A report from the Second Annual Radwaste Summit, held September 2–5, 2008, in Las Vegas, Nevada.

Same Issues, New Solutions at This Year's Radwaste Summit

What a difference a year makes. Last year, at the First Annual Radwaste Summit, waste generators were focused on finding a place for disposal for at least some of their waste, and solutions appeared to be far away. The low-level waste disposal facility in Barnwell, S.C., the only facility in the United States to take non–U.S. Department of Energy Class B and C LLW from all waste generators, was due to close to out-of-compact waste in less than a year, and no replacement or relief appeared to be in sight. (For the report on last year's radwaste summit, see "Covering All the Bases at the Low-Level Summit," *Radwaste Solutions,* Nov./Dec. 2007, p. 13.)

At this year's summit, sponsored by *Radwaste Monitor* and held again at the J.W. Marriott Hotel in Las Vegas, waste generators, for the most part, appeared to have moved beyond the worry about no place to send their waste and were looking at alternatives and solutions not necessarily considered last year. Barnwell has closed to out-of-compact generators, but nuclear, medical, and other industries continue to function. Of course, the problem of a lack of disposal sites still exists, and that issue still looms large over both the commercial and government waste management and disposal industries.

A "Solvable" Problem

Commissioner Gregory Jaczko, from the U.S. Nuclear Regulatory Commission, presented the meeting's keynote address. He repeated the NRC's position that LLW disposal in the United States is not in a crisis situation, although he acknowledged that we are experiencing a "challenging time." On the plus side, Jaczko said, there have been positive steps in Texas [which has issued a draft license for the Waste Control Specialists (WCS) LLW disposal site for the Texas Compact states]. Another plus is that the decommissioning of nuclear power plants is no longer the main driver in LLW disposal issues, which "gives us time," he said. However, he continued, the recent closure of the Barnwell, S.C., facility to out-of-compact waste is a "negative setback," and now 90 out of the nation's 104 reactors no longer have access to Class B/C LLW disposal. And the cost of LLW disposal has always been a major driver of medical research, he said. Storage to decay could have a further negative impact on this research.

So, what about solutions to the problem? Jaczko said one thing the NRC had done in the past was its 1997 rule on minimization of contamination. That rule applies to nuclear reactors licensed after 1997, but the staff has suggested amending the rule to have it apply to *all* operating reactors. The best thing you can do from a decommissioning standpoint is to have good housekeeping skills while you are operating, he said, because soil and facility contamination leads to more materials needing disposal.

And the industry needs to have more public involvement on this issue, Jaczko said. (More public involvement is a standard theme of Jaczko presentations.) If he had five suggestions on how to solve the LLW disposal crisis, he said, four of them would be to increase public involvement. This includes not only the public living near potential disposal sites, but also the public living near facilities that might need decommissioning. "Public involvement and technical solutions must go hand in hand," he said.

Another, "more concrete," solution, Jaczko said, might come at the policy level. Policy institutions can take a lesson from nature, looking at

how non-NRC-regulated facilities operate, including landfill sites and Resource Conservation and Recovery Act (RCRA) Subtitle C facilities. If these are alike technically, what does it take on the policy level to be able to use these for LLW? he asked.

In his final comments, he repeated his remark that because the recent round of commercial plant decommissioning has concluded, we have time to address these challenges before the next spate of decommissioning begins.

During the ensuing question/answer period, in response to a question about using existing DOE disposal sites for commercial LLW, Jaczko said that the NRC does not regulate DOE sites and thinks that the private sector could offer a better solution. However, he acknowledged, using a DOE site is an option that must be considered. A commenter noted that many countries have had success with the "volunteer community" approach. Jaczko said that because LLW disposal is a state, not a federal, issue, it would be up to the states or compacts to look into that. But for whatever reason, he added, the voluntary approach hasn't taken off in this country.

