

**A report from the 27th
Annual Waste Management
Symposium in Tucson.**

Waste Management 2002

Step-by-Step, Top-to-Bottom, Rebecca, and Other Topics

This year marked the 27th time nuclear waste management professionals gathered in sunny Tucson, Ariz., to listen, learn, and schmooze (and golf) at the annual Waste Management conference, hosted and sponsored by the University of Arizona, and cosponsored by the American Nuclear Society, the American Society of Mechanical Engineering, New Mexico State University and the Waste-management Education and Research Consortium, and the Nuclear Energy Agency/Organization for Economic Cooperation and Development, in cooperation with the U.S. Department of Energy and the International Atomic Energy Agency.

STEP BY STEP

In the opening plenary session, Acting Director of the DOE's Office of Civilian Waste Management (OCRWM) Lake Barrett noted that in the aftermath of the September 11 terrorist attacks, national security has become a major argument for opening a repository at Yucca Mountain. The U.S. Navy's nuclear ships are supporting the action in Afghanistan, and an operating repository ensures that Navy spent nuclear fuel will be

disposed of. In addition, proliferation reasons make opening a repository for commercial spent fuel a priority as well.

Barrett said he expected Nevada to veto the selection of the site and that the issue would go to Congress this summer. By law, Congress has 90 days to vote up or down on the repository (by a simple majority in both houses). Barrett added that he expected Congress to "act responsibly." If they don't, however, he said OCRWM will close out all its contracts and shut down the program. If that happens, the nation must await a new solution to be proposed by Con-

gress. Should they approve the repository, however, he continued, then the DOE will begin to prepare the license application. In response to a question from the audience about whether there was a backup plan should Congress vote down Yucca Mountain, Barrett said there was no backup. He noted, however, that the original Nuclear Waste Policy Act had considered the issue of a second repository. A report to Congress due in 2007 will make a recommendation on this issue, he said. In addition, he said, the original 70 000-ton limit that Congress placed on the first repository was purely an equity issue (that is, that the western part of the United States should not have to hold *all* the nation's high-level waste and spent fuel) and that the actual wording was that the first repository would be limited to 70 000 tons until a second repository was in operation. Technically, Yucca Moun-

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tain will be able to hold much more than 70 000 tons, he said.

Yves LeBars, chairman of the board of ANDRA in France, described the "stepwise process" his country continues to pursue in the search for a repository site. The process contains several stages, with

reversibility a feature at each stage. Thus, at the current time, France is still considering several different technical options.

Still, he said, the future of HLW disposal in France is unknowable. Final decisions have not been made, since the country is still taking it step by step.

A stepwise process is also in place in Japan, according to Sumio Masada, director of Japan's nuclear waste management organization (NUMO). Paid for by nuclear power plant owners, NUMO is responsible for site selection and characterization, the license application, repository development, public relations, community support, and collection of funds.

Lessons learned from work so far, Masada said, include the fact that stakeholder confidence is the basis for public trust. Also, he said, the project needs a robust safety concept, and an independent, competent regulator is vital. Finally, he said, the stepwise process, as is being used in the United States, is the best way to ensure public confidence and eventual success.

THE TOP-TO-BOTTOM REVIEW

In the wake of the DOE's recent top-to-bottom review of its Environmental Management (EM) program, a session held Monday morning after the plenary session attempted to address the review from several points of view—those of facility contractors, local residents near cleanup sites or waste facilities, journalists, and other interested parties.

A bit of background first: Last August, Assistant Secretary for EM Jessie Roberson initiated a "Top-to-Bottom" review of the EM program to develop a new plan to clean up serious problems at sites and to reduce the risks to human health and safety. The review, recently released, concluded that the EM program had been focusing on *managing* risk rather than *reducing* risk to workers, the public, and the environment. Four major areas of weakness were emphasized:

- EM's manner of soliciting, selecting, and managing contracts is not focused on accelerating risk reduction and applying innovative approaches to doing the work.
- EM's cleanup strategy is not based

on comprehensive, coherent, technically supported risk prioritization.

- EM's internal business processes are not structured to support accel-

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- The current scope of the EM program includes activities that are not focused on or supportive of an accelerated, risk-based cleanup and closure mission.

The report included the following recommendations:

- Improve the DOE's contract management.
- Move EM to an accelerated, risk-based cleanup strategy.
- Align DOE's internal processes to support an accelerated, risk-based cleanup approach.
- Realign the EM program so its scope is consistent with an accelerated, risk-based cleanup and closure mission.

