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Paladin's takeover of NGM Resources assured as compulsory sale triggered

Australia uranium mining firm Paladin Energy said October 28 it had acquired 91.58% of the shares in Australian firm NGM Resources, triggering a compulsory sale of all remaining NGM shares to Paladin under its off-market takeover bid.

Under the A$27 million (US$26.9 million) takeover of NGM Resources that Paladin launched in August, NGM shareholders will receive one share in Paladin Energy for every 23.9 shares owned in NGM.

NGM Resources' main assets are its three uranium exploration concessions in Niger's Tim Mersoi Basin. NGM Resources' most advanced project is the Takardeit deposit in Niger. In January, NGM said that deposit has an inferred resource estimate of 11 million pounds of U3O8.

Paladin said owners of any outstanding shares may offer them to Paladin until the official takeover offer expires November 5.

The company said NGM Resources shareholders who have tendered their shares to Paladin by that date would receive their new shares in Paladin November 12, but that the owners of shares acquired compulsorily might have to wait longer to get their Paladin shares.

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NRC inspector general investigating Jaczko's termination of Yucca review

The NRC Office of the Inspector General has initiated an investigation of Chairman Gregory Jaczko's decision to terminate the licensing review of DOE's Yucca Mountain repository project in Nevada, a senior OIG investigator said October 27.

Rossana Raspa, however, declined to say whether the investigation was triggered by a request Representatives Fred Upton of Michigan and Ed Whitfield of Kentucky, both senior Republicans on the House Energy and Commerce Committee, sent to the OIG October 20 or by a similar request former NRC Commissioner Kenneth Rogers made October 8. She would not say whether additional requests had been made.

The investigation comes after Jaczko's decision October 4 to move the licensing review to what the agency calls an "orderly closure" led to protests. In a letter to Jaczko October 13, four prominent House Republicans called the action "alarming" and said it had "the appearance of coordinated action" with DOE (NF, 18 Oct., 1).

Jaczko responded to that letter October 27, telling Representatives Joe Barton and Ralph Hall, both of Texas, Doc Hastings of Washington state; and Jim Sensenbrenner of Wisconsin that the closure is consistent with Congress'

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Spot U3O8 price ends month above $50/lb

At month-end, the spot price of uranium appeared to be settling into a relatively narrow trading range of $51.25 a pound U3O8 to $52.50/lb, according to several analysts. The last time the spot price ended the month above $50/lb was at the end of June 2009.

Whether the price stays above $50/lb or heads higher by year-end is uncertain and will depend on the motivations of individual buyers — in particular Cameco — and sellers, such as Nukem and others that might need to place material by the end of the year, analysts said. "I expect the price to continue to oscillate around an upward trend," said one analyst

TradeTech raised its spot price October 22 to $52.50/lb, up $4/lb from the price it reported October 15. TradeTech said the increase was the largest since November 2008, when the spot price rose $5/lb in one week. TradeTech said that the increase in mid- and long-term demand, coupled with continued buying interest from primary producers, helped fuel the

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Platts Forward Uranium Indicator

Current		Previous	
Low-High	Midpoint	Low-High	Midpoint
49.50-53.50	51.50	49.50-56.00	52.75

Other Uranium Pricing Indicators

Source	Price	Previous price
TradeTech (1) (Sep 30)		
Exchange value	46.75	45.50 (Aug 31)
Long-term U3O8	62.00	60.00
UF6 value ($/kgU as UF6)	135.00	131.00
Ux Consulting (2)		
Spot price (Oct 25)	52.00	49.25 (Oct 18)
Spot conversion (U.S.) ($/kgU as UF6) (Sep 27)	13.00	13.00 (Aug 30)

1. TradeTech's Nuexco exchange value reflects the company's judgment of the price at which sales of significant quantities of yellowcake could be concluded as of the reporting date.

2. The Ux Consulting's price indicates, subject to the terms listed, the most competitive offer available of which Ux Consulting is aware. Those terms (Oct 25) are: quantity, above 100,000 lb; delivery, within three months.

Secondary SWU Market Price Estimate (US$/SWU)

Source	Price	Last Report
TradeTech (Sep 30)		
Unrestricted	153.00	153.00 (Aug 31)
Restricted	153.00	153.00
Ux Consulting (Sep 27)		
Spot	153.00	153.00 (Aug 30)

Editor's Note: Table updated from NF Uranium Pricing Supplement of October 22, 2010. The Uranium Pricing Supplement, issued biweekly on Fridays, is available exclusively to NF electronic subscribers. For more information on electronic subscription delivery, please contact customer support, at the e-mail or phone numbers listed in the index box on the final page of this issue.

price rise.

Ux Consulting October 25 raised its spot price to $52/lb, up $2.75/lb from UxC's October 18 price. In its commentary, UxC said that with the price now above $50/lb, "additional supplies are likely to become available on the spot market, and some of the trader activity on the buy side is now more likely to shift to the sell side." UxC said that while many market participants believe the support level for the spot price is now well above $45/lb, it is unclear whether $50/lb is the new floor. "Only actual spot demand will tell," UxC said.

UxC's broker average price, or BAP, was $51.52/lb U3O8 on October 28, the same price it was a week earlier, but up 27 cents from October 27. The BAP is a daily calculated mid-point of the bids and offers reported by three brokers — ICAP Energy, Evolution Markets, and MF Global, according to UxC.

In Platts' opinion, based on discussions with market sources, spot U3O8 transactions over the next week are likely to occur within the range of $49.50-$53.50/lb.

In the long-term market, UxC raised its end-of-the-month price by $2/lb to $62/lb. TradeTech, which will publish its new long-term price October 31, had increased its long-term price September 30 to $62/lb, up $2/lb over its August 31 price.

UxC noted that, with the rise in the spot price, "it would not be surprising to see a further increase in the long-term price in the near future, especially if spot prices remain elevated and the long-term demand stays strong." Several analysts said they expected the long-term price to rise to somewhere within the range of $64-$66/ lb shortly.

Omaha Public Power District, Duke Energy, and Dominion received offers over the past several weeks for mid- and longer-term deliveries. Several market sources said they believed the utilities received more offers than some analysts had expected.

Market analysts and price publishers often have slightly different definitions of spot and long-term deliveries, but spot-market deliveries typically occur within roughly three to four months but can sometimes stretch out to 12 months; long-term deliveries are multi-year deliveries that start typically start 18-24 months in the future. Those deliveries but can sometimes start as early as 13 months out.

TradeTech's monthly mid-term price, which remained at $50/lb at the end of September, is expected to jump significantly, given the rapid rise in the spot price in October. Several analysts said they think the mid-term price is now at least $55/lb for deliveries more than 12 months out.

First Uranium quarterly production down

First Uranium produced 12,753 pounds of U3O8 at its Ezulwini mine in South Africa in its second-quarter fiscal 2011, which ended September 30, the company said October 19.

The total was down from the 13,098 lb U3O8 produced in the same quarter a year ago and from the 19,764 lb U3O8 produced in first-quarter FY-11.

First Uranium's underground Ezulwini mine has a measured resource of 2.2 million lb U3O8 and indicated resources of 4.8 million lb U3O8, according to company statements. It also has 2.7 million ounces of measured and indicated gold resources. The company's other major operation is a gold and uranium tailings recovery project at its nearby Mine Waste Solutions, or MWS, facility.

First Uranium said its gold production increased, with 14,820 ounces of gold being produced at Ezulwini in second-quarter FY-11, up from a year-ago when 7,952 ounces were produced. Its second-quarter gold production at MWS was 18,598 ounces, up from 13,422 ounces a year ago.

Denison to mill White Canyon ore

Denison Mines is to begin milling ore from Australia-based uranium development and exploration company White Canyon Uranium's Utah properties "on or about November 1," White Canyon Uranium said in a statement October 14.

White Canyon owns multiple mining prospects in south-

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Kazakhstan nuclear firm, Areva form joint venture on fuel fabrication

Areva and Kazatomprom signed an agreement to create a joint venture that could result in a nuclear fuel manufacturing facility operating in Kazakhstan in 2014, Areva said last week.

The venture furthers the aim of Kazakhstan, already the world's largest uranium producing nation, to become an integrated nuclear fuel cycle country, with plans for adding uranium enrichment, fuel fabrication and ultimately nuclear power plants to its national infrastructure.

The new joint venture company, owned 51% by Kazatomprom and 49% by Areva, is to build a fuel assembly manufacturing line based on an Areva design at the Ulba Metallurgical Plant in Ust-Kamenogorsk in eastern Kazakhstan, Areva said October 27.