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DOE Concerns

What EM Is Watching

Christine Gelles, director of Disposal Operations at the DOE's Environmental Management (EM) Division, noted that a reliable waste management system is critical to DOE missions. Among the DOE's current waste management concerns, Gelles said, are the following:

- Availability of resources to meet existing compliance requirements.
- Cost increases, both from changing market conditions and from growing program scope.
- Uncertainty in future disposal capacity.
- Uncertainty of future waste projections from reprocessing initiatives (such as the Global Nuclear Energy Partnership), which could lead to increases in the amount of greater-than-Class-C (GTCC) waste the DOE must dispose of.
- Potential challenges to DOE policies and strategies.
- Challenges from changing missions.
- Natural resources damages claims.
- Increasing inquiries on using DOE facilities for LLW and mixed LLW (MLLW) disposal.

On this last issue, Gelles said, the DOE is closely monitoring what happens in the private sector.

During the question/answer period, Gelles was asked if other organizations have had any success in getting access to DOE waste disposal sites. She replied that it has been determined that "some non-DOE waste streams have a nexus back to the DOE," so some of that waste has been successfully accepted at DOE sites. The DOE is "poised" for the next-step dialogue—that is, potentially accepting more non-DOE waste—Gelles said, but, she continued, that would involve a policy shift.

Asked what else it would take to put commercial and other non-DOE waste in DOE facilities, Gelles said it would require both a policy change and a statutory change. It would be a disservice to the public, she said, to make enough piecemeal decisions to accept non-DOE waste to effect a policy change without a public dialogue and statutory direction. The DOE has enough problems disposing of its *own* waste without bringing in non-DOE waste, she said.

To a question on whether taking non-DOE waste would tax disposal capacity, Gelles replied that capacity is already taxed by temporal concerns, not size. There is "tons of land" available for disposal sites, she said, but some permits are ready to expire, for example, the mixed waste disposal cell at the Nevada Test Site (NTS).

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What About the Nevada Test Site?

A session on the future of disposal at the NTS featured a variety of speakers from both the state of Nevada and the DOE. Jeff MacDougall, supervisor of Waste Programs for the Nevada Division of Environmental Protection (NDEP), pointed out that at the NTS the NDEP has an oversight role regarding the disposal of LLW and a regulatory role over the disposal of MLLW.

Right now, he said, there are both technical and political constraints on continuing disposal at the NTS. On the technical side, the site will not be accepting any more MLLW after December 2010. On the political side, Nevada's attorney general sent a letter on August 12, 2008, expressing concerns about MLLW and federal land withdrawal issues. This letter means that there will be increasing external scrutiny over the site in the future, MacDougall said.

In the long term, MacDougall said, there could be possible facility enhancements, including new disposal cells and an onsite analysis capability (waste acceptance criteria verification currently has to be done at the generator site).

Tim Murphy, chief of the Federal Facilities Bureau with NDEP, pointed out that the NTS is a unique location, being secure, isolated, and remote. In addition, the depth to groundwater ranges from 700 to 1000 feet. However, he continued, there is the equity issue to consider. The test site was the location of 100 aboveground atmospheric atomic tests and more than 800 underground tests. Nevada is the most arid state in the nation but cannot access groundwater under the site because of contamination from those tests.

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With regard to the land withdrawal issue, Murphy said that the state has asked the DOE to work with the U.S. Department of Interior (Interior) to resolve the issue. The state wants a good working relationship with the DOE. As for whether there's a future at the NTS, Murphy felt we would learn more in the next few months.

Frank Di Sanza, federal project director, Waste Management Project, with the DOE's Nevada Site Office, said that since 1961, some 36 million ft^3 of LLW/MLLW has been disposed of at the site (through August 3, 2008). Twenty-five generators have been approved to ship waste, and 12 of those have shipped MLLW. Right now, the NTS disposal closure date is 2027, at which time the site will be turned over to the control of the National Nuclear Security Administration.

Since 2004, the waste volumes have been dropping off. Now NTS has become a "boutique" facility, Di Sanza said: "You tell us what you have, and we'll dispose of it." This includes such items as the Zeus calorimeters from Brookhaven National Laboratory, he said.

As for MLLW capacity, Di Sanza said that at the end of August, there was about 512 000 ft^3 of space still available. He added that 99 percent of that is expected to be used by the 2010 MLLW closure date.

Christine Gelles began her presentation by commenting that NTS is critical to the EM mission. She noted that the amount of waste disposed of onsite (at the cleanup sites themselves) is much greater than the amount shipped offsite. Waste disposal at regional disposal sites (such as Hanford and NTS) is second in preference for EM.

