



## WCS Opens Federal Disposal Facility

On June 6, Waste Control Specialists LLC held a grand opening of its federal waste disposal facility, with U.S. Department of Energy representatives joining state and local officials for the ribbon-cutting ceremony. The opening of this facility has come just a little more than a year after the opening of the Texas Compact Waste Disposal Facility, and marks the completion of the integrated disposal operations at the Andrews County, Texas, facility.

“WCS is proud to support DOE Environmental Management in cleaning up environmental and public safety problems. Our unique low-level radioactive waste disposal capabilities provide a long-needed solution that is extremely important to the DOE,” said WCS CEO Bill Lindquist.

“I am proud to be here today to celebrate this historical event,” said Dave Huizenga, EM senior advisor. “We appreciate the state of Texas, the local communities, and Waste Control Specialists for their support of our important national cleanup mission and look forward to a continued collaborative relationship to ensure the safe disposal and long-term management of this nation’s low-level and mixed low-level radioactive waste.”

The DOE’s Los Alamos Field Office was the first to dispose of waste in the new facility. “With the help of WCS

**Above:** WCS, DOE, and LANL officials joined state regulators from Texas and New Mexico, along with community leaders from Andrews, Texas, and Eunice, N.M., for a ribbon cutting officially opening the Federal Waste Disposal Facility at the WCS site in Andrews, Texas. Among the ribbon cutters were: Bill Lindquist, CEO, Waste Control Specialists; Dave Huizenga, senior advisor, DOE Office of Environmental Management; Kent Hance, chancellor, Texas Tech University; Russell Shannon, president, National Bank of Andrews; Kathy Johns-Hughes, LANL program manager for TRU Waste; Ryan Flynn, secretary, New Mexico Environment Department; Charles Maguire, director, Texas Commission on Environmental Quality; and Bob Zap, mayor, City of Andrews, Texas.

and the supporters in Texas, we now have a cost-effective way of meeting our commitment to the Governor of New Mexico that was agreed to following the 2011 Las Conchas fire that came within 3½ miles of the Los Alamos National Laboratory waste storage area,” said David Nickless, Los Alamos Field Office DOE Transuranic Waste manager. The framework agreement between the DOE and the state of New Mexico requires the removal of 3706 cubic meters of waste from Los Alamos by June 30, 2014. Much of the waste is transuranic and is being disposed of at the Waste Isolation Pilot Plant in southeastern New Mexico. Some of the waste, however, is classified as low-level or mixed low-level waste and can be disposed of at the new federal waste disposal facility at the WCS site.



The Federal Waste Disposal Facility disposes of the first shipment of waste from Los Alamos National Laboratory in New Mexico.

## WIPP Celebrates 14th Anniversary

At the end of March, the U.S. Department of Energy's Waste Isolation Pilot Plant, located near Carlsbad, N.M., marked its 14th year as the United States' only operational deep geological repository for the disposal of radioactive waste. The facility disposes of transuranic waste from the nation's defense program.

"WIPP's 14th anniversary isn't just about passing another day on the calendar," said Carlsbad Field Office Manager Joe Franco. "It's about looking back at everything we've done, not only in the last 14 years, but going back much further." The Carlsbad Field Office has responsibility for WIPP and the National Transuranic Program.

Since that opening in 1999, WIPP staffers have worked 5.4 million work hours without cases involving days away from work, and dealt with more than 11 000 total TRU waste shipments, which have traveled more than 13.4 million miles. Some 86 000 cubic meters of TRU waste has been disposed in more than 165 600 waste containers. And 22 of 30 DOE sites have been cleaned of legacy TRU waste. In eight years' time, shipments to WIPP increased from one to two per week in 1999 to a high of 32 per week; the facility was originally designed to handle 17 shipments per week, but upgrades made in 2003 allowed workers to double waste receipt and handling capabilities.

"All who have ever worked at WIPP have every reason to be pleased. Together, we have served the DOE complex well," Franco said. "I'm proud to work with the entire team as we continue to build public confidence in our service to the nation for many years to come."

## Senate Releases "Discussion Draft" of New Waste Legislation

In late April, a bipartisan group of four U.S. senators released a "discussion draft" of comprehensive nuclear waste management legislation, aimed at reenergizing the efforts to reach a long-term solution to the nation's high-level radioactive waste and spent nuclear fuel.

