

# NuclearFuel

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## Unique NSG exception for India would discriminate, Pakistan says

In recent meetings in Vienna and elsewhere with members of the Nuclear Suppliers Group, Pakistan has urged NSG “not to discriminate against Pakistan by making a single exception for India” to accommodate the US-India agreement now under negotiation, Pakistan’s ambassador to Austria and the IAEA, Shahbaz Shahbaz, told Platts November 16.

“Pakistan has no objections if the Indian deal is approved as the basis of trade by the NSG,” Shahbaz said. “But if so, we want it to be on the basis of

criteria. We’ve been kept at a distance, there has been discrimination, but we now will play by your rules. You lay down the criteria, and we will respect them,” he said.

Ehsan Ul Haq, Chairman of Pakistan’s Joint Chiefs of Staff who is directly involved in Pakistan’s nuclear strategic planning, said that “instead of being country-specific,” NSG’s accommodation of the US-India deal “must provide a level playing field for Pakistan as well.”

Both Ul Haq and Shahbaz discussed

the US-Indian deal at a seminar on nuclear export controls and Pakistan, held in Brussels last week by the London-based South Asia Strategic Stability Institute. The recently established research institute will hold a seminar next year on Indian nuclear issues.

Parvez Butt, former chairman of the Pakistan Atomic Energy Commission and now a senior government adviser, said that Pakistan’s energy needs in the future will be “enor-

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## Fuel bank concept struggles to become a reality

Efforts to establish an international fuel bank as part of a strengthened nonproliferation regime continue to draw support from government leaders and international officials, but some observers say they see a troubling vagueness on even some of the most basic questions of implementation.

Securing the necessary fuel supplies from multiple sources — a key part of the effort — also has proved to be a challenge, although DOE’s National

Nuclear Security Administration said this month that it was planning to issue a request for proposals, or RFP, around the end of the year for the blend-down of 17.4 metric tons of high-enriched uranium. The resulting LEU would be transferred to the bank.

The goal of the fuel bank plan — which has been offered, in differing forms, by IAEA Director General Mohamed ElBaradei, US President

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## NEI works on suspension agreement consensus

The Nuclear Energy Institute has been trying to help forge a consensus industry position on how the Russian uranium suspension agreement should be amended. NEI is hoping such a consensus can be reached within the next several weeks so that the industry “can inform the [US] government” of its proposal to amend the Russian agreement, according to one source.

The US Department of Commerce offered terms of an amendment to the

Russians in a series of meetings in September and October (NF, 9 Oct., 1). But the Russians were unhappy with that proposal, as were US utilities, because it would not have allowed the sale of any Russian commercial SWU in the US until 2014. Russian and US negotiators were scheduled to meet last week in Vienna, sources said, but it was unclear at press time whether any progress was made.

Russian nuclear chief Sergei Kirienko

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**Current Uranium Pricing Indicators (US\$/lb U3O8)**

Source (date)	Price	Last Report (date)
<b>TradeTech<sup>1</sup> (Oct. 31)</b>		
Exchange value	60.25	55.75 (Sept. 30)
Long-term U3O8	60.00	55.00
UF6 value (\$/kgU as UF6)	169.00	157.00
<b>Nukem<sup>2</sup> (Oct. 31)</b>		
Spot Market Price Range		
Uranium (\$/lb U3O8)	55.50-60.00	54.00-55.50 (Sept. 30)
Conversion (\$/kgU as UF6)	11.25-11.50	11.25-11.50
<b>Ux Consulting<sup>3</sup> (Nov. 13)</b>		
Spot price	62.50	60.00 (Oct. 30)
Spot conversion (US) (\$/kgU as UF6) (Oct. 30)	11.75	11.50 (Sept. 25)

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. RWE Nukem's price ranges reflect bids and offers in the natural uranium spot market
3. The Ux Consulting price indicates, subject to the terms listed, the most competitive offer available of which Ux Consulting is aware. Those terms (Oct. 30) are: quantity, 100,000-300,000 lb; delivery, within six months.

**Secondary SWU Market Price Estimate (US\$/SWU)**

Source (date)	Price	Last Report (date)
<b>TradeTech (Oct. 31)</b>		
Unrestricted	120	117 (Sept. 30)
Restricted	134	131
<b>Nukem (Oct. 31)</b>	114-125	114-125 (Sept. 30)
<b>Ux Consulting (Oct. 30)</b>		
Spot	134	131 (Sept. 25)

has indicated that if an agreement on an amendment to the suspension agreement is not reached by the end of December, then the Russians will give notice to DOC in January that they will terminate the suspension agreement.

Given this timeline, NEI has brought together representatives from enrichment companies, US utilities (including some chief nuclear officers), and US uranium producers at two meetings so far, the most recent being November 14. Sources gave differing views as to progress on reaching a consensus, but one source said the parties were "participating constructively."