A recent court decision has eliminated one hurdle EM faces in reopening the Hanford Site for LLW and MLLW disposal, but DOE still is working through a National Environmental Policy Act (NEPA) review at Hanford, and pending that, Hanford remains off limits for disposal. The review should take another couple of years, she said.

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As for the attorney general's letter on land withdrawal, Gelles said the DOE is working with state regulators, the attorney general's office, and Interior to resolve the issue. She pointed out that two other letters have come from the attorney general's office, one concerning depleted uranium hexafluoride (DUF_6) and the other on waste from the Savannah River Site. Neither waste stream will be going to the NTS, Gelles stated.

In summary, Gelles said she was looking forward to resolving the issues with Nevada over the NTS and was confident they could be resolved. However, she noted, NTS is not EM's only option. EM plans to reuse Hanford once the NEPA review is resolved and is also monitoring the situation in Texas (where WCS runs an LLW disposal facility with potentially both commercial and DOE waste cells). Gelles said she hopes the issues will all be resolved by this time next year.

The TSCA Incinerator

The MLLW site at the NTS is not the only EM facility that is nearing shutdown. The Toxic Substances Control Act (TSCA) incinerator at Oak Ridge is due to shut down at the end of fiscal year 2009. Joy Sager, with the DOE's Oak Ridge Operations Office, noted that since 1991, the TSCA incinerator has safely treated 33 million pounds of MLLW and polychlorinated biphenyl (PCB) waste from throughout the DOE complex. Constructed in 1987, it began operations in 1991 and is the only incinerator in the country authorized to burn LLW with PCBs. Its operations have been extended twice—in 2003 and again in 2006—because there were no alternatives to replace it.

The plant was originally designed to handle large volumes of liquid wastes from the shutdown gaseous

diffusion plants, Sager said. In the late 1990s, solid waste was added to the mix.

A planned three-month maintenance outage at the end of last year led to a three-month unplanned outage at the beginning of this year. But the unit has been running well since restart this past April, Sager said. By the time the unit shuts down next year, it should have treated all the waste that has been identified as needing treatment.

The closure plan, Sager said, provides that the burn plan be complete in May 2009. Then EM will move into RCRA closure activities, and the unit will cease operations October 1, 2009. RCRA closure will be completed in the 2010-2011 time frame, and decontamination and decommissioning will begin in fiscal year 2013.

Mark Senderling, from EM's Office of Disposal Operations, noted that the incinerator site at Oak Ridge "is closing down around the incinerator, so we need to get that facility down and then out." The incinerator is being replaced, he said, "with a variety of technologies from a variety of suppliers."

Paul Larsen, senior vice president with EnergySolutions, represents one of those suppliers. He discussed the vacuum-assisted thermal desorption technology available at the Clive site, which, he said, has been very effective on a large variety of waste streams.

Renee Echols, senior vice president with PermaFix, another of those suppliers, said her company has been trying to get authorization to burn PCBs since 2004, and she has been saying at conferences that they will be treating PCBs "any day now" for the past three years. However, she announced, final authorization was due September 26, 2008, and by October, she expected PermaFix to be in the PCB processing business. Permafix offers a boiler, not an incinerator, and Echols said it will be able to treat mixed *and* PCB waste. It's a "small business about to go large," she said.

During the question/answer session, Gelles thanked the commercial companies for their efforts to replace the TSCA incinerator. "It's only because EM had confidence in the commercial partners that they were able to plan to shut the incinerator down," she said.

Private Sector Issues

The Generator Side

Ralph Anderson, chief health physicist with the Nuclear Energy Institute (NEI), noted that the first of the new reactors in the United States could come on line as soon as 2017. And these days, he continued, there have been changes in the United States, with the nuclear power industry working together with source manufacturers and fuel cycle facilities toward a common goal—access to waste disposal facilities.

The basic principles by which the industry is operating today include the following:

- Waste storage is safe.
- Waste disposal is preferable to storage.
- States and compacts are key in enabling options.
- An open and competitive market is necessary for innovation in solutions (the choice is always to have the marketplace, and not the courts or legislation, solve the problem, Anderson said).
- Regulation should enable safe options.