Senators Dianne Feinstein (D-Calif.) and Lamar Alexander (R-Tenn.), the leaders of the Senate Appropriations Subcommittee on Energy and Water Development, and Energy and Natural Resources Committee Chairman Ron Wyden (D-Ore.) and Ranking Member Lisa Murkowski (R-Alaska) collaborated on the proposal, which builds on the work by the Blue Ribbon Commission on America's Nuclear Future. The senators sought comment on the discussion draft and on a number of policy and technical questions from experts and stakeholders.

The legislation, known as the Nuclear Waste Administration Act (NWAA), includes the formation of a new government agency to handle the waste, called the Nuclear Waste Administration, which would have access to the Nuclear Waste Fund as well as supplemental appropriations to deal with defense waste. The new waste administration would be headed by an administrator appointed by the president. The legislation also considers the possibility of separating defense high-level waste from spent fuel, and calls for a process for soliciting states and communities to volunteer sites and obtaining state consent to study and site a storage facility or repository.

By the end of May, the Senate Energy and Natural Resources Committee had received more than 2000 comments.

In its comment on the legislation, the American Nuclear Society stated that "we applaud your efforts to reinvigorate the dialogue to address this nation's high-level waste and spent nuclear fuel disposal policy. But we must also express our concern that lack of action by the Congress and the Administration in addressing the Nuclear Waste Policy Act (NWPA) of 1982 et. Seq. sets a poor precedent for any future legislation on this matter. The NWAA could be a step forward in fulfilling the federal government's responsibilities but it must be done within the context of the NWPA, rather than replace it.

"A new nuclear waste management organization is critical for both the continued viability of the nuclear power industry in the United States as well as the credibility of the United States as a global leader in nuclear trade and non-proliferation. While we do not believe the governance structure proposed in the NWAA is the appropriate model, we strongly encourage the committee to continue their efforts to establish and ultimately charter an organization that will address our nation's nuclear waste," the ANS statement said.

Nuclear Energy Institute head Marv Fertel stated: "The industry fully supports the resumption of the Yucca Mountain licensing process, but this alone is not sufficient to create a sustainable, integrated program." He added that the industry believes in "concurrently pursuing a consolidated storage program and possibly a search for a second repository location." Fertel also noted that the industry opposes the legislation's proposal to head a new government nuclear waste agency with a single administrator, preferring instead a board of directors with a CEO.

National Association of Regulatory Utility Commissioners (NARUC) Executive Director Charles Gray wrote bluntly that "the federal government must improve its dismal record on waste disposal." On the issue of siting a storage facility, NARUC pointed out: "We in effect

already have multiple interim storage facilities in operation currently due to the federal government's failure to follow current law and accept waste for permanent disposal."

According to the online political analysis entity Politico, many commenters essentially said: "The NWPA is the law of the land and should be enforced." Others asked, "How do we know your new legislation won't be undercut the same way?"

- In the meantime, the industry still awaits the decision by the U.S. Court of Appeals for the D.C. Circuit on whether the U.S. Nuclear Regulatory Commission must continue its review of the Yucca Mountain license application. On May 24, the petitioners in the lawsuit asked the court to take the case off hold and issue a decision on the merits of the challenge. The court had placed the case on hold last year (to be in effect through January 2013) pending decisions on the federal budget that could affect the NRC review. With Congress taking no action to either fund further review of the license application or to prevent the review, the petitioners asked the court to issue a decision. The petitioners include Aiken County, S.C.; Nye County, Nevada; South Carolina and Washington states; NARUC; and three individuals.

## San Onofre Permanently Shuts Down; Decommissioning Ahead?

In early June, Southern California Edison (SCE) decided to permanently retire Units 2 and 3 of the San Onofre Nuclear Generating Station. Both units had been shut down since January 2012, over concerns about leaking tubes in new steam generators supplied by Mitsubishi Heavy Industries. SCE had hoped to restart Unit 2 at a reduced (70 percent) power level, to generate income while it dealt with the Unit 3 steam generators, but the prospect of a lengthy regulatory process on the restart led the utility to conclude that its efforts would be better focused on planning for replacement generation and transmission resources. No decision on when SCE will commence decommissioning the units had been made at this writing.