The 400-metric ton uranium/year unit — about 800 fuel assemblies/year — is scheduled to start operating in 2014, Areva said.

The agreement was signed in Paris by Areva CEO Anne Lauvergeon, and Kazatomprom Chairman Vladimir Shkolnik October 27 during Kazakh President Nursultan Nazarbayev's official visit to France.

Areva and Kazatomprom now have three separate joint ventures. In addition to the fuel manufacturing one announced last week they are Katco, a uranium mining joint venture owned 51% by Areva and 49% by Kazatomprom, and the fuel marketing joint venture Ifastar owned 51% by Areva and 49% by Kazatomprom.

Fuel from the new Kazakhstan production line will be marketed by Ifastar, Areva spokeswoman Fleur Floquet-Daubigeon said in an interview October 28.

Kazatomprom said in an October 28 press statement that the fuel will be marketed to Asian utilities. In a separate statement, Areva CEO Anne Lauvergeon said the agreement illustrates Areva's "integrated offer strategy and strengthens our position on the world-wide fuel market."

Vladimir Shkolnik, chairman of the Kazatomprom board, said the move is "consistent" with his company's plans "to create a vertically integrated company with [a] complete nuclear fuel cycle." The agreement marked "another important milestone of this strategy," he said.

Kazatomprom has recently said it intends to favor giving access to its uranium mines to companies that support its goal of becoming an integrated nuclear fuel cycle company. "If someone comes along who is committed to help" Kazatomprom develop into a full fuel supplier, Kazatomprom is ready to share part of the increased uranium production, KAP Vice President Galimzan Pirmatov said in September at the World Nuclear Association Symposium in London (NF, 20 Sept., 1).

The new Areva-Kazatomprom joint venture confirms plans made under a 2008 memorandum of understanding, which originally foresaw first output of Western-design fuel assemblies from the Ulba plant in 2012 (NF, 16 June '08, 1).

State-owned nuclear company Kazatomprom has a separate agreement with Canada's Cameco for a uranium conversion facility. Progress on that agreement for a 12,000-metric ton UF6 conversion plant at the same Ulba facility has apparently stalled.

When the agreement was announced in June 2008, Kazatomprom said construction would begin in 2009. When asked if construction had begun, Cameco spokesman Robert Gereghty replied in an October 28 e-mail that "we continue to work with Kazatomprom to evaluate opportunities aimed at cooperating on UF6 conversion." He did not expand on his comments or reply to questions about the planned facility and joint venture.

The conversion facility was reported under the 2008 agreement as coming out of a 51% Kazatomprom joint venture. Cameco was planning to "potentially hold an interest of up to 49%," Cameco said in 2008.

Separately, Gereghty confirmed Cameco has not yet received an amendment to its Kazakhstan subsoil use agreement at its 60%-owned Inkai mine. The amendment would provide for a five-year appraisal period for mining at Inkai's so-called block 3 region and increase annual production from blocks 1 and 2 to 3.9 million pounds in 2010.

Cameco had been expecting that approval by September 30, but Gereghty said October 28 it was still "progressing through the Kazakh government approval process."

—David Stellfox, Barcelona

Holtec barred from federal contracts while TVA notice pending

The Tennessee Valley Authority could be ending its 10-year relationship with Holtec International with the federal utility's issuance of a notice of proposed debarment to the spent fuel storage cask and pool-rack vendor October 12.

TVA spokesman Raymond Golden said October 15 that Holtec is excluded from work on any new federal contracts while the debarment process is pending. Golden declined to provide a copy of the notice of debarment or to comment further until the process is completed, which he said is expected to take several months.

It is unclear whether the proposed debarment would have an impact on Holtec's existing contract with Energy Northwest for spent fuel storage casks at the Columbia nuclear power plant in Washington state. The Bonneville Power Administration, a federal agency, plays a role in approving those contracts, but Energy Northwest did not return phone calls seeking comment. Energy Northwest's only customer is BPA, which buys and sells electricity in its Pacific Northwest service territory, including Washington state, Idaho and Oregon.

Otherwise, TVA is Holtec's only federal customer. Holtec also has supplied pool re-rack services and spent fuel storage casks to other nuclear power plant operators in the US as well as in Spain, Switzerland and Ukraine.

The privately owned Holtec does not release information about its finances or market share, and company spokeswoman Joy Russell declined October 28 to comment on TVA's action.

Holtec has 30 days to respond to TVA's notice. Once TVA

has received that response, the debarment could be lifted, or Holtec could remain debarred for up to three years from all federal contract work, Golden said.

TVA's notice places Holtec on the Excluded Parties List System, or EPLS, a list of parties excluded from receiving federal contracts. The EPLS is maintained by the General Services Administration, an independent federal agency that provides various services to the federal government. According to the EPLS web site, the list is "used to keep agencies abreast of administrative as well as statutory exclusions taken throughout the federal government."

Parties can be excluded under the general Federal Acquisition Regulation, or FAR, or under specific agency regulations or statues. Holtec's listing on the EPLS does not explicitly state the reason TVA proposed debarment, but references causes for debarment outlined in FAR 9.406-2 and the Postal Services' regulations in 39 CFR 601.113.

The two regulations say causes for debarment include convictions and civil judgments related to contracts and antitrust statutes, offenses "indicating a lack of business integrity or business honesty," or "a preponderance of evidence" showing various violations of federal and state laws, as well as any other cause of a "serious or compelling a nature" that warrants debarment.

Golden said TVA has a contract with Holtec that is due to expire "toward the end of this calendar year" and that Holtec would complete the work it has been paid to do. "Anything beyond that, we will have to wait and see," he said.

TVA contracted with Holtec in 2000 to rerack the spent fuel pool at the Sequoyah nuclear power plant in Tennessee and the Browns Ferry plant in Alabama. TVA also entered into a contract with Holtec in 2000 under which 20 Hi-Storm 100 spent fuel dry storage systems were delivered to Sequoyah, according to Holtec. In 2001, that contract was extended to include delivery of 16 more of the systems to Browns Ferry. In a July 2009 statement, Holtec said TVA contracted for an additional 45 Hi-Storm 100s for near-term delivery to Sequoyah and Browns Ferry, with an option to acquire 36 more.

The Browns Ferry contract was a sole-source $20 million, five-year contract to supply eight Hi-Storm 100 spent fuel storage casks. Eight additional Hi-Storm 100 overpacks and eight MPC-68 canisters were slated for delivery in 2008, according to Holtec.

Holtec also bid on a request for proposals that TVA issued in December 2008 for delivery of about 100 casks for use after 2011. But TVA allowed the bids, submitted in March 2009, to expire without executing a contract, Golden said in an October 28 e-mail. He said TVA told bidders at the time that it was rethinking its approach to dry cask storage.

Golden said in his e-mail that Browns Ferry and Sequoyah "maintain enough spent fuel pool space to accommodate a full-core offload. The Sequoyah and Browns Ferry dry cask storage facilities have been in use since 2004 and 2005, respectively. Watts Bar has sufficient storage capacity in its spent fuel pool to last until approximately 2015."

But Golden said information on the number of casks that TVA purchased and that have been delivered under the existing contract with Holtec is "business sensitive." He declined to comment on when Sequoyah and Browns Ferry would lose full-core capability without additional dry storage casks. But he said that both Browns Ferry and Sequoyah will continue to need storage casks. "TVA continues to evaluate its options regarding on-going dry cask storage procurement needs and strategy," he said.

TVA recently awarded Holtec competitor Transnuclear its first re-rack contract, TN said in an October 15 statement. TN will provide Nustor wet storage racks to TVA's Watts Bar plant, TN said.

TVA's proposed debarment of Holtec comes more than two years after a federal investigation related to the Browns Ferry contract that resulted in John L. Symonds, a former manager at the plant, pleading guilty to a felony charge of making a false statement on a financial disclosure form. The plea was related to about $54,000 in payments he received in 2002 from Holtec subcontractor US Tool & Die (Nucleonics Week, 9 Aug. '07, 1).

At the time he received the payments, Symonds was the modifications manager for the TVA Browns Ferry-1 restart project in Alabama. The unit was returned to service in May 2007 after a shutdown that lasted more than 22 years.

Court filings in the case said that Holtec "directed" US Tool & Die to send the $54,000 in two installments to a company owned by Symonds and his wife. The company, Krohn Enterprises LLC, performed background investigations, according to the sentencing memorandum provided to the court by Symonds' attorney.