The session began with John Longenecker, executive director of the Energy Facilities Contractors Group, whose members represent 90 percent or more of DOE contractors. His group did a study of contractor spending and how to save money. The following suggestions were among the conclusions: Buy off the shelf (that is, don't create first-of-a-kind tools if a commercial-grade item will do); use industry standards; lift the scrap metal moratorium; and ease up on ultraconservative interpretations of existing regulations (an action, he said, that could produce significant savings).

Gary Perkowski, mayor of the city of Carlsbad, N.M., home to the Waste Isolation Pilot Plant (WIPP), noted that as a result of the review, waste could be coming to the WIPP facility at a faster rate. He also noted that the mission of WIPP may be expanded beyond disposing of transuranic (TRU) waste. The facility

could perhaps handle some HLW but certainly could be used for low-level waste disposal, he stated. Land is available for an expanded mission.

However, Perkowski cautioned, if the DOE is serious about increasing the rate at which the waste comes to WIPP, it must increase the number of TRUPACT containers being built and set up a repair and maintenance facility to keep the containers in good repair.

Chris Logan, from Monitor Publications, had more questions than comments about the Top-to-Bottom review. For example, if a *de minimis* level were established, what would it be? Does it make sense to lift the moratorium on recycled metal if there is no market for the material? Can some waste be reclassified? For instance, could some TRU waste be reclassified as LLW? Finally, he asked, who is now in charge of long-term stewardship? Could it be moved to other agencies? For example, he said, could FUSRAP stewardship reside with the Army Corps of Engineers, while that for Rocky Flats come under the aegis of Fish and Wildlife?

Jim McCarthy, from American Operations Corp., stated that while the Top-to-Bottom review was a courageous venture and on the right track, it did not go to the very top or to the very bottom. For one thing, he said, it did not address the gridlock of overregulation. Still, he said, the review reinforces the idea that it is better to pursue a good course of action today rather than waiting for the "perfect" course of action in some indefinite future.

Frank Coffman, from DMJM&N, provided some sobering judgments of the EM program. Without some breakthrough business practices, program cleanup costs could reach some \$300 billion, he said, and you cannot reconstruct and reorganize yourself to save

that much money. Thus, he said, EM has some problems ahead that must be faced. The major one, he said, is the fact that HLW is currently defined by origin. For example, any Hanford tank waste is considered HLW, regardless of its activity level. This fact alone, he said, could cause us to spend some \$300–\$400 billion instead of \$100 billion.

In a session wrapup, George Johnson, president of Strategic Marketing, stated that the EM program needs a training program for people out in the field, since it's in the field that people will have to implement the changes.

In a luncheon address immediately following this session, Harry Boston, then head of the DOE's Office of River Protection (ORP) at Hanford, discussed the Top-to-Bottom review as it would apply to the Hanford tank wastes. Echoing what Coffman had said, he noted that when all tanks wastes were considered to be HLW, vitrification of the entire inventory made sense. However, he said, if they can treat the lower risk tank wastes more cheaply and quickly, that would be a win-win situation for everyone. Not all waste must be vitrified, and many of the tanks can be closed in place, resulting in potential savings of \$20 billion and 20 years. In the end, he said, "we have to recognize that after 50 years of operation, we can't put it back the way it was." Even if we were to dig it up, he continued, where would we put it?

He added that the leadership for this new focus must come from the DOE itself. The DOE leadership must show contractors that "a new regime welcomes creative solutions."

OLD DOGS, NEW TRICKS

A session on Monday afternoon on lessons learned in environmental restoration projects brought a host of speakers with old problems and new ideas.

The first speaker, Robert Whiteside, from Texas World Operations Inc., reported on a project that he defined as "teaching old dogs new tricks." The management at the Oak Ridge site, looking to plug a series of old fluid injection wells, brought in an oil field company to solve the problem. The wells, which range from a minimum of 56 feet deep to a

maximum of 2000 ft, were abandoned in the 1980s and now must be cleaned up and capped.

The company began its task with an Activity Hazard Analysis (AHA) for each well, which, Whiteside said, really made the workers a part of the team. The primary hazards identified include the isotopes from fluids injected in the wells, ambient isotopes "lying around," and ambient isotopes in plants, water, and animals nearby. For this reason, materials (vegetation, etc.) were cleaned away from the wells before any work began. Cost of the AHA was only 1 to 2 percent of the total cleanup costs.

Whiteside noted that the company had to use metal detectors to find some of the wells, since some of them were just metal caps on the ground surrounded by plants. At the time he presented the paper, the company had plugged 33 wells, within budget, with no accidents or incidents.

