

Yucca Mountain in the News

Transportation

● On April 2, the U.S. Department of Energy signed a Record of Decision on the mode of transportation and Nevada rail corridor for the spent fuel/high-level waste repository being planned for Yucca Mountain, Nev. Specifically, the DOE has decided to select the mostly rail scenario analyzed in the Final Environmental Impact Statement (EIS) as the transportation mode both on a national basis and in the state of Nevada. Under this scenario, the DOE will rely on a combination of rail, truck, and possibly barge to transport spent fuel and HLW to the repository, with most of the material coming by rail. The DOE has selected the Caliente rail corridor as the one where it will construct a rail line in Nevada to the repository.

In conjunction with the issuance of the ROD, the DOE issued a notice of intent to prepare an EIS for the construction and operation of the rail line. In the EIS, the DOE will also consider the potential construction and operation of a rail-to-truck intermodal transfer facility, proposed to be located at the confluence of an existing main-line railroad and a highway, to support legal-weight truck transportation until the rail system is fully operational.

Both notices were published in the *Federal Register* on April 8.

● Serious challenges lie ahead as the DOE develops the national transportation system for the repository, noted the Nuclear Waste Technical Review Board in a March 29 letter to Office of Civilian Radioactive Waste Management Director Margaret Chu. Stated the letter: “Although the release of the DOE’s initial strategic plan in November 2003 is commendable [see *Radwaste Solutions*, March/April 2004, p. 18], the Board feels that the plan lacks the necessary detail for truly understanding the DOE’s intentions and awareness of the complexity and scale of transportation planning.” The board recommended that the DOE develop a chart showing the schedule for transportation planning activities according to each activity’s scope, duration, resources required, and relationship to other activities. This will enable the DOE to demonstrate that a systematic approach to planning is being undertaken, the board said.

Other key transportation issues the board identified include: clarification about waste acceptance; inventory of rail, truck, and barge access for each nuclear plant site; cask procurement; the use of truck transport; security planning; and emergency response capability by states and local communities. The board also emphasized the importance of collaboration and communication with transportation stakeholders—including individual states and affected units of local government—“early and often.”

In a final point, the letter stated: “The Board observes that the DOE can draw on considerable operational experience on how to transport nuclear waste safely. This is evidenced by previous and ongoing campaigns involving [the Waste Isolation Pilot Plant], foreign research reactor fuel, naval spent fuel, and West Valley spent fuel. However, no formal integration of transportation activities within the agency appears to be taking place. The Board encourages the DOE to establish such a mechanism, perhaps by reestablishing its Senior Executive Transportation Forum.”

For its part, the DOE noted that its work on transportation had been “quiet” until recently because of a lack of funding (see p. 50, this issue).

Schedule

Despite DOE protests to the contrary (see p. 49, this issue), more voices are being heard stating that the DOE is underestimating the time it will take to license and open the Yucca Mountain repository. Delays of 5 to 10 years are being projected in various reports and in various testimonies. A case in point is the report prepared by Energy Resources International Inc. for Indiana Michigan Power Co., owner of the D. C. Cook nuclear power plant. This report stated that the DOE cannot open a nuclear waste repository until sometime after 2015, some five years after the DOE’s scheduled 2010 opening date. The report was prepared as evidence in a lawsuit the utility has filed against the DOE for failure to take possession of spent fuel by a January 31, 1998, contract date.

Waste Package Closure Technology

The Idaho National Engineering and Environmental Laboratory is designing a prototype, remotely controlled system to permanently close spent nuclear fuel containers before they are placed in a repository. The system, the Waste Package Closure System, will also be built and tested at the laboratory. The waste package will consist of two containers, one nested within the other, with three lids. The packages can have various diameters and heights. INEEL engineers are integrating off-the-shelf equipment in the design of the closure system. However, the team has had to develop new or modified equipment for some parts of the operation—for example, a tool to remotely purge and fill the inner container with helium. All operations have to be done remotely because of high radiation fields.

Philip Wheatley, the lab’s Yucca Mountain relationship manager, said the project takes advantage of INEEL’s established expertise. “The INEEL has been designated as the DOE lead lab for nuclear energy technology. We have a proven history of spent fuel canister welding process development.” Wheatley added that other areas of expertise—in particular, robotics, hot cell operations and de-

sign, systems engineering and automated welding developed by the lab in receiving, handling, storing, and transporting spent nuclear fuel—make the lab attractive to the Yucca Mountain Project team.

