom LaGuardia, from TLG Services, now a part of Entergy, had one piece of advice for D&D contractors: "Don't bid fixed price!" And this applies to *any* D&D job, he advised, whether you are a contractor or a subcontractor, whether you are bidding for either government or commercial work. He speaks from experience, he says, since he is currently "eating a lot of costs" on the Saxton concrete removal job.

Additional advice:

- Insist on bid performance and payment bonds.
- Clearly state the scope and limitations of the work to be done.
- Insist on adequate time to prepare a bid.
- Reject proposal page limitations—insist on more space and provide more detail.

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fore the abatement work began. Costs have increased because the amount of waste has increased.

The other waste disposal problem at Fermi-1 is related to the residual sodium at the plant, which, Goodman noted, cannot be disposed of. Instead, current plans are to react it onsite to turn it into something that *can* be disposed of. However, contrary to plant records, plant workers have now found tritium in the secondary sodium, which is complicating the disposal plans.

D&D

Decontamination and decommissioning was the focus of the second of the two DD&R executive sessions. Russ Mellor gave an update on the issue of the independent spent fuel storage installation (ISFSI) at Connecticut Yankee, which experienced a 14-month delay because of lawsuits against its construction. At this stage, he reported, all challenges are in abeyance or denied, and construction has begun.

But looking at the larger picture, he noted that there seems to be a trend toward increasing efforts to stop projects that are truly beneficial through court actions, local venues, etc. He said it is difficult to file suits against local entities that you have dealt with throughout the plant life, but for the good of the plant you have to do it.

Another issue at the plant is contaminated groundwater. Historical

the workers and then to finish the job when the plant is being decommissioned. Rather, he said, plants must look at cleaning up soil as the spills happen. If you don't, he warned, the groundwater can become contaminated, giving you a real headache when you begin D&D.

Moving the discussion to the Yankee Atomic site, decommissioning there is now 80 percent complete, Mellor reported, and the current focus is on moving the fuel to the ISFSI. At meeting time, there were three canisters on the pad. The first canister had taken about 25 days to load, the second took about 15 days

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to load, but the third took 7 days, and Mellor felt the last was a reasonable number to shoot for. However, he noted, it's important to be extremely careful during the fuel loading process, since one accident of any kind at any site will set back the work at any other decommissioning plant.

Wayne Norton, president of Maine Yankee, reported that D&D is about 65 percent complete at his site. Fuel

- Characterize. Visit the site repeatedly and talk to people there (workers, not just managers).
- Identify areas of risk and how you will deal with it.

Regulatory interface is another area of concern. Local regulators do not trust federal regulators, he noted. Local interest groups do not trust *any* regulators. The NRC Agreement State limitations are not strict enough for some public interest groups, and

state legislatures have the power to override federal regulations. Utility management, at the highest level, must get involved in this issue, he urged, even though it is hard to get their time and attention.

John Greeves, from the NRC, noted that from the regulatory agency's point of view, decommissioning reactors are not a problem; the sites are "reasonably clean" and they have adequate decommissioning funds. It's the materials sites (old uranium and thorium sites, in particular), he said, that are the real problems; they rarely have enough money to undertake cleanup.

There must be a clear relationship between planned decommissioning activities and associated cost estimates. The materials sites again have problems with this.

On the subject of groundwater monitoring, Greeves said that the "operational" environmental monitoring that operating plants conduct may not be adequate for site characterization when it comes to decommissioning. "I'm going to come after you" on this issue, he stated.

Jon Stouky, from Mega-Tech, spoke on three subjects: nuclear engineering education, decommissioning of the past generation of reactors, and decommissioning costs.

On education, he noted that there is now a projected shortfall of some 800 nuclear engineers just around the corner. That is not counting the staff needed if the industry continues to go for license extension or if new reactors appear on the horizon. Universities need to be creative to share the remaining research reactors still in existence, and industry needs to do its share to help universities turn out the next generation of nuclear engineers. There's an \$8 billion/year nuclear economy in the state of Virginia alone, Stouky maintained.

On reactor decommissioning, Stouky noted that there are some 10 to 15 little reactors around the country not on the screen for decommissioning. These need to be gone from the landscape, he said, but right now they have little visibility, staff, or funding. These decommissioning projects differ from the large commercial decommissioning projects by one zero, he explained—they are about \$50 million projects rather than \$500 million projects.

Now is the time to get these facili-



A Virtual Tour of Yucca Mountain

After regular sessions for the day had ended, a sizable crowd gathered for what the meeting officials had billed as a "virtual tour" of Yucca Mountain. Wearing the requisite hard hats and safety equipment, veteran Yucca Mountain tour guides took the audience on a "trip" to the mountain, showing them the 360-degree mountaintop view, leading them into the tunnels, and in the process discussing repository design, scientific experiments, hydrology, seismology, volcanic history, and other issues. The hour-long "tour" was enjoyable and well received—and much less hot and dusty than the real thing. (Photo courtesy Idaho Section of ANS.)

ties off the map, he said. The owners may not realize that this is an opportunity time for Barnwell access; in some six years, Barnwell will be closed to them forever. However, he noted, antinuclear groups in some cases may oppose the decommissioning of these plants, hoping instead to use them as ammunition against new plants.

In the area of costs, Stouky said it was time for industry and regulators to get a better handle on decommissioning costs to make sure that decommissioning funding for current plants is adequate. However, because the decommissioning plants have little incentive to provide cost data to other plants (see "D&D Dollars," *Radwaste Solutions*, Sept./Oct. 2002, p. 50), he suggested that operating plants *pay* the decommissioning plants to provide the information. He also suggested that the DOE should support (that is, fund) such a project as well.

During audience discussion on this last topic, Tom LaGuardia noted that the DOE has the cost infor-

mation for the Shippingport decommissioning, but it was so difficult to project future costs from Shippingport costs that eventually the DOE just buried the data. And Jim Fiore said that support of this project was "not going to happen in EM." Finally, Ken Powers, who had managed the decommissioning Big Rock Point plant before going to Rocky Flats, noted that such cost data might be useless without a scope document. Collecting costs doesn't help unless you know what you started with, he said.

Wrapping up the session, Russ Mellor observed that the next big issue is state cleanup standards (in contrast to the NRC's 25-mrem cleanup standard). California has a proposed law for zero release above background using the best available monitoring equipment, he said. Connecticut has a 19-mrem limit, Maine has a 10-mrem limit, but the state of Illinois has clearly defined limits in terms of pCi/g levels; they have usable numbers, he concluded.—*Nancy J. Zacha, Editor* ■