Kent Dorr, from Kaiser-Hill, reported on the cleanup of solar evaporation ponds at the Rocky Flats site. The project faced some serious challenges, not the least of which was a preset closure date that had been negotiated with the state of Colorado but that had not been initially communicated to the workers. To try to meet the closure date, the project formed a teaming relationship with the regulators, so that 45-day review periods could be shortened to two or three days. Dorr said the project could not have met its deadlines without this teaming relationship.

One other challenge was the discovery of an owl's nest on one of the structures that was due for demolition. The project came to a complete halt until the eggs could be removed and sent elsewhere for hatching.

Among the lessons learned that Dorr listed, one of the most telling was his reminder that if you have 26 cuts to make, be as vigilant on number 26 as you were on number 1, since a problem with a cutting project may not show up until late in the game. In his case, he said, workers got lax toward the end of a project, and a worker became contaminated with liquid in a pipe that was not expected to be there.

Steve Hoeffner, from Clemson University, described an ongoing research program to identify an alter-

native technology to clean up 200 million ft³ of plutonium-contaminated soil at the Nevada Test Site (NTS). The cost to do the cleanup with existing technology (using a road grader to scrape up the soil into windrows and a front-end loader to dump it onto a truck and then trucking the material 200 miles to the Area 3 waste disposal site at NTS) is estimated to come to about \$60 million. The DOE hopes to save about a third using an alternative technology.

The research program has been a huge effort to consolidate, Hoeffner said. Numerous studies have been done in the past, but until now, no effort was made to consolidate the information in one location or to provide an overall summary of research done so far.

James Hylko, from Weskem LLC, reported on the application of risk-based corrective action (RBCA, pronounced "Rebecca") at completed UMTRA (Uranium Mill Tailings Remedial Action) program sites to check the cost of the project per theoretical cancer death prevented. The original UMTRA program was expected to cost \$180 million but actually came in at about \$1.45 billion. Looking at individual projects, Hylko reported that the Slick Rock remediation work, which cost \$53 million, resulted in a theoretical cost of \$18 billion per cancer death averted.

Looking back at some of the work completed, Hylko said that had RBCA been applied to UMTRA, only 50 percent of the sites would have been remediated, and many of the other projects would have been reduced in scope. Savings achieved by applying RBCA would have been about \$530 million, he said—about half the total cost.

Looking at some of the non-UMTRA cleanups in the same vein, Hylko noted that the cleanup of Enowetok Atoll had averted one theoretical death, but that six workers died during cleanup operations.

Amchitka Island, an uninhabited island in the Aleutian chain some 1300 miles southwest of Anchorage, was used by the U.S. Navy as a radar station for many years and also used by the U.S. Atomic Energy Commission (AEC) to conduct three (nonnuclear) tests. The AEC drilled mile-deep wells on the site, yielding diesel-fuel-contaminated mudpits. The mudpits were finally cleaned up

last year, and Michael Giblin from the DOE and David Stahl from IC Corp. reported on the trials of cleaning up such a remote site. The major obstacles were the weather (they worked in the spring and summer, and in July, for example, it rained 27 out of 31 days) and the remote distances (the site was a two-week boat trip from any major supply depot, and the airplane landing strip was often fogged in, making supply delivery a chancy thing). Even with a generous policy of flying workers back to civilization on a regular schedule, worker morale remained a consistent issue.

DRAMATIC CHANGES

A session on progress in the cleanup at DOE sites featured speakers from DOE headquarters and from sites around the country. Waste Management regular Jim Fiore, at that time deputy assistant secretary for Site Closure (he was scheduled to be reassigned in mid-March), gave an overview of the progress made during the past year. At Fernald, he noted, silo remediation has begun. At Mound, 38 hectares have been deeded back to the city (which now has more than 40 percent of the site). At Weldon Springs, all waste went into a disposal facility last June, so that the job is nearly complete there. At Oak Ridge, the gunite tanks have been stabilized and the uranium deposits have been removed from the Molten Salt Reactor Experiment. Decommissioning and decontamination of the 60-inch cyclotron at Argonne National Laboratory has been completed, and at Los Alamos National Laboratory (LANL), some 6000 drums of TRU waste have been retrieved.

Looking forward, Fiore said he didn't foresee any site closures in 2003, but perhaps there would be some in 2004 or 2005. In the meantime, he said, "you'll see dramatic changes at many sites."

Jef Walker, director of the DOE's Office of Technology Integration in the Office of Science and Technology (OST), spoke of his office's new focus on closure sites. In particular, OST will be focusing on the needs of sites with the nearest-term closure time lines. These include Rocky Flats and the Ohio sites (Mound and

Fernald). The OST's efforts to find new technologies are essential if the EM mission is to succeed, Walker said.