US Tool & Die was Holtec's cask fabrication subcontractor when Holtec acquired the company in January 2004. Holtec subsequently changed the fabricator's name to Holtec Manufacturing Division.

Symonds said he "knowingly and willfully" failed to disclose receiving either payment on an annual Office of Government Ethics financial disclosure form that is aimed at identifying potential conflicts of interest.

Under his plea agreement, Symonds agreed to cooperate with federal law enforcement agents and the US Attorney's Office. The investigation did not result in further prosecutions. Symonds was ordered to pay a $5,000 fine and was sentenced to two years' probation by a federal judge in December 2007 for the felony conviction.

—Maureen Conley, Washington

Uranium One says Russian owner has no formal role in its US mines

Canadian uranium miner Uranium One told the US NRC October 18 that Russia's state-owned uranium company, Atomredmetzoloto, and its government parent company Rosatom will have "no formal relationship" with Uranium One's US subsidiaries after ARMZ becomes the majority shareholder in Uranium One.

The Canadian firm also said it now has no intention to export uranium from its US mines. "These operations are specifically intended to create a new US source of natural

uranium for commercial customers in the United States, who currently rely overwhelmingly on imports to supply their needs," the company said October 18 in response to a request for additional information, or RAI, from the NRC.

Two US approvals of ARMZ's planned takeover of Toronto Stock Exchange-listed Uranium One are the only remaining clearances needed for the deal.

Under the deal, ARMZ will become the 52.1% owner of Uranium One through two ARMZ subsidiaries — Effective Energy NV of the Netherlands and the Russian joint stock company UMC, or Uranium Mining Co.

A joint stock company is a type of corporation or partnership involving two or more legal persons. UMC was founded in 2006 as part of the reorganization of state nuclear enterprises. Russian uranium enricher Tenex and nuclear fuel manufacturer TVEL were given equal ownership shares in UMC when it was created.

Approval of the Uranium One-ARMZ deal by the US Department of Treasury's Committee on Foreign Investments occurred October 22, despite pleas by four Republican US congressmen to block the deal on national security grounds (NF, 18 Oct., 1). NRC has not yet weighed in on the deal.

Uranium One assured NRC in its October 18 response that "neither ARMZ nor Rosatom will hold any unique powers by agreement or otherwise" with regard to Uranium One's US subsidiaries Uranium One Americas and Uranium One USA.

The NRC is reviewing Uranium One's request for an ownership change because the two Uranium One US subsidiaries hold NRC materials licenses, which include attached decommissioning liabilities.

Uranium One subsidiaries own and operate the licensed and permitted Irigaray in-situ recovery, or ISR, central processing plant, the Christensen Ranch satellite ISR facility and associated uranium ore bodies, all in the Powder River Basin of Wyoming. Collectively, these facilities are known as the Willow Creek Project.

The nearby Moore Ranch project is expected to become a satellite ISR operation, with loaded resins being transported to Willow Creek for further processing into dry U_3O_8. The NRC issued an operating license October 1 for the Moore Ranch project.

The NRC had queried Uranium One about the validity of a letter of credit that is meant to serve as a surety against default on decommissioning liabilities on its US properties. Uranium One told NRC in its October 18 RAI response that the Bank of Montreal, which issued the letter of credit, has confirmed that the letter remains valid after its takeover by ARMZ.

"Rosatom and ARMZ will not directly participate in decision-making with regard to decommissioning liabilities at the Irigaray, Christensen Ranch and Moore Ranch projects under the licenses and are not liable for any decommissioning liabilities under the licenses," Uranium One said.

Uranium One "emphasizes that it will remain a separate and independently managed corporation, separate and apart from ARMZ.

"ARMZ's financial standing will have no bearing on the development and operation of the Uranium One US facilities or the ability of Uranium One Inc. and its subsidiaries … to complete the required decommissioning under the licenses," Uranium One said.

Uranium One spokesman Rob Buchanan said by e-mail October 27 the company expects NRC approval "within the next several weeks, keeping us on track to close the ARMZ transaction by the end of the year."

In its October 18 RAI response, Uranium One said that on closing the deal, it will "remain a publicly listed company on the Toronto Stock Exchange and the Johannesburg [South Africa] Stock Exchange and will continue to be subject to extensive ongoing securities regulatory, corporate governance, and financial reporting requirements under applicable Canadian laws and regulations, and the rules and regulations of the TSX and the JSE."

The company said the equity and debt finance markets "that Uranium One has accessed in the past and intends to access in the future are subject to extensive regulation and public disclosure requirements."

They said Uranium One will continue to be governed by a board of directors with a majority of "independent directors" as defined in National Instrument 52-110 of the Canadian Securities Administrators, which regulates securities in Canada.

Although indirectly owned by Rosatom, ARMZ "operates as a commercial participant in the global uranium industry" and is a joint stock company organized under Russian laws, Uranium One said.

There will be nine directors on the board following the takeover. ARMZ will be entitled to nominate five of them, although two of the five must be "independent" directors who have no material relationship with ARMZ as defined under National Instrument 52-110, Uranium One said. ARMZ will also have the authority to place two individuals into Uranium One management positions. Uranium One told NRC that one of those employees will be in Kazakhstan and that neither will be in the US.

Financial statements attached to the Uranium One RAI response showed that ARMZ had a 2009 after-tax profit of 6.7 billion rubles (US$219.4 million).

The statements show ARMZ had assets worth 106.4 billion rubles ($3.4 billion), equity of 82 billion rubles ($2.7 billion) and liabilities of 24.4 billion rubles ($796.5 million). They also show that 2009 sales to Russian nuclear manufacturer TVEL, including uranium, coal and services, totaled 9.4 billion rubles ($306.2 million).

TVEL and Tenex, the Russian uranium enrichment company, are ARMZ's "principal" customers, Uranium One said.

—David Stellfox, Barcelona

Russia's Tenex opens US office in bid for utility business

Russia's Techsnabexport opened a US office last month as it seeks to increase sales of enriched uranium to US utilities and prepares for the end of an agreement to sell downblended high-enriched uranium through USEC.

Tenex has already signed 11 contracts with nine US utilities for about $5 billion in long-term fuel supplies, Director General Alexey Grigoriev said October 21, according to the transcript of his remarks in Washington DC. He did not name the utilities.

Tenex has established a US subsidiary, Tenam Corp., in response to the forthcoming end in 2013 of an arrangement for distribution of Russian downblended high-enriched uranium and increasing competition, Grigoriev said in the transcript posted on the company's web site.

It is important that Russian enriched uranium products "win and hold adequate shares of the US market," he said.

The expansion of capacity and technological upgrades of Areva, Urenco and USEC have resulted in increased competition, Grigoriev said. "We do understand the circumstances and are taking measures to remain competitive," he said.

Tenex and US utilities can contract for long-term enriched uranium supplies starting in 2011, he said. Under a 2008 amendment to a deal allowing enriched uranium sales by Russia in the US, Tenex can secure up to 20% of the market. In September 2009, Grigoriev said Tenex had six contracts with US utilities and that those contracts represented a third of the quota (NF, 21 Sept. '09, 1).

Competitors are building enrichment plants in the US to better serve customers there, Grigoriev said. Tenex would also like to begin talks on building an enrichment plant in the US using Russian technology, he said.

The ratification of a US-Russian nuclear cooperation agreement meeting the requirements of Section 123 of the Atomic Energy Act, which regulates most nuclear equipment exports, may "create the legal basis needed to start practical discussions about building a Russian technology based enrichment plant to the US," Grigoriev said.

President Barack Obama submitted such an agreement to Congress in May for ratification.

Tenex is directly involved in the construction of an enrichment plant in China, Grigoriev said. "We have significant experience in this area," he said.

The US office of Tenex should be viewed as "a kind of 'trade mission' of the Russian nuclear industry" in North and South America, Grigoriev said. Tenex is affiliated with state-owned Rosatom, holder of key Russian nuclear industry businesses.

Under the HEU agreement set to expire in 2013, Tenex provided downblended uranium through USEC to US utilities. Through that arrangement, Tenex supplies about 45% of the separative work units, or SWU, a standard measure of enrichment, needed by US nuclear power plants, the company said.

The amendment to the Russian suspension agreement allows Tenex to begin direct sales of enriched uranium products in the US up to the 20% market limit. That limit could rise to 25% if Russia agrees to continue to downblend high-enriched uranium.

