

Work on Waste Confidence Rule Could Take Two Years

In a September 6 directive to staff, the commissioners of the U.S. Nuclear Regulatory Commission called for the development of an environmental impact statement and a revised waste confidence rule, plus an associated rule on the temporary storage of commercial spent fuel, to be completed within 24 months. The new rule will have to address extended storage (life of the plant plus 60 years beyond plant shutdown) of spent fuel at nuclear power plants, as well as environmental impacts should a final repository never be built.

This directive came in response to a June ruling of the U.S. Court of Appeals for the District of Columbia Circuit that remanded the most recent waste confidence finding to the NRC (see "Headlines," *Radwaste Solutions*, July-August 2012, p. 6). In August, the NRC stated that while the staff will continue reviewing applications for new reactors and for the renewal of existing reactor licenses, final decisions on those applications will be suspended until the waste confidence issue is resolved. This could affect final approvals of several new reactor projects, including the Levy project in Florida and the Lee project in South Carolina. Licenses for both plants had been expected to be issued in late 2013.

- In other regulatory actions, in early October the NRC issued a Part 40 combined construction and operation license for International Isotopes' uranium deconversion plant. The plant, to be built in Lea County, N.M., will deconvert depleted uranium hexafluoride (DUF₆), the tailings left behind after uranium enrichment, into uranium tetrafluoride, which will then be used as feedstock for the company's fluorine extraction process to produce fluoride gases. The NRC license permits the processing of eight million pounds of DUF₆ annually.

EPRI Report Gauges Benefits, Risks of Early Transfer of Spent Fuel to Dry Storage

According to a report released by the Electric Power Research Institute (EPRI) examining the benefits and impacts associated with accelerating the transfer of spent nuclear fuel from spent fuel pools to dry storage at nuclear power plants, it is "unclear" whether the potential risk reductions due to lower amounts of heat and cesium in spent fuel pools would offset the real increase in risks, occupational safety hazards, operational impacts, and costs associated with such a policy.

The report, an update of a 2010 study, evaluated two scenarios: one in which the transfer of spent fuel from fuel

pools to dry storage would take 10 years to implement, and one in which it would take 15 years. (The original 2010 report assumed that the transition of five-year-cooled spent fuel could be accomplished in 5 years.) Benefits and impacts were determined for a representative boiling water reactor plant, a pressurized water reactor plant, and for the industry as a whole. Various operational constraints affecting the ability to accelerate the transfer of fuel were taken into account, such as the availability of handling equipment for the spent fuel pool and the dry storage casks.

Key findings from the study include the following:

- Spent fuel pool inventories would drop by some 67–78 percent for a representative PWR plant and by 73–78 percent for a representative BWR plant.
- Decay heat generation in the spent fuel pools would decrease by 23–32 percent.
- The source term from cesium would be reduced by 43–53 percent for a PWR plant and by 47–48 percent for a BWR plant.
- The increase in worker dose for the U.S. nuclear industry as a whole is estimated at 1650 person-rem and 2090 person-rem for the 10-year and 15-year scenarios, respectively.
- The economic impact to the U.S. nuclear industry is estimated at \$3.5 billion to \$3.9 billion above current operating costs, which includes costs associated with procurement of dry cask storage systems, cask loading operations, dry storage facility construction, and annual operation and maintenance.

The full report can be obtained from www.epri.com by searching on product No. 1025206.

Hearing Held on Bingaman's Nuclear Waste Bill (S. 3469)

On September 12, the Senate Committee on Energy and Natural Resources held a hearing on S. 3469, the Nuclear Waste Administration Act of 2012, which is intended to implement the eight recommendation of the Blue Ribbon Commission on America's Nuclear Future (BRC). The bill was authored by committee chair Sen. Jeff Bingaman (D-N.M.), who is retiring at the end of the current congress. He has already said that he does not expect the bill to make it through the legislative process in an election year.

Testifying at the hearing were BRC co-chairman Gen. Brent Scowcroft and commissioner Richard A. Meserve. Both testified that they were pleased to see that Sen. Bingaman's draft legislation incorporates many of the changes to existing law that will be required to implement the BRC's recommendations. They stated, however, that

while the bill generally mirrors the BRC recommendations, there are a few areas of difference that they believed to be worth highlighting and exploring, including the following:

— The BRC recommended the establishment of a congressionally chartered corporation to carry out the waste program. The bill proposes instead to create a Nuclear Waste Administration, an agency of the federal government, to carry out this role.

— The bill places limits on the amount of spent fuel that can be accepted for consolidated storage prior to congressional ratification of a consent agreement for a repository. The BRC concluded that “the current rigid legislative restriction . . . should be eliminated,” but also added that the challenge of establishing positive linkages such that progress on storage supports repository progress, not undermines it, remains important. The BRC did not recommend any linkage provisions, preferring them to be the subject of negotiations between the waste management organization and potential storage facility host communities.

In general, both Scowcroft and Meserve expressed satisfaction with the work of the Senate committee in addressing the issues raised in the BRC final report.