- In related news, on May 14, Dominion Resources Inc. notified the U.S. Nuclear Regulatory Commission that all fuel had been removed from the reactor of the shutdown Kewaunee plant. Dominion expects to take the full 60 years allowed under the law to decommission the plant. And Duke Energy Florida is currently updating the site-specific cost estimate for decommissioning Crystal River-3 and validating the sufficiency of the trust fund.

## NRC Weighs in on Premature Degradation of Spent Fuel Cask Structures . . . and Other Regulatory Issues

In mid-April, the U.S. Nuclear Regulatory Commission issued an Information Notice on premature degradation of spent fuel storage cask structures and components from environmental moisture. The notice cited issues of spent fuel cask degradation at the Peach Bottom Atomic Power Station's independent spent fuel storage installation (ISFSI) and the Three Mile Island-2 ISFSI at the Idaho National Laboratory, in both cases caused by water intrusion. According to the NRC, these examples show the importance of periodically monitoring the physical condition of a spent nuclear fuel storage system. By obtaining baseline measurements and performing periodic evaluations, accelerated degradation can be detected before the structures and components of a storage system are unable to perform their intended function, and corrective actions can be implemented. Such information may prove useful in assessing aging management in license renewal applications, the agency said.

- The NRC is amending its security regulations for the transport of spent nuclear fuel.

The amendments establish generically applicable security requirements similar to current measures imposed by the agency in Orders to licensees following the terrorist attacks of September 2001. The amendments establish acceptable performance standards and objectives for the protection of spent nuclear fuel shipments from theft, diversion, or radiological sabotage. The changes were published May 15 in the *Federal Register*.

Details of the measures imposed by Orders over the past several years are protected as Safeguards Information. In general, the Orders resulted in enhancements in the following areas: preplanning and coordination with states and local law enforcement agencies; improved communications among movement control personnel; requirement for armed escorts throughout the shipment route; the development of normal and contingency response procedures; and more thorough background investigations of individuals associated with the shipment. The final rule addresses all of these areas.

A proposed rule and draft guidance documents were published Oct. 13, 2010, for public comment. The NRC received 17 comment letters. Comments are addressed in the current *Federal Register* notice.

The final rule will be effective August 19.

- The NRC is requesting public comment on proposed changes to its regulations for packaging and transporting radioactive material.

The agency's current transportation regulations are based, in part, on standards developed by the International Atomic Energy Agency (IAEA), an international standard-setting organization. The IAEA periodically revises its transportation standards to reflect acquired knowledge and experience. The NRC is updating its own regulations to be compatible with the IAEA's 2009 transportation standards and U.S. Department of Transportation (DOT) regulations.

The NRC and the DOT share regulatory authority over radioactive materials transport. The DOT is the lead federal agency for regulating hazardous materials transport in the United States and for interacting with the IAEA.

The proposal includes 13 changes designed to improve consistency with IAEA standards. In addition, the NRC is proposing to revise a fissile material exemption to further reduce the very low chance that uranium with very low enrichment could inadvertently begin a nuclear chain reaction.

The NRC is also proposing changes to the requirements for quality assurance programs to allow certain program amendments to be made without prior NRC approval, and to extend the duration of NRC's program approvals. Quality assurance refers to the procedures and actions necessary to provide confidence that a system or component will perform satisfactorily. The quality assurance program changes will make the agency's oversight more efficient and allow its focus to remain on reducing the risk of transportation incidents.

Other changes would clarify the requirements for obtaining a general license, the responsibilities of general licensees, and the roles of certificate holders, applicants for a certificate of compliance, and the users of certified transport packages.

The public may submit comments on the proposed changes until around August 1—that is, within 75 days of publication in the *Federal Register*, which was expected shortly after the May 20 announcement. The proposed rule will be available on the federal rulemaking website at [www.regulations.gov](http://www.regulations.gov) under Docket ID NRC-2008-0198.

Comments may be submitted on that website; by email to [Rulemaking.Comments@nrc.gov](mailto:Rulemaking.Comments@nrc.gov); by fax to Secretary, U.S. Nuclear Regulatory Commission, 301-415-1101; or by mail to Secretary, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Rulemakings and Adjudications Staff.

• The NRC is interested in comments on a draft study examining if faster removal of spent reactor fuel from pools to dry cask storage significantly reduces risks to public health and safety. Based on previous research showing earthquakes present the dominant risk for spent fuel pools, the draft study evaluated how pool leakage

from a potential earthquake might cause the spent fuel to overheat and release radioactive material to the environment. The draft study concludes there is approximately a one-in-10-million-years chance of a severe earthquake causing a radioactive release from the pool at the site examined.