Wade Ballard, assistant manager for Planning and Integration at the DOE's Richland Operations Office, spoke of the shifting plans for the huge Hanford site. The DOE is "changing the way we look at the Hanford site," he said. The new focus divides the work

Alice Williams, from the DOE's West Valley cleanup project, reported that tank cleanout there is now complete and that the last glass pour will take place this current fiscal year. Progress is also being made in size-reducing, segregating, and packaging spent vitrification equipment for on- or offsite storage.

At a Tuesday session on decommissioning costs, Jeff Stevens from

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into three areas: Restore the river corridor, transition the Central Plateau, and prepare for the future.

River corridor cleanup is now scheduled to be completed by 2012; this includes getting all the fuel out of the K-basins by 2004 and placing eight production reactors in a cocooned state. This activity will eventually shrink the active Hanford cleanup efforts to about 75 square miles (from its current 586 square miles). The Central Plateau work will include completing plutonium stabilization by 2004, retrieving and sending all TRU waste to WIPP, and supporting the ORP work on tank wastes.

Nancy Tuor, chief operating officer of Kaiser-Hill, the Rocky Flats cleanup contractor, reported that the site is nearly one-third of the way through its closure project—slightly under budget and slightly ahead of schedule. One major accomplishment during the past year has been the chemical decontamination of plutonium-contaminated gloveboxes to LLW criteria, cutting costs and preserving valuable WIPP space. Overall, some 178 structures have been demolished since 1995, and the Security Protected Area was significantly reduced last July, cutting security costs and shortening the time it takes work crews to gain access to various facilities.

A continuing problem remains the lack of enough TRUPACTs to ship TRU waste to WIPP. "We can't get containers fast enough," Tuor said.

Kaiser-Hill described an effort the company is making to estimate the costs of decommissioning work at individual buildings at the Rocky Flats site. On average, he said, the system estimates have been coming in within about 10 percent of the actual costs. But that means that some estimates are coming in "dead on," while on some jobs, the estimate is off by almost 50 percent. This he attributed to the fact that at Rocky Flats "a glovebox is not a glovebox is not a glovebox," meaning that each glovebox is unique.

The company is trying to use time card information on past jobs to predict costs for future jobs, but workers are not always diligent about using proper project numbers on time cards, leading to data that are not totally accurate. Still, he said, the workers are getting better at recording numbers, and in the future, cost estimates should come in closer to actuals.

Scott Dam, president of Jupiter Corp., in his presentation on using a systematic approach for decommissioning planning and estimating for nuclear power plants, noted that plant life extension has lulled some plants into complacency regarding decommissioning funds. Plants that are planning life extension must still make sure that their decommissioning funds are adequate should an unplanned event occur that would mean immediate shutdown, he cautioned.

ACROSS THE GLOBE—A CONCERN FOR STAKEHOLDER INVOLVEMENT

Usually Thursday morning Waste Management sessions I attend feature seven or eight speakers, a session chair or two, and one audience member: me. What a pleasant surprise, then, to show up at the Thursday session on “Achieving Stakeholder Consensus for Openness and Transparency” and see a room full of interested, engaged audience members. To add to the pleasant experience, in a session featuring speakers from several international venues, the only speaker unable to show up came from Texas (and she was able to provide a substitute to present her paper).

The kickoff speaker was John Dalton, from the U.K. Nirex, an agency owned by U.K. waste producers for the purpose of finding storage and disposal solutions for the country’s nuclear waste. He reported on that agency’s recent efforts to throw off the nuclear industry’s reputation for arrogance and secretiveness. The agency has been working hard to make its actions and decisions more transparent to the U.K. population, Dalton said, and has even set up an “independent transparency panel” to oversee the agency’s work and to issue reports, which are published, among other places, on the Nirex website (www.nirex.co.uk). This transparency, he said, allows and encourages people to begin to engage in dialog about issues Nirex deals with. As a measure of the effort’s success, Dalton pointed to two recent reports on nuclear waste management activities from the country’s Parliament: the House of Lords report of 2001 and the House of Commons report of 2002.

U.S. citizens are used to the fact that the mass media tends to give more time and space to antinuclear opinions than to industry views. As reported by Elvira Maset from Argentina’s Atomic Energy Commission, this bias extends to South America as well. In Argentina, she reported, the mass media are more attracted to the antinuclear message because they are drawn to sensationalism. Science and technology, on the other hand, are not considered news, she said. Therefore, she stated, public campaigns on behalf of nuclear

waste management activities must include emotional symbolic messages directed to the public.