Another witness at the hearing, president and CEO of Constellation Energy Nuclear Group Henry Barron, also addressed the concept of a Nuclear Waste Administration, stating that it would be imperative that the CEO of such an agency “not be subjected to the political uncertainties associated with presidential appointment.”

Areva Wins Eddy-Lea Energy Alliance Spent Fuel Storage Contract

Areva has won a contract from the Eddy-Lea Energy Alliance to plan and promote a spent fuel storage installation in southeastern New Mexico, about seven miles north of the Waste Isolation Pilot Plant site.

Eddy-Lea Energy Alliance, also known as ELEA, is composed of the cities of Carlsbad and Hobbs, N.M., and New Mexico’s Eddy and Lea counties. The away-from-reactor spent fuel storage facility would have a capacity of 70 000 metric tons of uranium and reportedly would provide some 150 job opportunities.

Vermont Begins Shipping LLW to Texas

In September, a 30-gallon drum of wastes from the University of Vermont and from Burlington’s Fletcher Allen

Health Care hospital was shipped to the Texas Compact’s low-level waste disposal facility in Andrews County, Texas. And the Vermont Yankee nuclear power plant, which generates almost 90 percent of Vermont’s LLW, also made a shipment in September, and expected to have two more shipments completed by early October.

The Texas Low-Level Radioactive Waste compact consists of the states of Texas and Vermont. The Andrews County facility, which officially opened earlier this year, is operated by Waste Control Specialists.

D&D Updates

- Shipments of low-level radioactive waste from the Zion nuclear station in northern Illinois, currently being decommissioned by ZionSolutions, to the EnergySolutions LLW disposal site in Clive, Utah, were expected to begin in November or December 2012. In addition, construction is 50 percent complete on the concrete storage units being used at the independent spent fuel storage installation (ISFSI) at the site, and the heavy haul path between the fuel building and the ISFSI was scheduled for completion in November.

- Radioactive material has been found in the space (the annulus) between the inner and outer steel walls of one of Hanford’s double-walled waste storage tanks. The material is a dry mound some 2 feet by 3 ft in size and doesn’t appear to be growing. It was discovered during a routine video inspection of the annulus. U.S. Department of Energy officials stated that no material has leaked outside the outer steel wall or the concrete casing that surrounds the structure, and there is no present hazard to workers or the groundwater. They are trying to determine whether the material leaked from an inner tank or oozed into the space between the two walls from a nearby pit. “There is no evidence of it leaking liquid from the inner shell right now,” a DOE spokeswoman said. The possibility that it could be overflow from a nearby pit arises because a pipe runs into the annulus from the pit.

- The nuclear-powered aircraft carrier *U.S.S. Enterprise*, on its 25th and final deployment in the Arabian Sea, will enter dry dock in Virginia in 2013, where it will be deactivated and have its spent fuel removed. It will then be shipped to Puget Sound Naval Shipyard in Washington State to have its eight reactor compartments removed. The compartments will be barged up the Columbia River to a designated Navy disposal trench at the Hanford site—the same disposal method used for nuclear submarine reactors. Disposal operations are scheduled to begin in 2018 or 2019 and will take six to eight years to complete.

- Workers at the Savannah River Site recently poured more than 2.8 million gallons of grout into the below-



More than 2.8 million gallons of cement-like grout were recently poured into SRS's dormant C Reactor facility to safely eliminate a potential source of contamination while fully preserving the historical integrity of the building.

ground-level disassembly basin at the site's C Reactor, part of a process known as in situ decommissioning. C Reactor ran from 1955 to 1985, producing plutonium for nuclear weapons during the Cold War. P and R reactors at the site have already undergone in situ decommissioning.

- In mid-September, the Savannah River Site announced the operational closure of tanks 18 and 19, before the December 31, 2012, deadline agreed among the U.S. Department of Energy, the South Carolina Department of Health and Environmental Control, and the U.S. Environmental Protection Agency. The last tanks closed at SRS were tanks 17 and 20 (adjacent to tanks 18 and 19) in 1997. (For more on the tanks closure, see "Closing Waste Tanks at the Savannah River Site: It's Never As Easy As It Looks," *Radwaste Solutions*, September-October 2012, pp. 18-23.)

- Also in mid-September, the 394th—and final—load of "knockout pot sludge" was removed from the K West Reactor basin at the Hanford Site. The removal campaign had begun in mid-July. The next step will be removing a second type of sludge at the K West basin, being stored underwater in engineered containers. Technology is being developed to remove that sludge, which accounts for most of the waste remaining in the K West basin. After the end of the Cold War, fuel irradiated to produce plutonium, but not yet processed to remove the plutonium, was stored in cooling basins attached to the two K Reactors. The fuel deteriorated during the decades that passed, contributing to a radioactive sludge that built up in the basins. (Any material coming off the fuel that is smaller than a quarter-inch is considered sludge.) The knockout pot

sludge represented less than half a cubic yard of the total 37 cubic yards of sludge being held in the K West basin, although it totaled 15 000 curies of the total 51 000 curies in the sludge. (Earlier, the sludge from the K East basin was consolidated into the K West basin, and then the K East basin was demolished.)

