## Yucca Mountain License Application Due Mid-2008; Other Yucca Mountain Updates

The U.S. Department of Energy plans to submit the license application for the Yucca Mountain high-level nuclear waste repository to the U.S. Nuclear Regulatory Commission by no later than June 30, 2008. Head of the DOE's Office of Civilian Radioactive Waste Management Edward Sproat explained the new date before a hearing of the House Energy and Commerce Committee's Subcommittee on Energy and Air Quality on July 19. The mid-2008 application date translates to a repository operations date of no earlier than the first quarter of 2017, Sproat continued (a 19-year delay from the January 31, 1998, operations date given in the original Nuclear Waste Policy Act [NWPA] of 1982).

The DOE's original deadline for submission of a license application was December 2004, but that date came and went with no application submitted and with a few half-hearted promises of "any day now." After a few more months, however, the DOE stopped making any guesses on when a license application might be submitted, and subsequent changes in the program made even the most experienced DOE-watchers uncertain about when the license application would come. Worried industry officials began fretting that the submittal might be delayed beyond the end of the Bush administration, when a possibly less-supportive administration might move into the White House. But the mid-2008 date gives the DOE a little more than six months of cushion before a new administration takes over January 20, 2009.

The license application schedule is detailed as follows:

- Design for license application complete . . . . November 30, 2007
- License Support Network certification . . . . December 21, 2007
- Supplemental EIS issued . . . . May 30, 2008
- Final license application verifications complete . . . . May 30, 2008
- Final rail alignment EIS issued . . . . June 30, 2008
- License application submitted to the NRC . . . . June 30, 2008
- License application docketed by the NRC . . . . September 30, 2008

The DOE also developed what it terms the "best achievable" repository construction schedule, as follows:

- Start Nevada rail construction . . . . October 5, 2009
- Construction authorization from the NRC . . . . September 30, 2011
- "Receive and Possess" license application submittal to the NRC . . . . March 29, 2013
- Rail access in service . . . . June 30, 2014
- Construction completed for initial operations . . . . March 30, 2016
- Startup and pre-op testing complete . . . . December 31, 2016
- Begin receipt of spent fuel and HLW . . . . March 31, 2017

This schedule depends on several factors, the DOE admitted, including appropriations "consistent with optimum project execution," issuance of an NRC Construction Authorization consistent with the three-year period specified in the NWPA, and the timely issuance by the NRC of a Receive and Possess license. It is also dependent on the timely issuance of all other necessary permits and authorizations, the absence of litigation-related delays, and the enactment of pending legislation proposed by the administration. Most experienced industry and legislative officials are skeptical that this schedule can be achieved.

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- Senator Peter Domenici (R-N.M.) has vowed to try to move the administration's so-called "fix Yucca" legislation before the end of this congressional session. The Bush Administration bill was introduced in both chambers of

Congress in March, but the election-shortened legislative schedule has meant fewer days for work on actual legislation. Domenici's office has said that the senator planned to introduce a chairman's mark of the bill in September or October.

Passage of this bill is one of the conditions the DOE feels is essential for meeting the repository operations schedule of early 2017. The bill would revise rules governing use of the Nuclear Waste Fund, would lift the legal limit of 70 000 metric tons of waste that can be disposed of in the repository, and includes a "waste confidence" provision that would end the U.S. Nuclear Regulatory Commission's role in a part of the licensing process for new reactors. For the purposes of approving a new plant, the bill would declare that there is adequate national storage for spent fuel and radioactive waste. For its part, the NRC has said it does not mind transferring this role to Congress.

- The U.S. Department of Energy would be given authorization to construct spent fuel storage facilities on federal land in all states that have operating or shutdown nuclear power plants, under proposed provisions attached to the Senate's $30.73-billion energy and waste funding bill for fiscal 2007. The provisions would not require the DOE to site the storage facilities, but would give the department the authority to do so. This could mean licensing as many as 31 separate interim storage facilities. Spent fuel could be stored there for up to 25 years before being reprocessed and recycled or sent to Yucca Mountain. Funding for all work related to the facilities would come from the Nuclear Waste Fund.
- Stop "flyspecking," a federal appeals court told the state of Nevada in early August as it rejected the state's allegations that the U.S. Department of Energy violated the National Environmental Policy Act in evaluating transportation routes for shipping spent reactor fuel to a repository at Yucca Mountain from nuclear power plants around the country. Many of the state's claims were dismissed as being "without merit," and the U.S. Court of Appeals for the District of Columbia Circuit at one point suggested that the state was "flyspecking," that is, grasping at minor details to challenge features of the DOE's plans for the repository. The court, however, did not rule on the merits of all the claims, noting that some of the claims were not yet "ripe," meaning the state may be able to raise some of those issues again later when the DOE is closer to opening the repository.