The NRC began the study following the March 2011 Fukushima nuclear accident, where the spent fuel pools survived a strong earthquake. The study considered a spent fuel pool similar to those at Fukushima and 23 other U.S. reactors, and an earthquake several times stronger than what the pool's design considered. The study examined both a "full" spent fuel pool and one with less fuel and more spacing between individual fuel assemblies, as well as emergency procedures for adding water to the pool in the unlikely event that the earthquake causes the pool to lose water.

"Our detailed analysis showed that even a very strong earthquake has a low probability of damaging the pool studied to the point of losing water," said Brian Sheron, director of the NRC's Office of Nuclear Regulatory Research. "The draft study also shows that even if this particular pool was damaged, the fuel could be kept safely cool in all but a few exceptional circumstances. We'll use the final study to inform further analysis of U.S. spent fuel pools."

In cases where the analysis led to fuel damage, the draft study concluded existing emergency procedures would keep the population around the plant safe. Those emergency measures could mean relocating people from a large area of potentially contaminated land. The study also examined the potential benefits of moving all spent fuel older than five years (and therefore easier to cool) into storage casks within five years. For the scenarios examined, the study concluded faster fuel transfer to casks would not provide a significant safety benefit for the plant studied. The NRC will incorporate public comments and use the final study in a broader regulatory analysis of the spent fuel pools at U.S. operating nuclear reactors as part of its Japan Lessons-Learned activities.

The public and interested groups can comment on the study, using **Docket ID NRC-2013-0136** on the [Regulations.gov](http://Regulations.gov) website, for 30 days following publication of a notice in the *Federal Register*, expected in late June. Comments can also be submitted, using the Docket ID, via mail to: Cindy Bladey, Chief, Rules, Announcements, and Directives Branch (RADB), Office of Administration, Mail Stop: TWB-05-B01M, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

The study will be available on the [Regulations.gov](http://Regulations.gov) website, as well as in the agency's electronic document database, ADAMS, under accession number ML13133A132.

- In mid-April, the U.S. Environmental Protection Agency issued for public comments its draft revised protective action guidelines and planning guidance for radiological incidents. The update guidance revises the agency's 1992 Manual of Protective Action guides and Protective Actions for Radiological Incidents. The updated guidance applies the manual to incidents other than just nuclear power plant accidents, updates the radiation dosimetry and dose calculations based on current science, and updates late-phase guidance (that is, guidance covering the cleanup after a significant radiological event), the EPA said. The revision also recommends a simplified approach for the administration of potassium iodide and provides basic planning guidance on reentry, cleanup, and waste disposal.

### **DOE Taps EPRI to Lead Dry Spent Fuel Storage Project**

The Electric Power Research Institute (EPRI) will lead a multi-year research project to evaluate the safe storage of spent nuclear fuel in dry storage casks. The U.S. Department of Energy is investing \$15.8 million over five years in the project, with the nuclear power industry contributing at least 20 percent of the total cost.

EPRI will design and demonstrate dry cask technology at full scale for evaluating the conditions of high-burnup spent nuclear fuel during storage.

"The project will enable us to equip a dry storage cask lid with advanced instrumentation so we can collect gas samples and monitor temperature and other variables while the fuel is cooling down," said Neil Wilmshurst, EPRI vice president and chief nuclear officer. "While testing the high-burnup fuel has been conducted to analyze individual effects, this will be the first integrated testing to determine whether there are any cumulative effects."

The demonstration will enable researchers to evaluate the performance of the cask system and ensure the integrity of the fuel. Information from the project could also be used to inform future regulatory actions associated with high-burnup used fuel storage and transportation.

The target date for loading fuel into the instrumented cask is mid-2017. This year, EPRI will be developing a draft test plan, scheduled for completion in September. Following an eight-week public comment period, a final test plan will be completed by the end of the year. Activities in 2014 through 2016 will focus on designing the instrumented lid, obtaining a license for the modified lid, identifying the fuel rods to be included in the test program, procuring the cask, and conducting a dry run.