Funding

Reclassifying the Nuclear Waste Fund as a user fee, to ensure that the approximately \$750 million collected annually from nuclear ratepayers will be spent only on the DOE's civilian nuclear waste program, is a "dead issue," stated Rep. David Hobson (R-Ohio), chairman of the House Appropriations subcommittee that controls DOE spending. Hobson said in a subcommittee hearing in late March that such a move would amount to playing "Russian roulette" with funding for the DOE repository project at Yucca Mountain. He added that the Senate will not support the change either. A bill (H.R. 3981) to make the Nuclear Waste Fund a user fee had been introduced into the House on March 17. Hobson did note that the \$880 million budget request for fiscal 2005 seemed justified. Opening the repository is important not only for the present generation, but for future generations as well, he said.

License Application

- The DOE needs to improve the quality of technical information in the documents it is providing to the NRC in support of the license application for Yucca Mountain. Otherwise, the NRC said, the commission may have to issue a large volume of requests for additional information (RAIs), which could extend staff review time. More specifically, the NRC asked the DOE for further explanation regarding why selected information is appropriate for expected repository conditions; how it selected certain data and why it believes they are representative; how it treats specific uncertainties; how it justifies extrapolation or interpolation of data; and how it has taken alternative conceptual models into account.

Tempering the bad with some good news, the NRC did cite what it called "good practices" by the DOE, including the condition report documentation, data and database referencing to promote transparency, effective data qualification program, and software documentation.

- The DOE will address all 293 key technical issue (KTI) agreements with the U.S. Nuclear Regulatory Commission by August, the DOE has stated. In some cases, the DOE will present the results of the work it performed to address technical issues, while in others the department will describe long-term research on the issues. The DOE has already submitted work on 213 of the KTIs to the NRC for review, and the NRC has determined that 90 of those contain sufficient information to support a license application. The DOE maintains it is still on

course to submit the license application to the NRC in December.

Court Rules NRC Can License Spent Fuel Storage

A U.S. federal appeals court has ruled that the U.S. Nuclear Regulatory Commission has the authority to license independent spent fuel storage installations. The ruling referred to Private Fuel Storage (PFS), a private venture attempting to build an away-from-reactor spent fuel storage facility on Skull Valley Band of Goshute Indian Tribal land in Utah. The suit against the commission had been brought by the state of Utah, by a group of Skull Valley Tribal members who oppose PFS, and nine individual Tribal members.

Utah attorneys had argued that the Nuclear Waste Policy Act of 1982 meant that Congress intended to allow spent fuel storage only at a reactor until a permanent repository is developed. The NRC had rejected this interpretation of the Act, but the groups appealed the agency decision.

The court concluded that the specific provision of the Act cited by the state "does not repeal or supercede the NRC's authority under the Atomic Energy Act to license private away-from-reactor storage facilities, and we therefore deny the petitions for review."

Report: Savannah River Watershed in Danger

The U.S. Department of Energy's plan to grout residual waste in all 51 high-level waste tanks at its Savannah River Site in South Carolina "will very likely leave a million or more curies of radioactivity in high-level waste" at the site, said a report issued by the Institute for Energy and Environmental Research. That action would create a residual waste problem that would later "be extremely difficult or impossible to remediate." The report, "Nuclear Dumps by the Riverside: Threats to the Savannah River from Radioactive Contamination at the Savannah River Site," maintains that all the waste should be removed from the tanks. The tanks themselves, however, should probably remain buried at the site if the activity level is low enough. The DOE has proposed diluting residual tank waste at SRS and other sites, allowing the department to reclassify the waste as low-level, then grout it, and leave it in place, as part of its risk-based accelerated cleanup program.

Calif. Attorney General Files Friend-of-Court Brief in Suit over Diablo Canyon ISFSI

California's attorney general, Bill Lockyer, has filed a friend-of-court brief in support of a lawsuit by two anti-nuclear groups, the San Luis Obispo Mothers for Peace and the Sierra Club, over what they term as the U.S. Nuclear Regulatory Commission's "refusal" to consider the potential environmental impact of a terrorist attack on an independent spent fuel storage installation (ISFSI) at the Diablo Canyon nuclear plant. "This administration, and this president, constantly remind us of the terrorist threat. And yet, in this case, they say the danger is so remote they can deny Californians their right to know the environmental effects of a terrorist attack on a nuclear facility," Lockyer said. He was referring to the NRC's position that the chances of such an attack are too remote to be considered. "A successful terrorist attack on a California nuclear facility, depending on its severity, could kill or injure

thousands of people, permanently contaminate valuable California natural resources, and devastate the economies of both the state and the nation," Lockyer noted. The brief was filed with the U.S. Court of Appeals for the Ninth Circuit in San Francisco.