Tenex has been "purposely and consistently widening its marketing and sales capabilities abroad," Grigoriev said. The company has subsidiaries in Germany, Japan, South Korea, the UK and the US, he said.—*William Freebairn, Washington*

Argentina says facility will produce enriched uranium next year

Argentine President Cristina Fernandez inaugurated a mothballed uranium enrichment facility last week that she said will allow the country to close the fuel cycle and continue the revitalization of its nuclear energy program.

Fernandez spoke during ceremonies October 25 marking the start-up of the Pilcaniyeu gaseous diffusion uranium enrichment complex in Rio Negro province. The facility will begin producing enriched uranium next year, Fernandez said, according to a video of her remarks on a government web site.

The Pilcaniyeu complex had been "abandoned" for more than a decade, and Argentina relied on foreign sources for the slightly enriched uranium used in one of its two operating reactors, Fernandez said. Slightly enriched uranium has a U-235 content between 0.9% and 2%.

"We are restoring to our country … a right that we should never have renounced," Fernandez said. She said uranium enrichment is "a strategic resource" and that the start of the facility's operations will help boost scientific and technical development in the country as well as guarantee the supply of enriched uranium to the country's power reactors.

The complex had 10 employees in 2003. It now has 120 workers, the country's National Atomic Energy Commission, known as CNEA, said in a report on its web site. The plant will start up with 20 diffusers used in the enrichment process that is controlled using software developed in Argentina and will add diffusers gradually, Fernandez said.

Argentina's entry into uranium enrichment is not expected to have a big influence on the market, said Jonathan Hinze, vice president for international operations at Ux Consulting. While Argentina has an established nuclear industry and should be able technically to enrich uranium, the country's own reactors use slightly enriched uranium and the capacity of the new plant might not allow for significant exports, Hinze said in an interview October 28.

The program may be oriented to feed future demand from a planned small reactor known as Carem that features an Argentine design and uses low-enriched uranium that has been enriched to 4.5% U-235, Hinze said. CNEA plans to build a 25-MW Carem prototype adjacent to existing power units at the Atucha site, but future versions could provide as much as 300 MW, the agency said.

The Pilcaniyeu complex has 30,000 square meters (323,000 square feet) devoted to enrichment process plants, and plans for the site include a research reactor, CNEA said.

In the 1970s, Argentina planned to develop uranium enrichment capacity in part to hedge against a nuclear weapons capability it feared was being developed by Brazil. But Argentina abandoned that idea in the 1990s in favor of purchasing fuel from outside the country, according to CNEA. Argentina decided in 2006 to re-activate the nuclear energy program that had stalled during the previous decade, including a plan to complete the gaseous diffusion plant at Pilcaniyeo, the CNEA paper

said. The project will meet all safeguards requirements of the International Atomic Energy Agency, CNEA said.

Argentina operates two heavy water reactors, both designed to use natural uranium. However, the 357-MW Atucha I, based on Siemens AG's PWR technology, has been using uranium enriched to 0.85% U-235, which reduces the amount of uranium fuel needed as well as waste volume, operator Nucleoelectrica Argentina said on its web site. The other operating nuclear power unit in Argentina is Embalse, a 648-MW Candu PHWR that uses natural uranium fuel.

Argentina is completing work on Atucha II, a 745-MW heavy water reactor that Fernandez said is scheduled to begin operating in 2011. On its web site, Nucleoelectrica Argentina says Atucha II will use natural uranium fuel.

Fernandez said the country is considering adding a fourth nuclear unit, and Argentine Planning Minister Julio De Vido was recently in South Korea seeking funding for that project. De Vido signed a nuclear cooperation agreement with South Korea in September, inviting that country's Korea Electric Power Co. to enter the competition to build a nuclear unit in Argentina, according to a government statement September 16. According to the statement, companies from France, Russia, China and the US are also in the running.

—William Freebairn, Washington

USEC says loan guarantee application has passed critical step

USEC last week said its long-delayed application for a federal $2 billion loan guarantee to help build a uranium enrichment plant in Ohio has passed DOE's initial technical review and that the department has provided it with a draft term sheet that will serve as a "framework for discussions" on the application.

DOE's consideration of the application had been held up by the department's concerns over the viability of the project.

"The department's decision to move forward reflects the significant progress we have made on both the technical and financial fronts in deploying the next generation of US uranium enrichment technology," John Welch, USEC president and CEO, said in an October 27 statement. "We look forward to working with DOE to continue advancing the project."

DOE does not publicly discuss specific loan guarantee applications and did not respond to a request for comment.

USEC's proposed $4.6 billion American Centrifuge Project would use what the company called "the most advanced centrifuge uranium enrichment machine in the world" to produce fuel for US and international nuclear power plants. USEC said the construction of the facility would create nearly 8,000 US jobs.

But the project has had a checkered history with DOE. USEC originally applied for a DOE loan guarantee in 2009. But in August of that year, DOE publicly urged USEC to withdraw its application, citing "technical and financial hurdles," followed by a 50% drop in USEC's stock price and sharp warnings from the company that it might have to abandon the project.

DOE then agreed to give USEC more time to perfect its centrifuge technology, giving the company $45 million toward that effort, so USEC could resubmit its application at a later date. USEC did that in July.

In the interim, DOE gave Areva Enrichment Services, the subsidiary of French firm Areva, a $2 billion loan guarantee in June for the $3.3 billion Eagle Rock uranium enrichment plant AES wants to build in Idaho. DOE had originally intended to support just one enrichment facility with a loan guarantee but said it would repurpose other funding in its budget to provide USEC with a loan guarantee, if USEC's application is approved.

But some observers of the project contend that DOE's continued engagement with USEC indicates political motivations might be at play. Ohio is a battleground state in the November 2 midterm election, and the Obama administration has focused many efforts in Rust Belt manufacturing states, where the creation of jobs could benefit Democratic candidates. With the retirement of Republican Senator George Voinovich, Ohio has an open Senate seat as well as a competitive gubernatorial race. Candidates in those races, as well as in Ohio's US House contests, were quick to applaud USEC's announcement.

In addition, Democratic Senator Sherrod Brown of Ohio, who is not up for re-election this year, visited the USEC project site in Ohio last week and said he would continue to urge DOE to approve the company's application. "No other place in the world is doing what we are doing right here and the thousands of Ohio jobs that go along with it are critically important to this region," Brown said.

USEC has said the plant will cost $4.6 billion to build, including the $1.8 billion already invested. The company began constructing the facility in 2007 but halted work after it ran low on funds. USEC has said if it receives the loan guarantee, it could begin commercial operations within two years and complete the plant within four years.

—Herman Wang, Washington

Urenco USA shuts cascades to fix seismic support welds

The Urenco USA uranium enrichment plan in New Mexico has temporarily ceased production in its two operating cascades to address issues involving welds in the structural support system designed to ensure safe operation during an earthquake.

The welds are part of the cascade upper support steel turnbuckles, which Urenco spokesman Don Johnson said in an October 28 interview "help dampen any energy that may be transmitted in any seismic event." He called the weld problem a "manufacturing issue," saying it is not an issue with the plant's operations or production. He said the welds only serve to stabilize the cascades during an earthquake.

Urenco USA elected to shut down cascade 2, which was the only operating cascade at the time, "because of insufficient documentation to demonstrate" the operability of the support turnbuckles, Urenco USA Chief Nuclear Officer and Vice President of Operations David Sexton said in an October 18 letter to NRC. Cascade 1 was already down for maintenance, he

said. Johnson said Cascade 2 was shut a few weeks ago.

Sexton said the company took that action because the turnbuckles are identified as Items Relied on for Safety, or Irofs, in its integrated safety analysis, or ISA. An ISA evaluates the consequences of possible accidents in a risk-informed way and identifies Irofs to prevent accidents or mitigate consequences. "Without sufficient evidence through analysis and test that these turnbuckles will perform acceptably under a postulated seismic event," the function of the Irofs "could not be fully demonstrated and a decision was made to shut down Cascade 2 to correct this condition," Sexton said.

He said the issue arose from reviews of weld inspection data on cascades one through seven that Urenco USA undertook to address concerns that arose during its commercial grade dedication process. Johnson said that process involves reviewing documentation that all materials, workmanship and construction meet standards. Sexton said Urenco USA's preliminary analysis shows the problem to be a result of the manufacturing process.

"At no time was the turnbuckle weld issue identified [to be] of high safety significance," Sexton said. "Insufficient documentation was the basis for shutdown of Cascade 2 with regard to the turnbuckles. Recent pull tests demonstrate the turnbuckles would have performed their safety function."

Sexton said new or repaired turnbuckles will be installed to support Cascades 1 and 2 before production recommences. Johnson said he could not say when that will occur. He added that material that had been spinning in the centrifuges was "drawn off into secure containers" when they were shut.