### **D&D Updates**

- The U.S. Department of Energy's Office of Environmental Management achieved a significant accomplishment at the West Valley Demonstration Project with the completion of the site's first nuclear facility demolition this spring. EM and its contractor, CH2M Hill Babcock & Wilcox West Valley, safely demolished the four-story 01-14 building. An estimated 100 intermodal containers of waste from the demolition have been shipped for radioactive waste disposal; an additional 38 truckloads of non-contaminated construction debris were sent to industrial waste landfills for disposal. The building was constructed in 1971 to support commercial nuclear reactor fuel reprocessing by Nuclear Fuel Services, the former site operator. Last year, workers removed hazardous components, isolated and removed facility systems, and decontaminated the structure prior to demolition activities. American Demolition and Nuclear Decommissioning, a local small business, completed the demolition.

- Sufficient funding from the U.S. Department of Energy received in May has enabled Savannah River Nuclear Solutions employees to return to normal work schedules at the Savannah River Site. The employees had been working reduced schedules because of the U.S. government's



*West Valley demolition work is shown in February 2013.*

## Industry news ▼

“budget sequester,” which cut federal funding across the board for most government projects.

- Removal of contaminated tailings from the former Atlas uranium mill site north of Moab, Utah, is now 37 percent complete, according to Portage Inc., which holds a five-year contract with the U.S. Department of Energy to do the work. And new permanent liners installed this winter in the sealed containers used to transport the tailings by railroad from the former mill site to the disposal site near Crescent Junction are accounting for increased efficiency. Workers used to have to install a temporary liner each time a container was used, a process that was time consuming and made emptying the containers at the site more difficult. Permanent liners are speeding up the process. Portage estimates that the liners will pay for themselves in four years, and save about \$3 million through the end of the project. A milestone of relocating 6 million tons of tailings was reached in mid-June, Portage said. A total of more than 16 million tons will be relocated during the project, which is scheduled to end in 2025.

- More than a million pounds of low-level radioactive waste have been removed from the site of bankrupt IMPACT Services, in Oak Ridge, Tenn. Science Applications International Corp. has been working as the state of Tennessee’s contractor in the cleanup of the facility at the west end of the East Tennessee Technology Park. A \$1.2 million surety bond associated with the IMPACT Services permit funded the cleanup. A lingering issue at the site, however, concerns eight 55-gallon drums of waste from the K-33 demolition project, which are the property of the U.S. Department of Energy. The Tennessee Department of Environment and Conservation and the DOE are in negotiations over removal of that material.

- In April the U.S. House of Representatives’ Natural Resources Committee unanimously approved a bipartisan bill to establish a Manhattan Project National Historical Park that would include facilities at Hanford, Wash. (specifically, B Reactor); Oak Ridge, Tenn.; and Los Alamos, N.M. The bill has to go to the full House for consideration. The Manhattan Project National Historical Park would be a unit of the National Park Service. A similar bill has been introduced in the Senate by Washington Sen. Maria Cantwell (D).

- The Hanford Advisory Board has asked the U.S. Department of Energy to slow down on transferring parts of Hanford from its environmental cleanup program to its long-term stewardship program. The DOE had been preparing to transfer control of the area around F Reactor to Mission Support Alliance as part of Hanford’s long-term stewardship program. However, the advisory board said, a final decision on the F Reactor area cleanup has not been issued, and won’t be issued for at least another year.

Therefore, turning the area over to long-term stewardship before that seems illogical, the advisory board said. According to the DOE, the area would receive better monitoring and followup under the long-term stewardship program than can be done under cleanup programs, where the focus is on completing a project and moving on.

- USEC shut down enrichment work at the Paducah Gaseous Diffusion Enrichment Plant at the end of May. Some workers will remain at the plant into next year, however, to handle operations and transition activities. USEC said the high production costs of the gaseous diffusion process and “falling prices in the global nuclear fuel market” have made it difficult to continue commercial enrichment at the plant. Work at the plant will continue through 2014 to manage inventory, meet customer orders, and ready the site for return to the U.S. Department of Energy. When decommissioning work at the plant will commence was not announced.

In related news, USEC has reported filed a nearly \$38 million federal lawsuit against the U.S. Department of Energy seeking unpaid fees. The contract services work in question “included work performed by USEC under contract with DOE to maintain and prepare the former Portsmouth Gaseous Diffusion Plant for decontamination and decommissioning,” stated Paul Jacobson, vice president of corporate communications for USEC.