The Russians would like to sell commercial SWU in the US well before 2013, the year the US-Russia high-enriched uranium agreement will end. US utilities have indicated they would like to see the suspension agreement amended to allow sales of 500,000 SWU to 1 million SWU a year beginning in 2008. But USEC Inc. is wary of allowing any more Russian SWU into the US because such sales could hurt USEC's ability to raise money to finance its American Centrifuge plant. A source said that USEC has also suggested

in the NEI meetings that utilities should drop their court appeals over the Russian suspension agreement, a precondition that the utilities have rejected.

But several sources said they believe the parties "are not that far apart" and that a consensus is possible. If not, a source said, the US government is going "to do what it wants" and that will probably be to support USEC's position.

**In the market . . .**

The spot U3O8 price rose over the past several weeks to at least \$62.50 a pound, the price reported by Ux Consulting November 13. But a number of analysts said that a seller could command a price of at least \$65/lb if it were to offer for sale 50,000 to 100,000 lb U3O8 for delivery by the end of the month.

Although Ux reported a limited number of fixed price offers being made to "preferred clients," a number of potential buyers have reported they can find very little uranium available for sale.

Mestena Uranium is expected to auction off about 150,000 lb U3O8 in mid-December, a sale that could move the year-end price close to \$70/lb, several analysts predicted.

Several sources said that Evolution Markets has quietly gone to a number of utilities with an offer to sell 1.2 million lb over the period 2008 through 2012. Offers to buy this material were said to be due to Evolution Markets on November 14. It is likely that competition to buy this material would center on how high a floor price a utility buyer would be willing to accept, several analysts said.

New to the market is the Tennessee Valley Authority, which is looking to buy some 3.5 million lb U3O8 equivalent over the period 2012 through 2016. Bids are due December 15.

Florida Power and Light is also said to be quietly looking for both near-term and long-term supply – about 200,000 to 300,000 lb for delivery by the end of this year and from 300,000 to 600,000 lb a year over the period 2011 through 2015.

Based on discussions with market participants, spot U3O8 transactions over the next two weeks are likely to occur within the range of \$64 to \$70/lb.

**URI reports nine-month results**

Uranium Resources Inc. said it sold 199,921 lb U3O8 in the first nine months of 2006 at an average price of \$28.41/lb. Over the same period in 2005, URI said it sold 219,000 lb at an average price of \$18.40/lb. But URI said that its average cost of uranium sold over the first nine months of 2006 was \$42.46/lb, compared to a cost of \$15.96/lb over the same period in 2005. URI said its costs include operating expenses and depreciation and depletion costs.

Over the first nine months, URI said it produced 117,395 lb from its Vasquez project and 70,017 lb from its Kingsville Dome project. Both projects are in Texas. Production over the same period in 2005 was 239,738 lb, all from the

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## Russian group aims to sue Urenco, claims tails exports illegal

Russian environmental group Eco-Defense informed prosecutors in Muenster, Germany last week that it plans to sue Urenco Deutschland for what it alleges are illegal transports of nuclear waste material to Russia.

At issue are shipments of uranium tails carried out since 1996 from Urenco's Gronau enrichment plant to Tenex in St. Petersburg. Tenex then transferred the tails to enrichment plants at Novo-Uralsk, Seversk, and Angarsk for re-enrichment under an agreement with Urenco.

The secondary tails generated by the re-enrichment are being stored at the Russian enrichment sites, Urenco officials told Platts earlier this year. According to researchers, some of the secondary tails have been re-enriched in Russia and are used to blend down high-enriched uranium to make commercial-grade power reactor fuel.

Separately, one well-placed Russian industry official told Platts earlier this year that the enrichment facilities no longer have room to store the tails and that it would be too expensive to build new storage capacity (NF, 31 July, 1). Last week the official confirmed that Tenex will stop taking Western tails for re-enrichment in 2008, when its existing contracts with Urenco and Areva/Eurodif expire, but said no formal announcement would be made this fall as had been planned.

A spokesman for Urenco in Gronau told Platts that the action by Eco-Defense has had no impact on the company's business with Tenex and that neither prosecutors nor other German justice officials have contacted Urenco about the allegation by Eco-Defense.

A spokeswoman for Urenco in Marlow said that the company views the charges as baseless because Urenco is shipping a "byproduct, not waste" to Russia under a valid commercial contract. She said Eco-Defense had "filed an allegation" with the court in Germany, but, so far, no charges have been filed by prosecutors against the company.

Recently, Eco-Defense members went to Gronau and met with the city's mayor. They also held a small demonstration in front of the Urenco enrichment plant, which ended peacefully after police intervened, sources close to the company said.