In the meantime, the industry is encouraging vendor development of centralized storage and is working to minimize B/C waste generation. One new approach to storage, Anderson said, would take advantage of decay. Some waste stored for 100 to 200 years may not need disposal, he commented.

On the regulatory side, Anderson asked if the U.S. LLW classification system (A/B/C) still makes sense. NEI plans to petition the NRC for a new framework in the next three to five years, he said.

Further, echoing Commissioner Jaczko, Anderson noted that the industry should begin communicating with the public on just what is at stake with LLW disposal. The industry hasn't done as good a job as it could have on communicating these issues, he concluded.

A Disposal Site Regulator Viewpoint

Bill Sinclair, deputy director of the state of Utah's Department of Environmental Quality, noted that the EnergySolutions LLW disposal site at Clive is a "superior site": it's isolated, dry, with saline groundwater; it's well managed, and the infrastructure has been improved in the last few years. As a regulator, he said, he is "satisfied" with the site. However, he continued, it's a *national* disposal site, so there are issues of equity, of being a "national dumping ground," and of being a "national treasure" that the state must deal with.

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On the two major issues looming for the site—the LLW reclassification efforts and the import of waste from Italy for potential disposal at Clive—Sinclair had much to say.

- *Waste reclassification.* Some in the industry see waste blending as the way to mitigate the loss of B/C waste disposal access, he said, quoting the "Dilution is the Solution to Pollution" phrase from long ago. From Utah's point of view, blending B or C waste down to A waste, or reclassifying B/C waste as A waste, would be done *solely* so that the waste could go in the Clive disposal site; consequently, the state will be watching those efforts closely.
- *Imported waste.* Sinclair noted up front that the proposed waste imports from Italy involve a routine import

application, will have little impact on the site's capacity, and any waste disposed there will meet the requirements of the existing license. However, he continued, the effort has national policy implications, including whether the United States should allow waste imports. There is also the issue of national responsibility—countries should deal with their own waste, he said. Consequently, the state and the Northwest Low-Level Waste Compact, of which Utah is a member, feel that this import would be a challenge to compact authority and could make the site an *international* dumping ground as well as a national one.

In conclusion, Sinclair stated that he is confident of the site's safety, but he feels there will be a fight should EnergySolutions try to change its cell for 11e.(2) (tailings) waste disposal into an LLW disposal cell or if it tries to extend the site boundaries. His final advice to the conference: "Don't put all your eggs in one basket."

During the question/answer period, asked if DU would be allowed to be disposed of at the Clive site (it's not allowed in Texas), Sinclair said that as long as it's classified as a Class A waste, it's not an issue to the state.

Waste Imports—The Details

At a later session, Paul Larsen, senior vice president with EnergySolutions, explained the company's viewpoint on the waste import issue. From the company's point of view, he said, "waste is waste." In addition, there is a global marketplace for nuclear services, and the viability of U.S. companies can be enhanced by the global market. In fact, he continued, the United States has been part of a global nuclear market for 50 years, and 87 percent of the uranium used in the Italian nuclear program came from the United States originally. Italy has used companies in both France and the United Kingdom for fuel reprocessing services.

There are U.S. regulations in place governing the import and export of nuclear waste, Larsen continued. The Italian waste is similar to waste EnergySolutions handles from its U.S. customers. The materials will first go to the company's Bear Creek, Tenn., facility for processing. What's left will be disposed of at the Clive site. No materials will be released to landfills under a bulk survey program, and the company has the ability to export back to Italy any waste that does not qualify for burial at Clive. Finally, current and future U.S. LLW disposal capacity will not be affected by the international work.

Nonetheless, Larsen said, both the Tennessee and Utah congressional delegations have proposed legislation banning the import of nuclear waste from other countries (HR.5632 and S.3225). The house bill has gone through one subcommittee hearing; no other action has been taken on either bill.