- Two workers for Washington Closure Hanford at the Hanford site got quite a surprise when preparing a building for demolition. They were removing asbestos-board panels from inside an old electrical substation near Hanford’s D and DR Reactors when they discovered a green MJB coffee can tucked inside a wall. Treating the can as they would any anomaly found at the site, they contact-



The coffee can/time capsule and its contents.



*Columbia Basin News ran a photo of President Dwight Eisenhower waving at the dedication of nearby McNary Dam in 1954.*

ed their craft supervisor. Wearing white coveralls and a respirator, the supervisor entered the building to inspect the can. He unpeeled the electrical tape that secured a metal lid and found several newspapers wedged inside. He pulled them out just enough to notice they were dated September 1955. The stash included copies of the *Seattle Post-Intelligencer*, the *Spokane Review*, and the *Columbia Basin News*. There was also a copy of the *GE News*, a publication for Hanford workers while General Electric managed the project. A memo form dated “9-26-1955 A.D.” was signed by three workers. The big news of September 26, 1955, was President Dwight Eisenhower’s heart attack. Mission Support Alliance, the Hanford contractor responsible for collecting artifacts and historical items discovered across the site, will bring the coffee can/time capsule and its contents before a DOE Hanford artifact committee that determines what to do with historical Hanford items.

### International Briefs

- The International Atomic Energy Agency has released its mission report on the Mid- and Long-Term Roadmap Towards the Decommissioning of Tepco’s Fukushima Daiichi Nuclear Power Station Units 1–4, which is based on a fact-finding trip made to the plant in mid-April. The report observes that “Although a relatively stable cooling of the fuel (and fuel debris) in the reactors and spent fuel pools has been established and is adequately removing decay heat, there are several challenges to achieve a sustainable situation. The accumulation of enormous amounts of liquids due to the continuous intrusion of underground water into the reactor and turbine buildings is influenc-

ing the stability of the situation and requires additional countermeasures at the short term. For ensuring the long term stability of the fuel (and fuel debris) cooling, it will be necessary to continue the efforts to improve the reliability of essential systems, to assess the structural integrity of the site facilities and to enhance the protection against external hazards.” The report highlights nine areas of important progress to date and offers advice on 17 points where the team felt that current practices could be improved. This advice covers improvements in strategy and planning for decommissioning, stabilization of the reactors and spent fuel pools cooling, management of radioactive releases and assessment of associated doses, management of radioactive liquids on the site, radiological protection of workers onsite and site decontamination, taking into account both international standards and experience from decommissioning programs in other countries. The full report can be found at <http://www.iaea.org/newscenter/focus/fukushima/missionreport230513.pdf>.

- Germany has drafted legislation to establish a broad, 24-member commission to find a geological repository for waste from Germany’s nuclear power stations. The commission would have until 2015 to first formulate search criteria. The search for the “best suited” final repository in stable granite, salt, or clay is supposed to be completed by 2031.

- The heavy-water plant in Glace Bay, Nova Scotia, Canada, is finally being demolished. The plant was built in the 1960s and shut down in 1985. Much of the plant was removed at that point, but several boarded-up buildings and underground pipes and concrete remained onsite. Eight of the remaining buildings were torn down in December 2012. And while some 15 000 cubic meters of concrete have been removed, another 25 000 to 30 000 cubic meters remain in the ground and must be removed. The \$3 million (Canadian) project is due to be completed next March.

- The Public Comment period on France’s Cigéo facility for the disposal of high-level waste began in May and will run through the middle of October. Public comments will be considered ahead of the license application to build and operate the facility, which the French nuclear waste organization, Andra, plans to submit to the French Nuclear Safety Authority next year. Given permission, Andra hopes to begin construction of the facility in 2019 and begin operations in 2025. For more on the Cigéo project, see “Introducing Cigéo, the French Geological Repository Project,” this issue, page 46.

- At the end of May, the Japan Nuclear Fuels Limited (JNFL) Rokkasho reprocessing plant successfully tested its “A” vitrification line, trapping highly radioactive materials from 70 liters of liquid waste within 25 glass logs, and moving the facility closer to operation. The plant has

taken 13 years to build, and its commissioning since 2006 has been extremely slow. JNFL expects to secure a license to operate the plant later this year. Fuel reprocessing remains central to Japan's waste management strategy.