While both Urenco and Tenex have maintained that the export of the tails to Russia is for re-enrichment and resale to power reactor owners, German press reports this week said Eco-Defense is alleging the main reason Urenco ships its tails to Russia is to dispose of them. The reports said Eco-Defense is supported by Greens and by a German political party consisting of disgruntled left Social Democrats and former Communists.

In 2004, Eco-Defense published a report in which it estimated that between 2000 and 2003, Urenco had annually generated tails amounting to roughly 7,000 to 9,500 metric tons U as UF<sub>6</sub>. According to World Nuclear Association figures, as of 2003, more than 545,000 mtU of tails had accumulated at the Russian enrichment plants.

At least some of the secondary tails after re-enrichment

were again re-enriched and the product was used for blending down surplus HEU to make commercial reactor fuel, Eco-Defense said. "Considering that the re-enrichment process [in Russia] results in only a minor reduction of the amount of tails to be disposed of, the tails transfer to Russia [may] constitute an illegal transfer of radioactive waste for final disposal," the Eco-Defense report concluded. It suggested Tenex had been charging Urenco 18% of the market price for enrichment services, a fee representing the operating costs of the Russian SWU plants.

The deal with Tenex allows European enrichers to avoid the cost of storing depleted uranium, or tails, and of transforming part of their tails into natural uranium or low-enriched uranium. German consultant Peter Diehl estimated in an Eco-Defense study that Eurodif and Urenco had gained \$200 million or more in 2004 alone from the tails re-enrichment business with Tenex, assuming that the Russians charged only \$20 per SWU for the re-enrichment. He estimated Rosatom's gain at \$52 million to \$150 million, provided the residual tails were used as blendstock for HEU downblending and assuming there was no cost for the disposal of "ultimate" tails (NF, 5 Dec. '05, 5). However, rising SWU prices and the prospects of a nuclear revival with increasing demand for enrichment have made the deal less attractive to the Russian industry, industry analysts say.

Eco-Defense's 2004 report asserted that "if the residual uranium contained in the tails were so valuable, then Urenco and Eurodif would be eager to keep the tails rather than to give them away." It added, "For Urenco and Eurodif, the main purpose of the deal is to solve their waste management problem by transferring the depleted uranium to Russia." The report estimated that the volume of ultimate tails in Russia arising from imports of foreign tails is about 10,000 mtU of UF<sub>6</sub>.

In 1997, the Federal Economic and Export Control Agency, BAFA, responsible for licensing the tails shipments, told the Bundestag, the lower house of parliament, that before initial shipments were authorized in 1996, "Urenco's intent to re-enrich tails in Russia was examined by [the German government] together with the governments of the Netherlands and the UK. The examination concluded that re-enrichment in Russia is not associated with any illegal disposal of residual [nuclear] materials, does not violate any international regulations, and that the storage of the re-enriched tails at the Russian enrichment plant sites conforms with international practice ... and meets international standards."—Mark Hibbs, Bonn; Ann MacLachlan, Paris

## Areva preparing fuel plants, products for market boom

Areva has been investing "discreetly" in its fuel fabrication capacity in recent years, notably in the US, so as to "be ready" for a nuclear revival that the company sees coming, Areva's Claude Jaouen said last month.

Jaouen, who at the time was Areva's executive vice president, fuel, said that there is still overcapacity in the fuel fabrication market, especially in the US. But, he said, Areva is investing in the sector because its customers demand more research and development, marketing in the US has required more spending, and it wants to preserve its nuclear sites in anticipation of a boom in the new plant market in a few years.

When Framatome and Siemens merged their nuclear businesses in 2001, there was speculation that the merged company, Framatome ANP, might close one of its US fuel manufacturing sites, Framatome's in Lynchburg, Virginia or Siemens' in Richland, Washington (NE, 13 Dec. '99, 1). Instead, the company first considered concentrating uranium activities at Richland, which is bigger than Lynchburg and makes UO<sub>2</sub> powder and pellets, but ended up keeping both sites operating, Jaouen said in an interview last month at the Topfuel 2006 conference in Salamanca, Spain. The Lynchburg facility now specializes in PWR fuel and Richland's in BWR fuel, he said.

In order to reduce operations to a single site, Framatome ANP, now called Areva NP, would have to make "big investments" at Lynchburg to make enriched boron-6 and to treat scrap material, or else "bring Richland up to the quality and price levels" of the PWR fuel made in Lynchburg, he said.

Areva's continuing investments in fuel production facilities and R&D in Europe and the US are part of a Eur 1.8 billion (about US\$2.4 billion) package to bolster the group's front-end facilities planned over the period 2005-2009 (NE, 14 March '05, 1).

Areva has raised its share of the US fuel market from 24% to 31% since the Framatome-Siemens merger, and "we don't feel the need today to rationalize" fabrication by shutting one plant, Jaouen said. The strategy can be adapted in the future based on market objectives and the plants' performances, Jaouen said, adding that whether EPR is developed in the US "is not totally unrelated to this picture."