## $20 Million for GNEP Siting Studies; Other GNEP News

In early August, the U.S. Department of Energy announced that it is making available some $20 million (authorized by Congress earlier) for conducting detailed siting studies for public or commercial entities interested in hosting facilities for the department's Global Nuclear Energy Partnership program. Entities could qualify to receive up to $5 million per site, the DOE said. The DOE also announced that it is seeking expressions of interest to obtain input from both the U.S. and international nuclear industries on the feasibility of accelerating development and deployment of advanced recycling technologies by proceeding with commercial-scale demonstration facilities, specifically a Consolidated Fuel Treatment Facility and an Advanced Burner Reactor. GNEP, launched earlier this year, proposes private-public-international partnerships to develop advanced technologies to recycle spent nuclear fuel, reduce wastes, and avoid the misuse of nuclear materials.

The applications for financial assistance grants were due in early September, and the DOE expected to announce the winning applicants by the end of October 2006.

To be eligible for funding for siting studies, the proposed site must meet minimum criteria related to size, hydrology, electricity capacity, population density, zoning, water availability, road access, and seismic stability. Preference for award of funding for the studies may be given to sites where the applicant has demonstrated community and state support for the use of the site for GNEP facilities, and preference may also be given if the proposed site has the potential for supporting both facilities.

The DOE is considering a two-track approach to demonstrate technologies under GNEP. The first track involves deployment of commercial-scale facilities for which advanced technologies are available now or in the near future. The second track would focus on future research and development on technologies for transmutation of fuels (containing plutonium and minor actinides).

Under the first track, the DOE is currently considering two commercial-scale facilities: a Consolidated Fuel Treatment Center, capable of separating spent fuel into its usable and waste components; and an Advanced Burner Reactor, which would convert transuranics into shorter lived radioisotopes while producing electricity. Under the second track, an Advanced Fuel Cycle Facility announced

earlier this year to support development of technologies to separate and fabricate the transmutation fuels for the Advanced Burner Reactor would be designed and directed through the DOE's national laboratories and, therefore, is not part of the siting studies or the industry-requested expressions of interest.

- The cost of reprocessing spent fuel is getting closer to that of a once-through fuel strategy, according to a report prepared by The Boston Consulting Group (BCG) for Areva NC Inc. BCG put the overall discounted cost of recycling spent fuel reprocessed at a greenfield facility in the United States at around $520 per kilogram, while the cost of the once-through strategy came in at around $500/kg. The report assumes that reprocessing and recycling facilities would be built on the same site.

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The report, however, is based on a modified Purex reprocessing technology, rather than on the Urex technology that President Bush has been promoting in his Global Nuclear Energy Partnership program. Urex is considered to be a more proliferation-resistant technology. Areva officials admitted that the proliferation aspects of the technology would need greater study. Environmental and security aspects of reprocessing were not addressed in the study.

Areva operates a large reprocessing facility at La Hague in France, and the company has long expressed interest in building a similar facility in the United States. Reprocessing spent fuel could provide additional fuel for new nuclear reactors, and could also reduce the amount of waste needed to be disposed of at a high-level waste repository, thereby possibly extending the capacity of the proposed Yucca Mountain repository and delaying or eliminating the need for a second repository.

## GAO: Rocky Flats Lessons Learned Can Be Useful for Other Site Cleanups

In 2001, when Government Accountability Office (GAO), the auditing arm of Congress, reported on the cleanup of the U.S. Department of Energy's Rocky Flats site, the cleanup was behind schedule and over cost. By October 2005, however, the contractor declared that it had completed the cleanup—much earlier and at less cost than either the DOE and the contractor had anticipated only five years previously.

The GAO was asked to determine the (1) factors that contributed to the cleanup's early completion, (2) remaining work and total costs, (3) measures to assess whether the cleanup achieved a level of protection of public health and environment consistent with the cleanup agreement, and (4) lessons the Rocky Flats cleanup may offer for other DOE cleanup projects.

The GAO found that four factors contributed to the early completion of the Rocky Flats cleanup: (1) the DOE's and the contractor's ability to overcome numerous challenges, (2) the use of an accelerated cleanup process, (3) site-specific characteristics that limited the scope of the contamination, and (4) the contractor's financial incentive to finish the work quickly and safely.

Although the cleanup is complete, the GAO said, its sufficiency has not yet been ascertained; key steps remain before the planned Rocky Flats National Wildlife Refuge that will occupy the site can open to the public. For example, this coming November, the regulatory agencies—the U.S. Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment—expect to issue their joint final decision on the sufficiency of the cleanup and any risk posed by residual contaminants.