Brooke Smith, international policy analyst in the NRC's Office of International Programs, noted that regulations in the *Code of Federal Regulations* Title 10, Part 110, govern the import and export of nuclear materials. When a request for import or export comes before the NRC, the agency consults with the host state(s), the compact commission, the DOE, and other agencies. The NRC has received some 2900 comments on the proposal, including a statement from the Northwest Compact that there was no authorized place to dispose of the waste. After that ruling, EnergySolutions filed suit against the compact commission. The NRC's role is strictly a regulatory one, Smith continued, ensuring that the waste will be disposed of safely and in conformance with the regulations.

What's Up in Texas?

David Cronshaw, senior vice president with WCS, said the company is anticipating disposal of the Fernald waste that they have been storing. They received the license to dispose of the waste in May 2008 and expect disposal operations to start by June of next year.

In addition, in August they received the draft license to run an LLW disposal facility for the Texas Compact. Under terms of the license, they would be able to dispose of Texas Compact LLW (Classes A, B, and C), as well as federal LLW. The final license is expected in November 2009 (if there is no public hearing, Cronshaw said), and disposal operations should begin toward the end of 2010. In the meantime, the company is making major infrastructure improvements at its Andrews Country, Tex., site, Cronshaw stated.

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Do We Still Need the LLW Compacts?

A panel session on the regional LLW compacts described the post-Barnwell world of LLW disposal. Donald Fowler, a consultant to the Central Midwest Compact (which consists of Illinois and Kentucky), noted that all nine nuclear reactors in Illinois have sufficient storage space to store all of the B/C waste generated over the licensed life of the reactors. Other B/C waste generators (hospitals, research entities, manufacturers, etc.) generate only about 100 ft^3 of such waste over a several-year period, he said.

One suggestion the compact is dealing with is a central waste store located near (or even on) a reactor site. Fowler said he did not know if that was even legal. He was sure,

however, that Barnwell would never be available again to out-of-compact generators. EnergySolutions spent $1 million in lobbying expenses earlier this year to try to change things, he said, to no avail. However, he said later in the session, South Carolina's on-again, off-again actions on Barnwell "torpedoed" other compacts' efforts to develop waste disposal sites.

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Robert Owen, chief of the Bureau of Radiation Protection in the Ohio Department of Health, stated that the closure of Barnwell is not having an *immediate* impact on Ohio generators. A survey of the state's waste generators asked if they were planning to generate B/C waste after 2008 (yes, to the tune of about 1100 ft^3 a year, mostly from utilities). Generators plan to store the waste onsite (utilities have the most room for this, Owen said) for between 5 and 20 years, some said. Generator concerns about onsite storage include liabilities and space limitations. Some are modifying operations to create additional storage capacity. In response to a question on what Ohio could do to help the situation, generators suggested regulatory relief and building a disposal facility.

Ohio law would allow the development of a storage facility that could store the waste for up to 100 years, but, Owen said, some private sector company would have to actually *do* it, because the state isn't.

Michael Mobley, chair of the Southeast Compact, said there was not a lot of concern among generators in his compact about B/C waste. Mobley continued that he hopes the compact stays in business because they are suing the state of North Carolina, and he wants to see a resolution to that lawsuit. Also, at their last meeting, the compact initiated a policy statement asking that Congress look into radiation control in the United States and establish a uniform policy ("a rem is a rem," he said).

Leonard Slosky, executive director of the Rocky Mountain Compact, looked back to 1979, which, he said, was a "great year for radwaste." The states "stepped up," he said, after the governors of three states with disposal facilities (Washington, South Carolina, and Nevada) threatened to close the sites if something wasn't done to make LLW disposal more equitable. But states have since not lived up to that promise made in 1979. The central purpose of the compacts is to control the flow of waste, Slosky asserted. The country *may* need more disposal facilities, he acknowledged, but he was unclear as to when that might happen. Generators have not been as articulate and demanding as they could be, he said.

Alan Pasternak, technical director of the Cal Rad Forum, which represents radioactive materials users in California, noting that it had been 28 years since the 1980 Low-Level Radioactive Waste Policy Act was passed and the compacts came into existence, asked how the compacts plan to spend the *next* 28 years. He suggested that they could, for example, urge waste disposal sites to accept problematic waste from out-of-compact generators (especially, he said, decommissioning wastes from medical and research facilities). Pasternak said that in California, these decommissioning wastes have become a real issue. The companies involved want to expand their facilities, but to do so, they have to decommission their old facilities, and they have nowhere to send the decommissioning wastes, so can't proceed with their business plans. Another thing the compacts can do, Pasternak said, is look at the many options out there, including the use of DOE facilities. Instead, he said, the compacts seem to look at the DOE disposal sites as "a threat."