- The last shipment of spent nuclear fuel from the Dairyland Power Cooperative's La Crosse BWR spent fuel pool to the plant's newly construction independent spent fuel storage installation took place in mid-September. In total, some 120 000 pounds of spent fuel was moved to the ISFSI in five shipments. For details, see "La Crosse Fuel Is Moved to an ISFSI," this issue, page 24.

- In early September, workers completed emptying the ninth single-shell underground storage tank at the Hanford Site. Some 140 single-shell tanks remain to be emptied. The site is on schedule to have all 16 single shell tanks in the C tank farm emptied by fall 2014. Eight of the nine tanks emptied so far have been on the C farm.

- Most of the East Wing of the Oak Ridge Site's massive K-25 uranium enrichment facility has now been demolished, leaving only a section on the south end that will have to be dealt with separately because of technetium-99 contamination. The West Wing demolition was completed some time ago, and all that remains of the former U-shaped building is the central North Tower. Demolition on that building will begin soon, demolition contractor URS/CH2M Oak Ridge announced in September.

- Workers have completed environmental cleanup of the F Reactor area at the Hanford Site, a first for the nuclear reservation. About 1.5 million tons of contaminated materials, including building rubble, soil, and animal carcasses, have been removed from the area around F Reactor and away from the Columbia River. F Reactor was one of nine reactors lining the Columbia River that produced plutonium for the nation's nuclear weapons program. It was Hanford's third reactor, operating between the mid-1940s to the mid-1960s. Near F Reactor was a laboratory and animal farm used for radiation exposure research.

- The U.S. Army Corps of Engineers will remain in charge of cleaning up the "Shallow Land Disposal Area" in Park, Pa., even as the U.S. Nuclear Regulatory Commission is launching an independent investigation of the cleanup work. The toxic waste disposal facility received

radioactive and chemical waste from the former Nuclear Materials and Equipment Corp., which was later owned and operated by BWX Technologies and its predecessor Atlantic Richfield Co. These companies produced submarine nuclear fuel and a range of nuclear products for the federal government and private industry. Officials stopped the cleanup project in May, when about 10 percent of the cleanup has been completed, after crews discovered quantities of what is called “complex” materials, like uranium and plutonium. This discovery has caused the cost of the project to balloon from an estimated \$170 million to as much as \$500 million.

- In early fall, Hanford’s Waste Treatment Plant received the first of 87 specially designed leaded-glass shield windows for the Pretreatment, High-Level Waste Vitrification, and Low-Activity Waste Vitrification facilities and for the

14 of which were considered to pose a “significant” health hazard to humans. Since the cleanup started three summers ago, 2184 particles have been recovered, with 409 classed as significant.

- The 15-nation Pacific Island Forum, meeting in August at the Cook Islands, issued a communiqué saying that the United States, which tested 67 nuclear weapons in the Marshalls from 1946–1958, has a special responsibility to clean up the mess left by these nuclear tests. The communiqué, endorsed by the forum’s leaders, said radioactive contaminants were still present in the Marshalls and that the U.S. should “live up to its full obligations” to remove them and compensate affected populations.

- Local communities want the 5000 cubic meters of low-level waste from Denmark’s three research reactors to remain in storage at Riso. Six communities had been selected

as possible locations for an underground disposal facility, but political leaders and local community residents are urging the government to keep the waste where it is. In 2003, the Danish parliament commissioned a study into possible disposal sites. The original list of 22 sites was reduced to 6 earlier this year, and geologists are expected to narrow the number down to 2 or 3 in the near future. The final decision will lie with the Health Minister.

- In August, the United Kingdom Nuclear Decommissioning Authority published a report outlining two options for managing intermediate-level radioactive waste in central and southern Scotland: (1) the current, or “baseline,” strategy of storing all waste on-site, or (2) consolidating waste from some sites to reduce storage area. The

NDA said storing waste at fewer locations could reduce the cost, environmental impacts, and decommissioning timescale. The facilities in question are Magnox Ltd.’s Chapelcross and Hunterston A stations and EDF Energy’s Hunterston B and Torness stations. Only the EDF stations have operating reactors. Under the second proposal, intermediate-level waste from Hunterston B would be stored at Hunterston A’s waste facility, eliminating the need to create separate storage at Hunterston B. Hunterston A could also be used to store ILW from Torness. The report was be viewed at www.nda.gov.uk/documents/upload/Intermediate-Level-Waste-Storage-Solutions-Central-and-Southern-Scotland-Credible-Options-August-2012.pdf.



Workers at the Waste Treatment Plant warehouse inspect one of the 22 specially designed windows received for installation in the Analytical Laboratory.

Analytical Laboratory. Each individual shield window weighs 7200 pounds, is 16 inches thick, and measures 75 in. wide by 65 in. tall. The first 22 of the windows are for the Analytical Laboratory. They will be stored in a controlled environment until they are installed in the fall of 2013.

International Briefs

- The summer cleanup of the seabed near the Dounreay nuclear plant in Scotland has been completed. A remotely operated vehicle was used to recover tiny radioactive fragments that were discharged from the plant into the sea in the 1970s. This summer, 299 particles were collected,