NRC authorized the introduction of uranium hexafluoride into the second cascade at the Eunice, New Mexico plant July 21, after authorizing the startup of the first cascade June 10 (Inside NRC, 21 June, 8).

The plant is designed to have 72 cascades operating by the time it is fully built in the next three to four years. At that point, its annual capacity would be 5.7 million separative work units, or SWU, a standard measure of uranium enrichment. When operations began, company officials said they expected to ship their first cylinder of enriched uranium to a fuel fabricator before the end of the year.

At full capacity, the plant is expected to supply 50% of current US enrichment needs, according to the company. Urenco also operates enrichment facilities in Germany, the Netherlands, and the UK. Currently supplying about 25% of the global enrichment market, Urenco is jointly owned by the governments of the UK and the Netherlands and by German utilities RWE AG and E.ON AG.

—Maureen Conley, Washington

NRC authorizes NFS to restart second process line

NRC authorized Nuclear Fuel Services October 22 to restart the ammonium diuranate process line in its Blended Low Enriched Uranium Prep Facility, or BPF. The line had been down since last December due to NRC concerns about an October 2009 incident at the plant and NFS' decision to restart operations before fully understanding the cause of the problem.

NFS spokeswoman Lauri Turpin said in an October 28 e-mail that the ammonium diuranate process line is designed to "utilize ammonium hydroxide to precipitate uranium from a solution to a solid form." She said NFS expects to restart the line in early November.

Once that line is restarted, the uranium hexafluoride line will be the only one still shut as a result of NRC's concerns, which the agency documented in a confirmatory action letter, or CAL, January 7. Turpin said NFS has not yet finalized a schedule for requesting NRC approval to restart that line.

Separately, the BPF's uranium-aluminum process line was restarted in July but shut September 27 after workers observed a crusty buildup of material inside a centrifuge. Turpin said NFS is completing some engineering modifications and plans to restart the process line this week.

NFS last month paid a $140,000 fine to NRC in connection with the 2009 incident, which occurred in the U-Al line. An unexpected reaction in the line led to the release of nitrogen compounds and an evacuation of the facility. In September, NRC cited NFS in the incident for three Severity Level III violations, the next to the lowest of NRC's four categories of violations, and two Severity Level IV violations, the lowest (Inside NRC, 11 Oct., 6).

NRC took escalated enforcement action, in part, because it had raised concerns about the plant's safety culture, culminating in a February 2007 confirmatory order requiring an independent third-party safety culture assessment.

At its Erwin, Tennessee facility, NFS recovers uranium from surplus DOE high-enriched uranium material and either delivers it to commercial nuclear fuel fabricators or puts it in a form suitable for final disposition. NFS also operates a uranium fuel materials production facility to support the US fleet of nuclear-powered submarines and aircraft carriers.

—Maureen Conley, Washington

Competing claddings offer improved corrosion resistance, burnup rates

Fuel vendors and industry research groups are encouraging utilities to adopt new fuel designs with what they call "modern" claddings to achieve zero defects.

The Nuclear Energy Institute published guidelines in March 2008 for utilities and fuel suppliers to meet the industry's goal of achieving zero fuel failures by the beginning of 2010. One of the recommendations, said Gordon Clefton, NEI senior project manager, was for utilities to adopt fuel assemblies with new cladding designs.

"We knew some of the older designs of fuel cladding have performance that's less reliable than the newer designs," he said October 13.

Three fuel vendors supply the US market — Westinghouse, Areva, and Global Nuclear Fuel, which is a

joint venture of GE, Hitachi and Toshiba. Each has advanced cladding designs in various marketing and testing stages.

The most advanced Westinghouse cladding design commercially available is Optimized Zirlo, an alloy of niobium, tin, iron, and zirconium. It has a lower tin content than Zirlo, its older product standard. The optimized version "improves the corrosion resistance capability by about 40%," said Eugene Piplica, a manager of nuclear fuel at Westinghouse.

"Over the years, our utility customers have asked for better performing products to be able to more efficiently use uranium," he said in an interview October 13. In order to push for higher fuel efficiency, Piplica said, longer burning time and higher burning temperatures are required, which "puts a demand on the cladding to increase the corrosion resistance, and that was the driver behind Optimized Zirlo."

The designed passed the NRC's safety review in 2005. So far, 16 reactors worldwide, including two in the US, have adopted Optimized Zirlo-clad fuel for general use. Another three utilities "have firm commitments" and a fourth "has the option" — a total of 13 plants — to load rods with Optimized Zirlo cladding, according to Piplica. He also said the French utility EDF "is going to convert their plants one unit at a time, starting in 2011 or 2012" to Optimized Zirlo. Arizona Public Service and Virginia Electric Power recently obtained NRC approval to load Optimized Zirlo-clad fuel on a test basis in APS' Palo Verde and Virginia Power's Surry and North Anna reactors.

GNF's latest cladding design on the market is Process 9, which is a Zircaloy 2 variant, according to GNF Vice President of Fuel Engineering Andy Lingenfelter. But the company is preparing to submit a new product called Ziron for NRC review. Lingenfelter described the new design in an October 22 e-mail as "an evolution" from Zircaloy 2. "Corrosion performance and associated hydrogen pickup were targeted in particular for improvement with the GNF-Ziron alloy," he said.

GNF only produces fuel for BWRs. All of its US customers use Process 9 clad fuel rods for reloads, said Lingenfelter. Exelon's Clinton and FirstEnergy's Perry have loaded Ziron-clad fuel on a test basis, and Southern Nuclear Operating Company has applied for NRC approval this May to test fuel clad with Ziron.

Areva's most advanced cladding in the market is M5, according to industry officials. The company declined requests for an interview. In a document submitted to an American Nuclear Society meeting on fuel performance in Orlando, Florida in September, Areva officials described M5 as "an optimized zirconium-base alloy."

As of July 2009, the paper said, M5-clad fuel rods have been loaded in 73 commercial PWRs in 12 countries.

Tradeoffs

Reducing corrosion and hydrogen pickup, which "somewhat go hand in hand," has been the primary driver for cladding design improvement, said Kurt Edsinger, senior program manager of nuclear fuel at the Electric Power Research Institute. In an October 18 interview, he said achieving these attributes is a "subtle" process through "trial and error."

"You put the different alloy elements in the cladding for different purposes. Some are put in there for strength. Some are put in there for corrosion resistance. You are looking at what the tradeoffs are and trying to figure out moving in a net positive direction," Edsinger said.

Westinghouse's Optimized Zirlo achieved higher corrosion resistance by reducing the tin content. "However, tin adds strength to zirconium," Piplica said, "so you've got to optimize to a point where you balance the tin content against corrosion improvement and strength degradation." Because the new fuel has lower strength, "it's more susceptible to any impurity that might be introduce during the manufacturing process," Piplica said, and "you need to be very careful about manufacturing."

A paper presented at the Orlando meeting said that Optimized Zirlo "demonstrated improved corrosion performance and structural stability" at burnups of up to 65.3 gigawatt-days per metric ton uranium for an individual fuel rod and up to 63.4 GWd/mtU for a fuel assembly. A Westinghouse paper on Optimized Zirlo's performance at higher burnups published last year in Nuclear Engineering and Technology, an international journal of the Korean Nuclear Society, noted that in one case, Optimized Zirlo-clad fuel reached a rod burnup exceeding 73 GWd/mtU.

GNF's Ziron is also zirconium based and contains tin, iron, chromium and nickel, according to the document it submitted to the industry meeting on fuel performance.

Areva's M5, however, contains "1% niobium with no tin and a well mastered content of oxygen, iron and sulfur," according to its presentation paper to the industry meeting. "This absence of tin," it said, "yields a very low corrosion rate at high burnup."

Future improvement

Clefton of NEI called the industry's search for better cladding materials a continuous "ramp of improvement."

"It's been evolutionary. There's never been plateaus," he said.

Future designs will "continue to improve corrosion resistance" and "continue to march up in burnup," said EPRI's Edsinger, "so the economics are better, the amount of fuel that's leftover is lower."

Westinghouse's next product is called Axiom, said Piplica. In a presentation paper to September's fuel performance meeting, company officials said Axiom has over 97% zirconium with various amounts of niobium, tin, iron, chromium, copper, silicon, vanadium, and nickel.

The first batch of Axiom alloys was irradiated in a US plant, which the paper identified only as "Plant A", in 2004. Since then, "Axiom has been included in multiple reactors and irradiation programs," it said.