In addition to deciding what they might do for the next 28 years, Pasternak said, compacts should look to the past 28 years to see what they haven't done:

- They have not provided regional equity in waste disposal.
- They have allowed a situation to develop in which 36 states lack B/C disposal options.

Compacts need to address the B/C waste issue "head on," Pasternak said. Efforts to change the definitions of A/B/C waste to get the waste into the Clive site "won't work," and blending and mixing are not long-term solutions.

The Cal Rad Forum supports the Health Physics Society's proposal to use the DOE's GTCC disposal site for B/C waste, Pasternak said. If it's safe for GTCC, then it's certainly safe for B and C waste, he commented. In the meantime, he supports using existing DOE sites for the non-DOE waste.

The idea of using DOE sites for disposal of non-DOE B/C waste would be a "nonstarter," because most of those sites are located in the states that brought up the equity issue in the first place.

During the subsequent question/answer period, Slosky said the idea of using DOE sites for the disposal of non-DOE B/C waste would be a "nonstarter," because most of those sites are located in the states that brought up the equity issue in the first place. At the end, Slosky summed up the solution to the problem in one sentence: "When the demand exceeds the opposition, there will be progress."

More about Blending

A session on intentional mixing or blending of LLW to make it Class A waste featured speakers from government, industry, and disposal facilities. Jim Kennedy, senior project manager for Low-Level Waste at the NRC, pointed out that in the past the commission has gone on record as being against such blending. However, he continued, there are drivers for the NRC's new look at the issue:

- The NRC's own Strategic Assessment of the Low-Level Radioactive Waste program.
- The recent closure of the Barnwell facility to out-of-compact waste generators.
- The NEI/Electric Power Research Institute initiative on blending.
- Licensee requests for approval to blend.

Blending, he explained, is the mixing of higher and lower levels of waste concentrations into a homogeneous waste form. It does *not* include clean or untainted materials, and it is distinguished from "averaging," which, he said, is a mathematical tool.

Blending is the mixing of higher and lower levels of waste concentrations into a homogeneous waste form. It does not include clean or untainted materials, and it is distinguished from "averaging."

The NEI's Ralph Anderson stated that the nuclear industry supports the NRC's revisit of mixing. It's important for the NRC to pursue *any* idea that brings flexibility to the disposal of LLW. And, if the NRC proceeds with an action, it's an enabling action; it will not *require* anything. In sum, Anderson said, it's not about Utah or Texas, or about EnergySolutions or WCS, it's about flexibility. "Controversy should not dissuade us from exploring these options," he stated.

Tom Duberville, vice president of Studsvik Inc., said his company offers B/C waste generators an option to blending. The company proposes to take title to the waste, treat it, dispose of Class A material, and store (at the WCS facility) any B/C waste until a disposal option is available. A license amendment allowing them to do this has been submitted to the Tennessee licensing authority, he said.

Bret Rogers, senior vice president with EnergySolutions, offered his company's own plan, called "ResinSolutions," which involves receiving spent resins (from nuclear power plants) at their Waste Optimization Facility in Tennessee, processing resins of several plants together, and then disposing of them as Class A waste. The final Class A waste forms are identical to those shipped straight from the plant, he said. Operations could begin as early as the end of 2009, he concluded.

Scot Kirk, director of Licensing and Corporate Compliance for WCS, said there has to be a better solution than dilution. He said reversing the NRC's existing policy on diluting B/C waste to A would be contrary to basic policy and positions and as such should not be taken lightly. At the very least, he said, it should be done by rulemaking and not by policy reversal. Kirk continued that Texas law allows the importing of waste from any other state or regional body, subject to approval by the state's LLW commissioners (these commissioners, by the way, do not yet exist). Kirk said this was a better solution and that waste that is diluted will not be acceptable in Texas.