Ann Bergmans, from the University of Antwerp, reported on Belgium’s efforts to site an LLW disposal facility. The country’s previous approaches failed, Bergmans said, be-

put into the technology to be used. This leads them into strategic thinking, Bergmans said.

Some interesting examples of public views that influenced official actions were presented by Harold Blackman, from the Idaho National Engineering and Environmental

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cause the country viewed the issue as solely a technical one. The country had looked for a technically feasible site, then tried to convince the local community to accept the facility.

Now, however, Bergmans said, the process has been turned upside down. Today the country is looking for volunteer communities willing to discuss being the site for an LLW disposal facility and has formed partnerships with two communities to study the feasibility of siting the facility. One of the communities is located in the Mol/Dessel area, which already hosts the temporary waste storage facilities. This community is interested in getting the waste out of temporary storage and into permanent disposal. The other community, in the Fleurus-Farcienne area, is looking at the economic benefits of hosting such a facility.

Both partnerships have survived recent local elections, Bergmans reported, and she said that while the process has not yielded a final decision, discussions are continuing, and more results may be forthcoming in another year or so. The process takes time, she warned, but it has been educational for both sides. The experts have learned to listen to the public, and the public has become empowered as they grasp the concept that there is more than one solution and that they can have an in-

Laboratory. Scientists have the illusion, he began, that—given enough time and money—they can solve any problem that exists. But increasingly, he noted, public interest groups feel that they can influence any decision—or, better still, prevent any decision.

One example with a positive outcome was the decision several years ago to scuttle the Shell Oil Co. drilling platform, the *Brent Spar*. The original decision to sink the platform in the sea was both the least expensive and the most environmentally sound, Blackman said. But public interest groups in Europe raised such an uproar at the decision that Shell was forced to rethink the decision. Ultimately, Shell decided to tow the platform to the Norwegian shore, where it was used as part of a quay extension built on the shore. This final disposition became a win-win situation for everyone, Blackman said.

But sometimes public opinion and public protest lead to a very wrong decision. As an example of that, Blackman reached back into history to the Salem witch trials. The trials were held, he noted, as a response to the public concern about risk. The experts (the judges and local authorities) would likely have proposed a different solution, he said, and lives would have been saved in the

process. Thus, he concluded, public participation can be a two-edged sword.

Max Power, from the Washington State Department of Ecology, proposed establishing greater dialog with people affected by the decision to go forward with the Yucca Mountain repository for HLW: those whose backyard already has the waste, those whose backyard would receive it, and those along the shipping routes. There are two major questions that should be addressed in that dialog: "What would it take for you to feel that it is reasonably safe to take the next step?" and "What information would reduce your uncertainty?" Answers to these questions could be presented by, among other things, analogies from experience, independent science, and "concern-directed" research.

Power also made what he termed a "modest proposal" on the Yucca Mountain process (though he acknowledged that it may already be too late): (a) expand the Nuclear Waste Technical Review Board, (b) relax the three-year requirement for the DOE to submit the license application (give them as much time as it takes, he urged), (c) establish the afore-mentioned dialog, and (d) evaluate the progress annually.

Antun Schaller, from APO Ltd., an engineering company located in Croatia, described the efforts his country is making to interest journalists in the subject of radioactive waste management. The country has industrial, medical, and nuclear power plant waste, and so far has no facility in which to dispose of it. Several ministries in the country have waste oversight responsibilities, and Schaller acknowledged that this might become a problem in the future.

Croatia provides journalists with press conferences and with opportunities to visit waste facilities both locally and in foreign countries. In the process, Schaller said, the country hopes to create a class of "expert journalists" that the populace will trust. The population is generally very distrustful of any government communication, in part a carryover from the Communist era.

He gave two examples of the results of this effort, one negative and one positive. In the negative case, the government selected a site for a waste

disposal facility, but journalists wrote that the site would be used to house "foreign" (i.e., French) waste, turning the populace against the facility. But in the positive case, when local parliamentary members objected to a possible waste facility being sited in their region, journalists were able to report that similar facilities already exist worldwide with no negative effects to the local population.

Thomas West, a university student serving last year as a summer intern at LANL's Carlsbad site, reported on

(and demonstrated) his creation of a "virtual" document that described the characterization process used before waste is sent to WIPP. The digital document, based on a web platform, includes streaming video and explanations of the various types of waste characterization technologies used. Audience members found his document "way cool," and officials at WIPP and LANL are enthusiastic about his project and hope to turn it into a public information tool.—
Nancy J. Zacha ■