The planned ISFSI at Diablo Canyon would be able to hold up to 140 storage casks on seven concrete pads. The plant's two reactors will run out of storage space in the spent fuel pools in 2007 and 2008, and thus would be forced to close without the additional storage. The NRC issued a 20-year ISFSI license to the plant on March 22, which would allow the plants to operate through the end of their operating licenses, which are due to expire in 2021 and 2025.

However, Pacific Gas & Electric, owner of the plant, cannot proceed with the dry storage project until it obtains a state coastal development permit from the California Coastal Commission. Regardless of the outcome, the commission's ruling, due later this spring, will likely be appealed.

New Safety Procedures Installed at Hanford Tank Farms Cleanup Project

Hanford tank farm cleanup contractor CH2M Hill Hanford Group is hiring more safety technicians and will require that all workers on the project wear respirators. This latest action came in response to concerns expressed about vapors being released during tank cleanup efforts.

In late March, most work was stopped at the Hanford tank farms while the contractor reviewed whether more should be done to keep its workers safe. The halt to work came after more than 40 workers reported exposure to vapors from the underground tanks since January 2002. Despite many changes made by CH2M Hill by February 2004 to reduce exposure to vapors, 11 workers reported smelling vapors in mid-March. Workers have also reported such symptoms as headaches, nosebleeds, skin irritation, nausea, accelerated heart rate, and breathing difficulty.

The vapors released from the tanks contain most ammonia, according to CH2M Hill, but a watchdog group, the Government Accountability Project (GAP), maintains that some 1200 chemicals have been documented in the fumes. Most of these, however, are present in very small quantities, sometime one or two parts per billion. GAP had been urging CH2M Hill to require respirators for tank workers for several months, noting that the respirators were standard safety equipment for tank farm workers in the 1990s.

Some critics have said that the contractor resisted the mandatory use of respirators because the devices are bulky and could slow the pace of cleanup work, potentially costing CH2M Hill performance-based bonuses. The company has adamantly denied any such motivation.

GAO: Remediating Paducah Site Could Take 82 Years, Cost \$7 Billion

The U.S. Department of Energy has made some progress in cleaning up contamination and waste at the Paducah, Ky., uranium enrichment site, but much work remains to be done. This was the basic conclusion of a General Accounting Office report issued in April. The report, GAO-04-457, noted that between 1988 and 2003, the DOE has spent \$823 million at the Paducah site, and the DOE projects that cleanup will take until 2019 and cost almost \$1.6 billion to complete (9 years and about \$300 million more than an earlier projection). The \$1.6 billion, however, does not include the cost of other DOE activities required at the site after the plant ceases operations, including final decontamination and decommissioning and long-term environmental monitoring. The

DOE estimates that these activities will cost almost \$5 billion and bring the total costs at the site, including the \$823 million already spent, to more than \$7 billion (in 2002 dollars) through 2070, the GAO said. The report praised the success the DOE has had in its test program to remove trichloroethene (TCE) from groundwater at the site. The DOE has been able to remove about 99 percent of the TCE in a test zone, the report said, but the technology will not be fully implemented for more than a year.

International Briefs

- Swiss nuclear wastes should be stored in a Swiss repository, according to 83 percent of 1000 Swiss residents surveyed in a recent public opinion poll, while 17 percent favored storing the radwaste in another country. Sixty

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percent said scientific know-how could ensure safe disposal and that political opposition to a local site should not hinder a repository. The poll was commissioned by Nagra, the country's nuclear waste storage agency, and conducted by an independent public opinion research institute. Nagra's efforts to find a repository site are meeting with political resistance.

- The United Kingdom's D1202 fuel fabrication plant at Dounreay manufactured its last batch of research reactor fuel in early April. The plant will now be decommissioned, at a cost of some £3 million (\$5.5 million). Decommissioning should be completed in around 2008.

- An international team, led by the head of Radioactive Waste Disposal Safety at the International Atomic Energy Agency, has endorsed the site selection process for the proposed Australian low-level waste repository. The team concluded that the site selected offers good prospects for meeting internationally endorsed safety objectives and criteria. More work, however, will be needed to demonstrate that safety for licensing purposes, they concluded.