As for costs, the GAO continued, the total cost of the cleanup, since 1995, has been about $10 billion in constant 2005 dollars. This cost includes contract costs of about $7.7 billion (including contractor fees of about $630 mil-

lion), long-term stewardship and pension liabilities estimated at about $1.3 billion, and other costs of nearly $1 billion. Although numerous measures in place to assess the cleanup appear adequate to judge the sufficiency of the cleanup, the DOE did not effectively carry out some aspects of its oversight responsibilities, the GAO claimed. Among these assessment measures are completion of the regulatory process, activities undertaken to verify remedial actions, and reviews by independent and federal entities.

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The regulatory agencies have approved the cleanup of 360 areas of known or suspected contamination at the site. Data supporting the cleanup of these areas form the basis of regulatory decisions regarding the cleanup's sufficiency. Accordingly, the GAO said, it reviewed the contractor's controls intended to ensure the quality of these data and found them to be robust. However, the GAO noted, the DOE lacked assurance that the controls were working as intended because it did not independently assess the quality of these key data. The agency reported that one official said that the DOE was involved daily in reviewing documents and discussed with the contractor any data quality issues that arose. The DOE has identified and implemented at other sites some lessons from Rocky Flats, but the DOE has not systematically tracked lessons learned at all of its cleanup sites, thus potentially losing the benefits of such lessons.

The GAO recommendations include that the Secretary of Energy ensure appropriate oversight of contractors' controls over data quality and assess the costs and benefits of tracking lessons learned across the DOE complex. The GAO reported that the DOE, Interior, Colorado, and Kaiser-Hill provided written comments and generally agreed with the contents of the report. The EPA did not provide official written comments, but did provide editorial and technical suggestions, as did the other agencies. The GAO said the DOE concurred with the recommendation about tracking lessons learned, but did not state whether it concurred with the other two.

GAO report No. GAO-06-352, titled "Nuclear Cleanup of Rocky Flats: DOE Can Use Lessons Learned to Improve Oversight of Other Sites' Cleanup Activities," was released on July 10, 2006. It can be viewed at www.gao.gov.

## NRC Conducting Strategic Assessment of LLW Disposal Program

The U.S. Nuclear Regulatory Commission is conducting a strategic assessment of its regulatory program for disposal of low-level radioactive waste to determine if changes are needed. In a July 7 announcement in the *Federal Register,* the agency called for public comments and asked interested parties to address a list of questions about what steps the NRC could take to address obstacles to effective LLW management.

The agency last reviewed its LLW regulatory program in 1995, and since that time, there have been a number of developments in the LLW situation—including the fact that no new disposal facilities have resulted from Congressional efforts to get states to join together to establish regional disposal facilities, leaving waste generators with only three sites, one of which can only be used by 11 states, another which will soon be available to only three states, and a third which accepts only Class A (the least radioactive) LLW. After June 30, 2008, LLW generators in 36 states will be without access to a facility that accepts Class B and C waste.

According to the NRC, "several government and national technical organizations, as well as major stakeholder and industry groups, states and Congress, have raised questions or expressed opinions regard the current status of regulation and disposal of radioactive waste in the U.S.

Though many of these groups want action to be taken on issues of concern to them, they do not necessarily hold the same views regarding what actions are needed or what issues require the most attention. Meanwhile, a number of new technical issues, involving security matters as well as protection of public health and the environment, have emerged."

The goal of the strategic assessment is to identify and prioritize activities that the staff can undertake to ensure a stable, reliable, and adaptable regulatory framework for effective LLW management, while also considering future needs and changes that may occur in the nation's commercial LLW management system.

The comments were due by August 6, 2006.

## D&D Progress Updates

- In late June, British Nuclear Group completed a three-year project to remove three redundant pipelines, totaling some 6 kilometers, from the beach and offshore at the United Kingdom's Sellafield site. The project included removal of two steel pipelines, installed in 1949, and the recovery of a plastic Temporary Sealine installed in the early 1990s. The pipelines were historically used to discharge treated process effluent and rainwater from the Sellafield Site into the Irish Sea. The sections of the pipeline have been disposed of at the country's low-level waste repository at Drigg.
- The cost estimate for the Hanford site's Waste Treatment Plant has risen to $11.5 billion, and the plant operations date has slipped to August 2019, eight years later than the 2011 startup date initially forecast by contractor Bechtel National Inc. in 2003. The cost estimate has doubled from the $5.5 billion estimate made when Bechtel was awarded the contract. Since then, Bechtel has run into several problems, related to seismic analyses, system redesigns, and other issues. Bechtel says the latest cost estimate is based on a design that is now more than 65 percent complete and construction that is more than 25 percent complete. Bechtel also said the project has had problems getting nuclear-grade equipment and materials, because suppliers have largely lost the ability to produce those items as the U.S. nuclear industry declined. New suppliers have had to be qualified to meet the standards for nuclear-related work.
- Workers at the Hanford site have completed the processing and stabilization of the first load of radioactive sludge retrieved from the K-East Basin. Four cubic meters of sludge from the spent fuel pool in the K-East reactor were removed from a section of the basin known to contain lower radiation levels than other sludge in the basin. Officials with the U.S. Department of Energy and contractor Fluor Hanford targeted this sludge to be processed first to build knowledge and develop techniques for handling the more radioactive sludge to come. The sludge was pumped into large containers and transported to Hanford's T Plant canyon for processing. Sludge treatment began in October 2005 and was completed in early June. The project resulted in more than 330 55-gallon drums of treated waste that will be stored at the Central Waste Complex at the Hanford site, where they will be evaluated for disposal either on- or offsite.