Piplica said Westinghouse plans to seek an NRC license for the cladding material. "I estimate an application would not be made before 2017 with an expectation of obtaining a license from the NRC for Axiom about three years later," he said.

GNF plans to file a license application with the NRC for its Ziron in first-quarter 2011, according to Lingenfelter.

In a separate effort, the company's operation in Japan, he said, is working with the Japanese government to fulfill "the cladding goals associated with Japanese Next Generation Light Water Reactor," a joint project between the government and private companies. The program aims to produce 1,700-MW to

1,800-MW reactors that will achieve burnup rates of 100 GWd/mtU, higher than the current maximum achievable rates of 70 GWd/mtU to 80 GWd/mtU that are not routinely reached.

In theory, said Edsinger, "you can think at some point you are just going to reach the end of the road as to how far you can take zirconium alloys." But he said the industry has not seen that limit yet.

For that reason, said Piplica, Westinghouse is looking for "even further improvements in our cladding characteristics." He said the company's next step is "modifying the fuel pellets in concert with cladding to extract more energy out of the same amount of uranium."

Clefton agrees. "We might discover that today's fuels in round circular cylinder are better performing if they were in oval or in elliptical shapes or in a swirl pattern, something like that," he said.—*Yanmei Xie and Maureen Conley, Washington*

EC to adopt proposed directive for EU-wide waste management

The European Commission is scheduled to adopt a proposed directive on Management of Radioactive Waste on November 3 that, if passed into law, will require EU member states to compile national waste management inventories and draw up national programs, complete with timelines for program activity. It will also prohibit export of nuclear waste from the EU.

The proposal promotes geologic disposal of spent fuel and high-level waste, or HLW, saying that long-term interim storage places financial and other burdens on future generations and poses safety and security threats.

It also suggests peer reviews of national programs, but does not stipulate any obligatory mechanism for checking whether those programs comply with the directive or for taking legal action to compel an EU member state to abide by its provisions.

The proposal comes seven years after an initial attempt by the commission to pass legislation mandating geologic disposal for HLW and long-lived waste and setting time schedules for disposal facilities was rejected by the European Council.

The commission last week announced a press conference on the issue for November 3, as Greenpeace circulated a text of the directive that had been leaked.

"The final disposal of radioactive waste and spent fuel concerns all European citizens, as it raises questions of safety, security and health," the commission said in the invitation to the press conference.

Greenpeace, in an analysis of the proposed legislation, said it welcomed "some areas of increased transparency" the directive would provide. But Greenpeace EU nuclear campaigner Jan Haverkamp called the directive a "PR exercise to try to persuade Europeans that nuclear waste can be dealt with."

The directive, which complements the Nuclear Safety Directive enacted by the EU last year and follows the same principles, covers all types of radioactive waste.

In an explanatory memorandum accompanying the directive, the commission said that "whatever the future of nuclear power and non-power applications, the implementation of disposal as the end point in the management of existing and future radioactive waste is needed in order to assure safety in the long term."

No wait-and-see fix

The commission wants to promote final disposal and discourage wait-and-see solutions that have been adopted in several EU countries based on temporary above-ground storage of spent fuel and HLW.

"For high-level waste, there is a world-wide scientific and technical consensus that deep geologic disposal represents the safest and most sustainable option," the commission stated.

"There is a broad consensus that storage of spent fuel and radioactive waste, including long-term storage, is only an interim solution requiring active and permanent institutional controls," it wrote. "In the longer term only disposal with its inherent passive safety characteristics can guarantee protection against all potential hazards," the commission wrote. Elsewhere in the text, it defines disposal as emplacement of spent fuel or final waste in an authorized facility "without intention of retrieval."

Delay in implementing final disposal programs, the commission wrote, will mean that "burdens will be passed on to future generations, both to implement disposal as well as maintaining interim storage options. The associated risks are evident — unavailability of financing, lack of expertise, disruption as a result of unforeseen societal upheaval, terrorist threats, etc."

These ideas are also reflected in the preamble of the directive, which states that "it is an ethical obligation of each member state to avoid any undue burden on future generations" from spent fuel and long-lived wastes, including waste coming from decommissioning of nuclear installations.

The directive requires member states to establish national programs for radwaste management with "clear provisions for timely implementation of all steps of spent fuel and radioactive waste management from generation to disposal." It requires states to have dedicated radwaste management organizations and independent regulators and to ensure both sufficient resources and authority to do their jobs.

The directive's preamble encourages cooperation among member states in accordance with EU laws and standards at the regional level. It also encourages cooperation between EU member states and no-EU countries, such as the US and Canada, saying such cooperation could "accelerate decision-making through access to expertise and technology."

As one of the directive's general principles, Article 4 establishes that "radioactive waste shall be disposed of in the member state in which it was generated, unless agreements are concluded between member states to use disposal facilities in one of them."

That measure prohibits any export of nuclear waste outside the EU, but allows joint repositories such as have been under discussion for decades with no concrete result.

Prohibiting waste producers from dumping their waste in countries where safe disposal can't be monitored is "the sine qua non of the 'polluter pays' principle," said a commission source familiar with the document.

Out of line

Greenpeace, in its analysis, said the proposed directive is "out of line with EU hazardous waste laws" that require the EU to implement the precautionary principle and "oblige firms to use only the best available technologies." It said "this omission creates a far less stringent policy for radioactive waste."

According to the EC definition, "The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU".

Greenpeace also faults the proposal for failing to protect against "less developed parts of Europe...becoming 'nuclear waste dumping grounds.'"

Greenpeace further criticizes the commission for endorsing geologic disposal and declaring a consensus in favor of it without reviewing the scientific literature. Greenpeace contends that "a sub-standard commission proposal" could "lead member states to invest heavily in facilities which fail with costly results, both financially and environmentally."

The commission source said that the proposal takes into account the opinion of the European Nuclear Safety Regulators Association that comprises regulators from all 27 member countries, also known as Ensreg, that geologic disposal is the best route for HLW and unreprocessed spent fuel.

If the directive is approved by the European Council, it will become legally binding on EU member states. But the commission source said that the directive doesn't come with "teeth" that would allow the commission to take member states to court if they fail to abide by its provisions.

Only "peer pressure and public criticism," he said, could be brought to bear on states that don't draw up waste inventories or national waste plans with deadlines for disposal, or don't provide sufficient funds for implementation of those plans.

—Ann MacLachlan, Paris

UK: West Cumbria geology OK for nuclear waste disposal

The UK Department of Energy and Climate Change October 28 said that an initial look at the geology of western Cumbria County in northwestern England did not provide any reason for excluding the region as a possible site for disposing of the country's nuclear waste.

In a statement, the government said its early screening does not mean nuclear waste would be stored in the region. But it said there was no reason to prevent a local partnership from continuing to talk to the government about possibly siting such a facility in the Copeland and Allerdale boroughs of West Cumbria.

Those boroughs and the Cumbria County Council have entered into a voluntary and non-binding agreement to consider becoming the site of a nuclear waste repository. The agreement is known as the West Cumbria Managing Radioactive Waste Safely Partnership.

"The geological disposal facility site selection process is based on voluntarism and partnership, and these results do not present any reason why West Cumbria cannot continue to consider whether or not to participate in that process," Minister of State for Energy Charles Hendry said in a statement October 28.

This study by the British Geological Survey was based on existing information, rather than new research, and if the communities proceed in the voluntary process with plans to store nuclear waste, more detailed investigations would be required, he said.

Hendry said the government must make progress on geologic disposal, "the long-term sustainable solution for dealing with radioactive waste."

A small part of West Cumbria — a portion along the shoreline of the Irish Sea from Wigton near Carlisle in the north to Millom in the south — was excluded as a potential host to a future repository, but the majority of the area studied, including parts of the Lake District National Park and up to 5 kilometers (about 3 miles) offshore were not ruled out in the initial high-level survey.

Areas were excluded based on criteria such as whether coal, oil, gas, or metal resources were present or if there were ground aquifers or water-permeable formations in the area.

Greenpeace senior energy campaigner Ben Ayliffe said in an October 28 statement that the report "means that almost anywhere in the Lake District could become a dump for the UK's radioactive waste,"

Greenpeace, which opposes geologic disposal, noted that, based on the government's statement, even areas ruled out in the initial survey might still be suitable locations for surface facilities of a geologic disposal facility, or GDF.

"These facilities could include spent fuel stores, containing several thousand tonnes of highly radioactive material, as well as a spent fuel 'encapsulation' plant for waste from new reactors. And these above-ground facilities could be up to 20 kilometers away from the underground GDF," Ayliffe said.