Leonard Slosky noted that downblending certainly presents public perception problems. This issue, he said, is not unlike an issue the compacts have been dealing with since their inception: waste attribution. This involves B/C waste from outside the compact states mixed with B/C waste generated within the compact and then called compact waste. Both types of blended wastes are unacceptable to the compacts, he said.

And GTCC Waste?

James Joyce, from EM's Office of Disposal Operations, reminded the conference attendees that the Low-Level Radioactive Waste Policy Amendments Act of 1985 put the DOE in charge of disposal of GTCC waste. In the 2005 Energy Policy Act, the DOE was charged with developing a report on costs and schedule. This report was submitted to Congress in 2006, and a second report is due to Congress in 2010.

Right now, Joyce said, the DOE is in the process of preparing the preliminary draft of the Environmental Impact Statement (EIS). The draft EIS is due in May 2009, after which public meetings will be held. In fall 2009, the DOE will consider the public comments. The final EIS is due May 2010, and the second report to Congress on disposal alternatives will be delivered in July. After that, he said, they will await congressional action.

The NRC requires that GTCC be disposed of in a geologic repository, unless alternative methods are approved (for example, borehole disposal). GTCC waste includes activated metals from nuclear power plants, some sealed sources, and "GTCC-like" material that the DOE owns (for example, some West Valley waste).

More information on the EIS can be found at www.gtcceis.anl.gov/.

Around the World

The IAEA

Phil Metcalf, from the Waste Safety Section at the International Atomic Energy Agency (IAEA), spoke on the need for an international safety regime because of potential transboundary movement of waste, release of contaminants beyond boundaries, time frames in the life of nuclear waste that go beyond some countries' national existence, and the need to bolster public confidence in waste management. The IAEA's Joint Convention on Nuclear Waste, based on the nuclear safety convention developed after the accident at Chernobyl,

has been signed by 45 countries (all the nuclear nations with the exception of India and Pakistan). The convention is aimed at achieving a high level of safety in waste and spent fuel management. It is strictly an *incentive* convention, with no sanctioning capabilities.

International waste classifications differ from those used in the United States, Metcalf said. Those classifications include the following:

- High-level waste. This waste needs deep geologic disposal.
- Intermediate-level waste. This waste required intermediate-depth disposal.
- Low-level waste. This waste can be disposed of in near-surface disposal facilities.
- Very short-lived waste. This waste decays in storage.
- Very low-level waste. This waste, which includes waste with naturally occurring nuclides (what the United States calls NORM, or naturally occurring radioactive material), generally can go to a landfill.
- Exempt waste. This waste can be cleared for release.

The agency is in the process of revising its safety requirements, and the following issues were listed by Metcalf as ones that need to be addressed in the revision:

- Inadvertent human intrusion.
- Dose constraints for normal evolution scenarios.
- Risk constraints for natural disruptive events.
- Role of institutional control (perpetual control is not an option, he said).
- Regulatory control of near-surface disposal.
- Time frames for compliance demonstration.
- Time frames for control of mining waste.
- Application of requirements to existing facilities.

With regard to the last item, Metcalf said, there are "lots" of facilities in Eastern Europe that don't meet current standards, and these are undergoing periodic safety review.

Don't Call It "Drigg"

Dick Raaz, president of U.K. Nuclear Waste Management, started by informing the conference that the LLW disposal facility at Drigg in the United Kingdom is now known as the LLWR. "Don't call it Drigg," he said. Drigg is the village near the repository, not the disposal facility itself.

That bit of business done, Raaz got down to the business of describing the changing LLW situation in the United Kingdom. Raaz's company, U.K. Nuclear Waste Management, a consortium of URS Washington Division, Serco, Studsvik, and Areva, now operates the LLWR. The situation in the United Kingdom is different from what it was last April, Raaz asserted. The country has learned that "taking the easy path" and "business as usual" were not "getting the job done." If business as usual had been allowed to proceed, Raaz said, the LLWR would be completely filled up in December 2008, and there would be nowhere to send LLW.