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- Decommissioning plans for reactors at the University of Michigan and Cornell University were approved by the U.S. Nuclear Regulatory Commission through recently issued license amendments. The University of Michigan's Ford Nuclear Reactor operated between September 1957 and July 2003, while at Cornell, the Triga reactor operated from January 1962 to April 2003 and the ZPR operated between January 1962 and February 1997.

## International Briefs

- France's National Assembly voted out the country's waste bill in mid-June. The law, the Nuclear Materials and

Waste Sustainable Management Program Act, sets the country's nuclear waste policy for the next 15 years, endorsing the concept of deep geologic disposal for ultimate wastes—that is, material for which no further use can be foreseen.

- U.S. company Energy Solutions LLC has announced that it is forming a consortium seeking to operate the United Kingdom's low-level waste disposal repository at Drigg. Energy Solutions operates a Class A LLW disposal facility in Clive, Utah. The contract to operate the Drigg facility is the first such contract being put up for bid by the U.K.'s new Nuclear Decommissioning Authority. The NDA is hoping that competitive bidding of projects that were previously handled exclusively by state-owned British Nuclear Fuels Ltd. and its British Nuclear Group subsidiary will lead to efficiencies and cost savings. The Energy Solutions consortium consists of British Nuclear Group (the current operator of the Drigg facility), Fluor Corp., and Jacobs Babtie, a British affiliate of Jacobs Engineering.
- In June, the Swiss Federal Executive Council endorsed Nagra's latest feasibility study for nuclear waste disposal in an opalinus clay formation in the Zuercher Weinland area of the country. Selection of a specific site for this repository, which would most likely contain intermediate- and high-level waste, is still about a year away.
- Legal issues could delay the startup of the Konrad low- and intermediate-level nuclear waste repository in Germany for another year. The project has been under development since 1982 and was licensed in 2002. Even though the Superior Administration Court in the state of Lower Saxony announced in March that all claims filed by intervenors would be dismissed and issued that verdict in writing in July, the German Ministry of Environment and Nuclear Safety is holding up the authorization for the completion of construction until the Federal Administrative Court in Leipzig reviews the state court decision. At issue are objections by three municipal governments and one local land owner.
- The government of Spain has approved the establishment of an interministerial committee to find a site for the country's first spent fuel storage facility. The chosen site would also host a high-level technology center. Creating a spent fuel storage facility postpones the decision on building a repository for final disposal of spent fuel, a subject that has met with considerable public and political opposition in the country.
- The United Kingdom's Committee on Radioactive Waste Management (Corwm) wants the country to create a special body to oversee the implementation of the 15 recommendations the committee made on how to manage the U.K.'s higher level radioactive waste. Among the challenges of this special body would be screening the country for geographically unsuitable sites for waste disposal and then forming partnership arrangements with volunteer communities willing to consider participating in a facility siting. Corwm recommended that comprehensive "involvement packages" be offered to potential host communities to enable them to hire independent advice and fully engage in a negotiation process, and "community packages" of economic and other benefits be offered to host communities.
- The Korean community of Gyeong-Ju, which has agreed to host the country's low- and intermediate-level waste disposal facility, has already received benefits of some $300 million, and can expect to receive another $300 million gradually over the next 40 to 50 years. The community is adjacent to the Wolsong nuclear plant. This payout may make the Korean LILW repository "one of the most expensive in the world," according to a Korea Hydro and Nuclear Power Co. official.
- At the G-8 summit in July, U.S. President Bush and Russian President Putin endorsed a Russian plan to create international enrichment reprocessing centers, saying it dovetailed with the Bush administration's Global Nuclear Energy Partnership program. Negotiations focusing on working out proliferation, security, environmental, nuclear materials accounting, and other safeguards will be needed to enable the United States to drop its opposition to allowing other countries to send their U.S.-origin spent fuel to Russia. Russia has already said it wants to establish facilities to store nuclear waste from other countries, and to provide reprocessing and enrichment services as well. U.S. acquiesence is essential because the U.S. (the main global supplier of reactor fuel over the last several decades) controls most of the global spent fuel inventory and its ultimate disposition. The primary impediment to the Russian proposal is the U.S. objections to Russia's nuclear exchange with Iran, but Russia's poor track record on security and environmental controls at its current nuclear facilities could also affect negotiations.