Copies of the British Geological Survey report and DECC statements are at www.decc.gov.uk/en/content/cms/news/pn10_114/pn10_114.aspx.*—David Stellfox, Barcelona*

US blue ribbon panel looks at Finnish, Swedish programs

The group charged with recommending a new strategy for the disposal of spent fuel in the US is looking abroad for solutions.

The disposal subcommittee of the Blue Ribbon Commission on America's Nuclear Future was in Finland and Sweden during the past two weeks to discuss the final repository programs in those countries with the companies involved, nongovernmental organizations and politicians.

"Any place where they seem very close to a solution, not only technically but where they have a consensus, is interesting," commission member Jonathan Lash said in an

interview October 26.

At the commission's next meeting November 15-16, members will hear presentations on the French and Japanese repository programs. "We are in an omnivorous phase of consuming information," Lash said.

US Energy Secretary Steven Chu appointed the 15-member commission in January, after President Barack Obama had decided to end the Yucca Mountain repository project in Nevada. It is required to present recommendations to the secretary in January 2012. Creation of the commission came after more than two decades and $10 billion was spent on the Yucca Mountain project.

Lash declined to say what he thinks a solution to final disposal of spent fuel in the US might be. He said he has visited several dry storage facilities at US nuclear power plants and discussed the situation with nuclear utility representatives, whose costs for interim storage of the spent fuel continue to mount.

Committee members met with representatives from Posiva, the company developing a final repository for Teollisuuden Voima Oy and Fortum, and its counterpart the Swedish Spent Fuel & Waste Management Co., or SKB. They also met local politicians in the communities where the repositories are to be built.

Finland's and Sweden's spent fuel repository plans are the most developed in the world. Critics of the projects in both countries, including Greenpeace and the Swedish NGO Office for Nuclear Waste Review, say they are concerned that those plans will be accepted as an international standard and that research will not be conducted on alternatives.

They also contend that SKB and Posiva obtained support by paying for a variety of infrastructure, renovation and education projects in order to get communities to accept the repositories.

Lash said that was not his impression. "It seems to have been a hugely open process," in both countries he said. "There is a very high level of trust and the feeling that the communities are getting added value. I think it's reasonable for a community to expect benefits."

In addition to his commission post, Lash is president of the World Resources Institute, a nongovernmental organization that deals with environmental and social issues. He said he was "fascinated" by the Swedish system, which allows communities and nongovernmental organizations to apply for money from the Swedish Nuclear Waste Fund so they can independently review SKB's work and pay consultants to research spent fuel handling techniques.

Nuclear utilities pay into the fund based on a fee of roughly 1 Swedish oere fee (US 0.15 cents) per-kilowatt hour that the government sets annually to cover the cost of waste and spent fuel handling.

Lash said that while the commission thinks it can learn from the Swedish and Finnish systems, "I don't think we're going to directly bring back their models."

Both countries are small, he said, which means "there is a different setting" in terms of the amount of spent fuel to be dealt with and the way public comment processes can be organized.—*Ariane Sains, Stockholm*

SPENT FUEL CASK DEVELOPMENTS

Two casks leak helium at Peach Bottom

Operators at Exelon's Peach Bottom will likely need to unload a TN-68 vertical spent fuel storage cask that was found last week to be leaking helium from its main outer lid seal, NRC Region I spokesman Neil Sheehan said October 28.

He said Exelon might begin the unloading process early this week. Sheehan said NRC officials were unable to recall another time that a storage cask had to be unloaded. Exelon reported the leak to NRC after its location was discovered October 27.

Exelon and Transnuclear, which supplied the TN-68 system, were working last week to understand why the cask's outer lid seal began leaking and why another cask was found October 22 to be leaking helium from a drain port cover weld. Both casks were on the storage pad when the leaks were detected in the overpressurization system that helps ensure the spent fuel is contained in an inert environment.

Sheehan said both leaks were detected by the system for monitoring helium levels that was put in place at Peach Bottom. And in both cases, he said, the leaks are "very small." No radiation was released, Exelon said.

Sheehan said the two issues appear to be unrelated but that NRC's resident inspector and other NRC inspectors have been monitoring the situation. He said NRC will look at whether other casks could experience similar problems. NRC has "vehicles" such as information notices for alerting the industry of a generic issue, if it determined one existed, Sheehan said. He said the TN-68 system uses a bolted lid, unlike most dry storage systems that use welded lids.

Exelon spokesman David Tillman said October 28 that Exelon moved the cask with the leak in its drain port cover from the storage pad to the cask loading area of the Peach Bottom-3 containment building in early to mid-September and discovered the source of the leak October 22, the day it filed an NRC event report. Exelon said its preliminary review found the leak is in the weld plug that helps seal the drain port opening inside the cask lid. Sheehan said Exelon would fix the plug and return the cask to the storage pad. Tillman said Exelon was preparing to make those repairs.

Tillman said Exelon moved the cask with a leak in its main lid seal to the cask loading area of unit 2's containment building in early to mid-October and isolated the location of the leak October 27, when it filed an updated event report. Exelon said its preliminary review "indicates that a leak exists in the cask main lid outer closure seal." It said the cask would be "repaired and tested" before it is returned to the storage pad.

Tillman said Peach Bottom has 49 storage casks loaded with spent fuel.

Exelon said it was reporting both leaks under NRC's 10 CFR Part 72.75(c)(1) requirements for reporting non-emer-

gency defects in a spent fuel system component important to safety because of a reduction in the effectiveness of the cask confinement system. Both leaks exceed the leak rate allowed under the technical specifications for the TN-68 system, Exelon said. —*Maureen Conley, Washington*

NRC approves NAC-STC changes

NRC approved changes October 5 to NAC International's certificate of compliance, or COC, for the NAC-STC transportation package. Revision 12 to the COC incorporates spent fuel from Dairyland Power Cooperative's shuttered LaCrosse BWR.

Related changes to the NAC-MPC spent fuel storage system that allow it to be used with LaCrosse spent fuel became effective October 4. NAC has a contract to provide five storage systems, as well as design and licensing services, to enable Dairyland to transfer LaCrosse's entire spent fuel inventory into dry storage. The system was revised to allow it to be used with undamaged Exxon fuel assemblies, damaged Exxon and Allis Chalmers fuel assemblies and/or fuel debris, and zirconium alloy shroud compaction debris stored with damaged and undamaged fuel assemblies. LaCrosse fuel, which is about eight feet long, is shorter than standard-length BWR fuel. NAC applied for the amendment last December. —*Maureen Conley, Washington*

Changes in Holtec transport casks

NRC last month approved Amendment 8 to Holtec International's certificate of compliance for the Hi-Star 100 spent fuel transportation cask. The amendment, which NRC sent Holtec October 12, incorporates the Metamic neutron absorber into the inner multipurpose spent fuel canister that is placed into the Hi-Star cask for transport.

NRC had previously approved the use of Metamic in various canisters for Holtec's Hi-Storm 100 spent fuel storage system. The revised transport COC also incorporates a new design for certain components of the Al-Star impact limiter and includes a new section addressing manufacturing deviations. NRC also approved changes to the Hi-Star HB, a variant of the Hi-Star 100 that is to be used with the site-specific storage system approved for use at Pacific Gas & Electric's shuttered Humboldt Bay plant. Holtec applied for the amendment February 5. The revised COC expires March 31, 2014. —*Maureen Conley, Washington*

Holtec's Chernobyl project approved

Ukraine 's State Nuclear Regulatory Committee and other agencies with review authority have approved the technology Holtec International designed to store 22,500 spent fuel and absorber rods from the Chernobyl plant, Holtec said in an October 21 statement. The storage facility, which Holtec designed and licensed, will be built by Holtec in the Chernobyl Exclusion zone and will store the spent fuel and absorber rods from the Chernobyl-1, -2, and -3 RBMKs.

Holtec said the approval clears the way for a consortium of donor countries financing the project to authorize the balance of funding. Project funding is being administered by the London-based European Bank for Reconstruction and Development.

Holtec took the project over from Areva NP, formerly Framatome, in 2007 after the French nuclear services company could not win approval from the state-owned Chernobyl nuclear power plant and Ukrainian regulators for its proposed solution for treating and storing damaged and non-leaktight fuel. The Areva contract, awarded in 1999, was terminated "amicably" in April 2007 (Nucleonics Week, 26 April '07, 8).