- The German government's plan to abandon research at the Gorleben salt dome and work at the Konrad iron mine

and conduct a new nationwide search for a single geological repository site for all German radioactive waste will cost as much as 10 billion euros (about \$12 billion) in delay and wasted effort, according to the BRH, the German equivalent of the U.S. General Accounting Office. Gorleben is currently operating as an interim storage facility for high-level wastes. Gorleben and a facility at Ahaus are operated by German utilities, but the federal government is responsible for final HLW disposal.

- Norway is working on a plan for a final repository for spent fuel from the Halden research reactor. The committee working on the plan will study how much fuel needs to be stored and will suggest various storage methods, but it is not prepared to make a site recommendation. Norwegian regulators have indicated that a joint Nordic repository (i.e., joining with either Finland or Sweden) would be the most cost-effective solution for the country, but that such a solution is most likely politically impossible.

- Lithuania has chosen three locations for further study as potential sites for a final repository for low- and intermediate-level waste from the Ignalina nuclear power plant. All three sites are near the plant. The country plans to dispose of about 100 000 cubic meters of waste in a near-surface facility built above the groundwater level. The sites near Ignalina were chosen because transport would be minimized and because other factors are favorable—the area is not heavily populated, the geology is suitable, there is little potential for other economic development of the land, and there is little risk of flooding.

- The United Kingdom Atomic Energy Authority has begun a program to decommission its sites much earlier than originally planned, with the Winfrith research center to be completely cleaned up by 2020 instead of 2050; work

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at the Dourney complex in Scotland will be completed by 2047 instead of 2063; the Windscale site should be brought to a passively safe interim state by 2017, some 30 years ahead of schedule; and the Harwell cleanup program will reach a passively safe interim end state by 2015, five years ahead of schedule. The Winfrith and Harwell sites in the southern U.K. are being promoted as future high-tech business and science centers.

- A facility on the Kola Peninsula to treat solid radioac-

tive waste from nuclear-powered submarines and the civilian nuclear program is expected to begin operating this spring. The \$5 million facility, at a shipyard in Polyarny, was financed by the Arctic Military Environmental Cooperation (AMEC) program, which is a joint effort of Russia, the United States, the United Kingdom, and Norway. Waste will be stored at the facility until a final repository is available.

- South Korea's Ministry of Commerce, Industry and Energy is looking for preliminary applications to host a nuclear waste facility, including a low- and intermediate-level waste repository and a 20 000 tonne interim storage facility for spent nuclear fuel. Applications from local governments must demonstrate the consent of one-third of their residents, and may use the promise of financial compensation to secure consent. An attempt last year to name a site on Wido Island met with strong local opposition, and was eventually scuttled.

D&D Updates

- The segmentation and removal of the greater-than-Class C waste from the Millstone-1 unit has been completed. The project was the result of a cooperative effort by Dominion Nuclear Connecticut Inc., the owner of Millstone-1, Transnuclear Inc., the project prime contractor, Mota Corp., and Duratek Services Inc. Removal of the GTCC will allow workers to proceed with draining the reactor cavity and vessel, because the shielding provided by the water is no longer necessary to protect workers. Then the decommissioning team can decontaminate the vessel interior and coat it to prevent any residual contamination from getting into the air.

- Yankee Atomic Power Co. suspended shipping demolition waste from the Yankee Rowe reactor, which is being decommissioned, for nine days in March following a truck accident that left very slightly contaminated debris on a road embankment a few miles from the plant site. A container carrying 46 000 pounds of concrete debris and steel rebar came loose after the tie-down mechanism failed. The trucking company was cited for using underrated chains to secure an intermodal container to the flatbed trailer. The container was to be transferred to a rail car and shipped to the Envirocare of Utah low-level radioactive waste disposal site. This was the first accident in 625 shipments to date. The contents were recovered in less than 24 hours, and no other vehicles were involved.

- Fernald has completed building the waste retrieval and handling systems designed to remove radium- and thorium-bearing wastes from Silos 1, 2, and 3. Between 1952 and 1989, Fernald converted more than 500 million pounds of uranium into high-purity fuel cores for defense reactors located at other U.S. Department of Energy sites,

with the by-product materials stored in the Silos. Waste retrieval operations were expected to begin in May.

Also at Fernald, the demolition of the Pilot Plant, the last of the site's 10 uranium production complexes, has been completed.