- Sellafield Ltd. has been fined £700 000 (\$1.1 million) for mistakenly sending four bags of low-level waste to a local landfill, rather than to the United Kingdom's dedicated LLW disposal facility at Drigg. The shipment, the result of incorrect characterization of the bags of waste due to incorrectly configured equipment, took place in April 2010. Once Sellafield discovered the error, the company informed the Environment Agency and the Office of Nuclear Regulation. Ultimately, the company was fined for two violations: sending this waste, classified as "dangerous goods," by road under conditions unsuitable for the waste, and disposal of the waste at a conventional landfill site. The bags were later retrieved from the landfill and returned to Sellafield for correct disposal. In addition to the fine, the Carlisle Crown Court ordered Sellafield to pay more than £72 000 (\$114 000) in court costs.

- The Dounreay raffinate, the acidic liquid remaining after fuel reprocessing, has nearly all been transferred from storage tanks and cemented into drums ready for disposal. Some 1200 cubic meters of the raffinate was generated at Dounreay. It is highly radioactive and accounts for some 80 percent of the waste inventory at the site in terms of radioactivity. More than 4700 drums of cemented raffinate have been produced so far. The empty tanks that once held the raffinate will be decontaminated to meet low-level waste criteria, and then will be removed and disposed of in the new LLW facility.

- A German law ordering the cleanup of 126 000 barrels of radioactive waste at the former Asse nuclear waste facility has recently come into effect. The Asse site was one of Germany's most productive salt mines until it closed down in 1964. Shortly thereafter, the German government bought the mine and began to store low- and medium-level radioactive waste there. The barrels of waste, most of which came directly from the country's nuclear power plants, were stored in empty chambers already dug out by the miners. Now, however, because the mine is unstable and water has been seeping in for decades, new, more stable access shafts are being designed for the planned waste removal, which could take another 20 years. No decision has been reached on where the retrieved waste barrels will be stored.

- In early April, a pair of nesting peregrine falcons was discovered on the roof one of the reactors at the Bradwell nuclear station in the United Kingdom, temporarily bringing work to a halt on the decommissioning of the plant. Plans to work on both reactors concurrently were

changed, and all efforts were moved to the neighboring reactor. Peregrines, protected by law, do not make an actual nest; rather, they prefer to find a ledge. The fine gravel on the top of the reactor building provided an ideal location. The chicks hatched in June and can be expected to remain close to the nest through the summer. In 2008, nesting falcons cost site owners Magnox more than £1 million (about \$1.5 million) as a result of delays.

- Australia's oldest research reactor, the high-flux Australian reactor, at Lucas Heights, which started up in 1958 and was shut down in 2007, will be removed from the neighborhood near Sidney and moved to a new repository for radioactive material, to be located in the outback at Muckaty, 800 kilometers south of Darwin. The government is putting up nearly \$29 million (Australian) for the reactor cleanup and removal, and another \$36 million into securing a site to become the nation's repository for radioactive material, which will host waste from Lucas Heights and may provide the state government with a destination for contaminated soil from the former uranium smelter site at Hunters Hill.

- Phase One of the Dragon reactor decommissioning has been completed. Dragon, located at Winfrith in the United Kingdom, operated successfully from 1964 to 1975 and was regarded as one of Europe's most successful collaborations in applied science. Technology pioneered by Dragon, a forerunner of gas turbine-moderated reactors, developed highly efficient and reliable reactors with little contaminated waste. The site is now managed by Research Sites Restoration Limited, responsible for the closure program. Decommissioning began in 2005 but was halted after a few years due to a lack of funding. When additional funds became available in 2011, decommissioning restarted. Phase One involved removal of all of the reactor plant outside of the reactor pressure vessel, including the removal of 360 tonnes of reinforced concrete, 258 tonnes of steel, 85 tonnes of lead, 140 cubic meters of perlite, and 25 cubic meters of asbestos. Most of the metal removed, and all of the concrete, was reused or recycled.

- In mid-June, work began to lift into place the second part of the eastern segment of the arch that will form the new safe confinement for the Chernobyl-4 reactor. The lifting operations follow a completed inspection of the steel arch construction, operability of the jacking system, and a geodesic survey of arch metal construction position and foundations. The new safe confinement is being funded and sponsored by several countries and is being supervised by the European Bank for Reconstruction and Development. The first part of the eastern arch segment was lifted into place last November. ■