The project is expected to enter the next phase of detailed design, manufacturing, and site construction by year-end, Holtec said. Holtec's contract includes design and licensing of a double-walled storage canister that can be placed inside the Nuhoms modules delivered by Areva using Areva's transfer cask as well as a hot cell for remote cutting and packaging of fuel assemblies. Holtec will also use a forced gas dehydration system it has patented to dry the RBMK fuel. —*Maureen Conley, Washington*

Paladin ... *from page 1*

The October 28 announcement closes out the takeover, giving Paladin access to uranium in Niger. Paladin already has operating mines in Namibia and Malawi — Langer Heinrich and Kayelekera, respectively — and undeveloped resources in Australia.

Paladin had tried to walk away from the takeover bid after several employees at an Areva mine at Arlit in Niger and members of their families were taken hostage September 16. There has been no update from Areva on their status. Paladin said the hostage situation compromised its ability to explore and develop NGM Resource's uranium deposits and breached conditions of the takeover offer.

NGM Resources appealed to the Australian Takeovers Panel, which required Paladin to proceed with the takeover bid.

Finance development

On October 27, Paladin successfully raised US$300 million through issuing unsecured convertible debentures due in 2015. A debenture is a medium- to long-term debt instrument, acting effectively like a loan, in which Paladin repays the debenture with interest when it becomes due.

Paladin plans to use most of the money from the October 27 debenture issuance to repay early on US$250 million in debentures coming due in December 2011.

The remainder will be put toward the planned expansion of the Langer Heinrich mine and the pursuit of future growth opportunities, the company said.

On October 19, Paladin said it produced 1,362,713 lb U3O8 in third-quarter 2010 compared with 744,188 lb U3O8 in the same quarter a year ago, when its Kayelekera mine in Malawi was in its initial ramp-up period.

However, third-quarter 2010 production was down from the previous quarter's 1,442,842 lb U3O8 due to a slowdown in processing at Kayelekera during the installation and commissioning of a secondary resin cleaning circuit, the company said.

Paladin said it sold 1,043,000 lb U3O8 at an average realized price of US$46.50/lb in third-quarter 2010. It said a majority of the sales that quarter were in the spot market and that is why the average realized price dropped from the prior quarter's US$55.50/lb U3O8.

Third-quarter 2010 production results represent an annualized 3.6 million lb U3O8 production level versus an installed nameplate capacity of 3.7 million lb, Paladin said.

Dispute settlement

Australian uranium miner Paladin Energy announced the settlement October 29 of a dispute dating back to 2006 over rights associated with some Australian uranium resources.

Under the settlement, Paladin will pay Areva A$3.9 million (US$ 3.79 million) in exchange for Areva transferring all its marketing rights to Paladin for uranium resources owned by Paladin subsidiary Summit Resources Ltd. Paladin owns 82.05% of Summit Resources.

Areva had a strategic alliance with Summit, which did not proceed and under the settlement Summit will pay Areva A$4.5 million, of which A$2.5 million is paid as penalty called for in the strategic alliance agreement for failing to proceed with the alliance, Paladin said in a press statement.

The dispute centered around the Mount Isa and Valhalla/Skal uranium projects in northwest Queensland state.

The settlement ends the Areva-Summit Resources alliance, Paladin said. Paladin's announcement can be found at www.paladinenergy.com.au/. —*David Stellfox, Barcelona*

Jaczko ... *from page 1*

fiscal 2011 stopgap funding measure, or continuing resolution, as well as with NRC's FY-11 budget request and appropriations laws. He also said neither he nor anyone on his staff has communicated with DOE on this matter.

A key concern raised in that letter and elsewhere centered on Jaczko's reliance on language in the NRC FY-11 budget request, which has not yet been approved by Congress, to justify the termination.

Seven Republicans on the House Appropriations Committee, which controls NRC's budget, told Jaczko in an October 20 letter that the NRC FY-11 budget request is "irrelevant" under the continuing resolution. "Congress has approved only your fiscal year 2010 budget request, which did not include funding to shut down the Yucca Mountain license application," the letter stated. "We expect that you will continue your fiscal year 2010 activities until Congress provides you addition funding and direction."

The letter was signed by Representatives Jerry Lewis of California, ranking Republican on the House Appropriations Committee, and Rodney Frelinghuysen, senior Republican on the panel's energy and water subcommittee, as well as Republican subcommittee members Rodney Alexander of Louisiana, Ken Calvert of California, Dennis Rehberg of Montana, Michael Simpson of Idaho and Zach Wamp of Tennessee.

They warned that if Jaczko continued to shut down the licensing review, which they said "can only be seen as a partisan act," that they "will reconsider the flexibilities which the NRC has long enjoyed due to its reputation as an independent body."

They said Jaczko's actions "call into question whether the NRC, under your leadership, will be able to maintain its historical role as an independent regulatory and oversight body. If continued, your actions may seriously erode the NRC's relationship with this subcommittee."

Overstepped boundary?

Upton and Whitfield told NRC Inspector General Hubert Bell they were "concerned" that Jaczko had "overstepped his authority by making a decision to terminate the review of the license application based on his FY 2011 budget request, which has yet to be approved by Congress."

Rogers, who was a member of the commission from 1987 to 1997, asked that the OIG investigate what he called Jaczko's "unilateral actions" in an effort "to determine whether any legal or other improprieties have been committed."

In an interview October 27, Rogers called the termination of the licensing review "a very dangerous step." It was based on language in NRC's FY-11 budget request that said the review could transition to an orderly closure if DOE withdrew its license application or the licensing review were suspended. Neither action occurred. Until Congress approves the FY-11 request, NRC should not implement any new programs or actions, and canceling a program is a new action, Rogers said.

NRC's reputation as an independent agency is at stake, according to Rogers, who stressed that independence has been one of the key principles guiding commission actions. The agency is "under a microscope constantly" and "it is very important to make sure these judgments are unbiased," he said.

"I don't think we've seen the end of this by any means," Rogers said of the uproar over the termination of the licensing review.

'100% compliance'

Jaczko said at NRC's all-hands meeting October 18 in Rockville, Maryland that the decision to shut down the licensing process "was reviewed very, very carefully by the general counsel, and it's in 100 percent compliance with our statutory and legal obligations."

He reiterated that in his response to Barton, Hall, Hastings and Sensenbrenner. He said the orderly closure of the licensing review is consistent with past NRC practice and "with NRC's obligations to spend funds prudently under a Continuing Resolution pending final budget action by Congress." This action, he said, is separate from the commission hearing process and from any decision the commission might make on the Atomic Safety and Licensing Board ruling that denied DOE's motion to withdraw the Yucca Mountain repository license application. DOE and the state of Nevada appealed the ASLB decision to the commission, which has not yet ruled on the matter.

Jaczko said that NRC staff is just beginning an orderly closure of the program and that "no specific actions" have been taken to terminate the program. "Rather the first step of this process is to preserve the staff's work products, and complete and implement a detailed and comprehensive plan for this effort," Jaczko said. "This entire process is expected to take at least a year and include documenting the staff's review and other knowledge concerning the program by means such as comprehensive technical reports and videotaped interviews of technical staff."

He said that by preserving this information, "the agency will be able to respond to direction from the Congress or the courts." Jaczko's statement responded to lawmakers' question about how he was ensuring NRC would be able to resume consideration of the application if the commission or a federal appeals court upheld the ASLB decision.

Court urged to move ahead

South Carolina, the state's Aiken County and other petitioners supporting the Yucca Mountain project told the US Court of Appeals for the District of Columbia Circuit October 25 that the court should resume consideration of a lawsuit

challenging DOE's decision to kill the Yucca project. The court had put the consolidated lawsuit on hold until the commission ruled on the ASLB decision. Both cases involve many of the same issues, including whether DOE has the authority to unilaterally kill a congressionally mandated program.

South Carolina is one of two states involved in the lawsuit. Both it and Washington state are home to DOE nuclear defense sites where highly radioactive nuclear defense waste is now stored until it can be moved to a disposal facility. Both states also are home to nuclear power plants, whose spent fuel will remain at the plants until it can be moved.

—Elaine Hiruo and Steven Dolley, Washington

U market ... *from page 2*

east Utah and has entered into a sales agency agreement with Denison, under which the Canadian company will process uranium from White Canyon Uranium's Daneros mine at Denison's White Mesa Mill and sell the processed U3O8 into the spot market. White Canyon said the sales could begin as early as December and that it expects Denison Mills to mill about 45,000 metric tons of ore under the agreement.

—Michael Knapik, Washington; David Stellfox, Barcelona

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