So, what's the big deal? he asked rhetorically. The big deal, he continued, is this:

- The United Kingdom is moving ahead on Generation I decommissioning and dismantlement.
- Nine of 18 commercial sites in the country are in some phase of decommissioning.
- The cleanup liability (just to handle LLW) is about £8 billion ($14 billion) (under the "business as usual" plan).

There is a strong belief that massive savings opportunities exist, Raaz continued, and could save British taxpayers a lot of money. In fact, he said, lessons learned internationally will generate savings, and contracts currently being let incentivize contractors to find savings. Some of the savings will come from changing the way they look at the LLW stream, Raaz said. For example, money and space at LLWR can be saved by doing some waste treatment and volume reduction and by removing very low-level waste from the waste stream ahead of time. By judicious treatment and volume reduction efforts, he said, the closure date of the LLWR can be extended from 2050 to 2070. However, he said, he will need a license modification to do anything beyond just "dumping the waste in the vault."

In the meantime, he said, Vault 8 at the site will be completely filled by spring 2009, so he needs a new vault in place by January. ("It's nice to have a place to send LLW, but it's not so nice if it's your *only* place," he said. U.S. waste generators might say the same thing.) The new vault should last for about 15 years, he added, unless decommissioning activities go faster (faster equals cheaper, he said).

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Doing business in the United Kingdom is different from working in the United States, Raaz continued. The regulatory scheme is different, the licensing scheme is different, and partnering concepts are very different ("You are expected to be totally intermixed with your customers," he said). The bottom line, Raaz concluded, is that there is a fast-changing environment in the United Kingdom, the nuclear renaissance is very much on the public mind, the nuclear decommissioning market in the country is "real," and there's definitely an air of excitement there.

Depleted Uranium—A Liability or an Asset?

A panel session on DU sought to shine light on the question of whether the substance is a waste or an asset. John Longnecker, president of Longnecker & Associates Inc., reminded the conference that DU is the result of past government programs and is stored at various places around the country. At first, he said, it was considered to be an asset, because it would be used in the breeder reactor program. Then, when the breeder fell out of favor, it became a waste. And recently, when the price of uranium shot up to more than $100/lb, the DU has become an asset again. Even at the current U price of around $60/lb, the DU is valuable, and there are calls for the high-assay tails to be reenriched to natural uranium levels so they can be sold on the open market.

Mike Styvaert, from the Army Munitions Command, said that the U.S. Department of Defense feels that DU is a tremendous asset. It has been used in the manufacture of armor-piercing projectiles, and these items have been a major feature of both Gulf Wars. The material is also used in tank armor, Styvaert said.

Martin Letourneau, chair of the Low-level Waste Disposal Facility Federal Review Group, noted that something can have a high value, but unless someone wants to do something with it, it's a waste. Congress is interested in reenriching the uranium, but the DOE's EM division has no plans for reuse of the material. EM is charged with disposal, and DU has been and can be safely disposed of at DOE facilities. Either the NTS or the commercial site at Clive, Utah, would be acceptable for DU disposal, he said.

Daniel Shrum, vice president, Environmental Compliance and Permitting at EnergySolutions, noted that a recent Government Accountability Project report listed three options for DU disposition: sell the unprocessed tails, reenrich and sell, and store and dispose of it. From EnergySolution's point of view, he said, everything is a waste.

Patrice Bubar, deputy director of the NRC's Division of Waste Management, noted that the NRC does not have requirements on how to consider an asset versus a waste. If the commission finds that DU can be treated as a waste, then the DOE can be asked to dispose of it, under U.S. Enrichment Corp. regulations.

During the question/answer session, Phil Metcalf asked how we can dispose of something as long-lived as DU in an LLW disposal facility. It would not be possible to demonstrate compliance with international standards, he said. The answer given was that U.S. standards are different. Another commenter said that there are some who feel that DU should be considered a GTCC waste, based on its half-life. Alan Pasternak asked how many separative work units would be needed to reenrich this material, and what the cost would be. Longnecker replied that the cost using centrifuge technology would be about 5 percent of that using gaseous enrichment, but he gave no real numbers.

In the end, there was no consensus on whether the DU was, indeed, an asset or a waste, but this reporter got the impression that the majority of the conference attendees would have voted "waste."—*Nancy J. Zacha, Editor* ■