- The last of the spent fuel from the Maine Yankee reactor was loaded into a dry storage cask and placed on the storage pad in late February, completing the defueling project begun in August 2002. The utility's independent spent fuel storage installation (ISFSI) holds 60 storage casks loaded with spent fuel, and four more loaded with greater-than-Class C waste. The fuel will remain in the ISFSI for several more years until it can be shipped to a federal repository. Decommissioning at the plant is now about 85 percent complete, according to Maine Yankee President Ted Feigenbaum.

- The Big Rock Point Restoration Project is scheduled to begin major demolition this year, with the Contaminated Concrete Removal project removing the part of the bioshield concrete that surrounded the reactor vessel when it was generating steam, and with the removal of many of the main structures within the protected area, including the Off-Gas Stack, the Admin, Turbine and Service Buildings, the Screenwell Pumphouse, and the Rad-waste Vault. The Containment Sphere will be decontaminated during the year, and is scheduled for demolition in 2005.

- Waste retrieval has been completed on Tank C-106 at the Hanford site, the first of the Hanford waste tanks to reach this point. The tank was built in 1944 and is more than 20 years past its intended lifespan. The 530 000-gallon tank was once on the congressional watch list of "problem" tanks because of high heat caused by a mis-routed transfer of strontium waste from the B Plant processing facility in the 1970s. The heat problem was solved in the late 1990s with the transfer of 186 000 gallons of waste, containing about 4.4 million curies of radioactivity, to another tank. Accelerated cleanup plans call for the closing of up to 40 of Hanford's older single-shell tanks by October 2006.

Elsewhere at the Hanford site, the first phase of work in the 300 Area cleanup project is nearly complete. In July, a 117-acre parcel along the Columbia River will be returned to the local community "ready for industrial reuse." Some 288 000 cubic yards of loose dirt is being transported from a borrow area elsewhere on the site to create a level grade for future industrial development.

- Waste retrieval operations at the Pit 9 Glovebox Excavator Method (GEM) project at the U.S. Department of Energy's Idaho National Engineering and Environmental Laboratory (INEEL) were completed in February. Nearly \$80 million was invested in the GEM project to learn the best options for larger scale retrievals. Workers removed 454 drums—78 cubic yards—of waste from the

one-acre site, finishing more than eight months ahead of schedule. What has been learned about waste conditions, retrieval technology, and worker safety measures will be used to make future retrievals more efficient and cost-effective, the DOE said. Larger scale retrieval operations at the landfill are expected to begin within a year.

Low-Level Waste

- A three-judge panel of the U.S. Court of Appeals for the Eighth Circuit upheld a 2002 U.S. district court ruling that Nebraska had not acted in good faith in carrying out its responsibility for hosting a low-level waste disposal facility as a member of the Central Interstate Low-Level Radioactive Waste Compact. In its decision, the appeals court panel decided that the compact is entitled to about \$150 million in damages for funds and work expended.

Nebraska immediately filed for a rehearing before the full Eighth Circuit Court of Appeals. If that appeal fails, the state would have one last chance to make its case before the U.S. Supreme Court. Few people give the state much chance of winning at either level.

Nebraska, which has spent \$25 million fighting the lawsuit so far, is also pursuing settling the case. The \$150 million damages award would severely hurt the state's finances, given that it reportedly already faces a \$211-million budget shortfall. Reports say that the governor has offered to build the facility at a location in the state other than Boyd County, the original selected site. Other sources, however, report that the state is also considering raising the sales tax to cover the damages award.

- The staff of the U.S. Nuclear Regulatory Commission wants the commission to allow intentional mixing of radioactively contaminated soils, in limited circumstances and on a case-by-case basis, to meet license termination rule release criteria. The staff said such soil mixing may have the advantage of cost savings or of limiting exposure to workers. It would be allowed only as part of an overall approach to site cleanup, which includes application of the ALARA (as low as reasonably achievable) principle and only in cases where removing the soil would not be reasonably achievable. The NRC does not permit intentionally diluting waste to alter its classification from one category to another. The agency's current practice does, however, allow intentional mixing for meeting waste acceptance criteria at offsite disposal facilities and for limited waste disposals, on a case-by-case basis. The scenarios the staff envisions for mixing soil to meet release criteria would not interfere with that practice. The staff also said soil mixing would provide an option to facilitate decommissioning sites with long-lived radionuclides, such as uranium and thorium, that are having difficulty with decommissioning for various reasons. ■