Jaouen left his position as Areva's fuel chief November 1 and was succeeded by Ralf Gueldner of Areva NP GmbH. Jaouen is now executive VP responsible for organizational changes in Areva's engineering units.

### Cross-qualification

Under a strategy conceived by Jaouen's predecessor in the fuel job, Bernard Esteve, who now is executive president of Areva North America, the company has been cross-fertilizing the nuclear fuel products of Framatome and Siemens, choosing the best features of both to design a single product line. For example, the group developed a product using Framatome's M5 clad material on the basis of Siemens' HTP assembly design. The group's European fuel factories at Romans, Dessel and Lingen are now broadly capable of making the same fuel types, according to Jaouen and other Areva NP officials.

Jaouen said this cross-qualification gives the group "much more flexibility" to respond to an event that could close one of the plants, such as a hurricane or other climatic challenge. In the light of unexpected events that have closed

major fuel cycle facilities in Europe and the US over the past few years, customers increasingly want to qualify "not just a [fuel] product, but also a given plant," he said.

"We have set reasonable periods" during which a single plant can be out of commission but the others can still ensure production and deliveries, he said. "We know how to cope with all the risks that we can conceive of today, including fire and hurricanes," and to assure production for three to six months following such an event, Jaouen said. "It's easier" to cope with emergencies when a company has a lot of fuel facilities, as Areva does, he said.

### Battle for fuel

Jaouen said that Areva's future fuel business is still closely linked to the group's success in selling new reactors. Today, after years of expanding its presence in the US and other countries, he said, Areva's fuel market still consists of "88% of our installed base [of Framatome and Siemens reactors] and 25% of our competitors' installed bases. This is still a market where the original vendor has a real advantage."

Despite the buzz at Topfuel about new fuel designs and the aura of competition, Jaouen said, "the real stakes" in the near term are not in new fuel sales, but in new reactors. "The battle for fuel will take place five or seven years" after the new reactor contest, he said.

Jaouen said that the takeover of Westinghouse by Toshiba was obviously one of the major events in the market but said Areva has "no idea of the consequences" of that deal. Areva's new partnership with Mitsubishi Heavy Industries is "very much focused on reactors," including joint design of a 1,000-MW-class PWR, and fuel hasn't been discussed specifically, he said. However, he said the MHI alliance could be advantageous because it could help the companies get a foothold in Asian markets, including China.

Jaouen spoke before the announcement last week that Hitachi and General Electric had entered into a cross-ownership agreement to set up a new joint venture in nuclear power.

But Jaouen said there were other big issues for the future nuclear power plant and fuel market, beginning with "what will happen in India," which he called "a huge uncertainty for me." Another is whether the Russians will really be able to ratchet up their nuclear industry and serve exploding domestic and export markets as they have announced. If they do, it will be "absolutely significant," he said, because it will "tip the market" to other reactor designs.

Today, only Russia's TVEL makes fuel for Russian-designed VVERs in commercially significant quantities. Westinghouse has supplied fuel for two VVER-440s and two VVER-1000s, but it lost the VVER-1000s at Temelin to TVEL this year, and Westinghouse officials have said that volume of business can't support the production cost in the long run.

All those developments won't shake out until the next decade, Jaouen predicted. "The set of players [in the world nuclear fuel market] is going to remain stable for the next five or six years," he said. "After that, there will be a new equilibrium."—Ann MacLachlan, *Salamanca*

## Audit of DCS MOX facility finds flaws in procurement QA

An audit has found “significant quality-affecting issues” that need to be addressed in the procurement activities of the private consortium that is building a mixed-oxide fuel fabrication facility for DOE, NRC said last month.

NRC staffers last week characterized the issues as “early difficulties,” with many of them tied to the question of which of two quality-assurance approaches the Duke Cogema Stone & Webster, or DCS, consortium will use. But a leading critic of the MOX project said the memo revealed more fundamental problems.

The MOX plant, which is to be built at the Savannah River Site in South Carolina, is a central part of DOE’s disposition program for 34 metric tons of surplus weapons plutonium. The majority of that plutonium is to be fabricated into MOX fuel and irradiated in US reactors. Under a 2000 presidential agreement, Russia also is pursuing a disposition program for 34 mt of surplus plutonium.

The October 6 NRC memo is from Paul Bell, an agency staffer who accompanied DCS auditors as they reviewed the procurement activities for the MOX project. The NRC endorsed the findings of the DCS audit and concluded that, “if uncorrected, the programmatic importance and regulatory significance of the identified adverse conditions may have a direct impact upon the quality of the items purchased, tested, and installed in safety-related applications.”

According to the memo, the DCS audit team “expressed concern that the current grading process does not apply the appropriate controls and control points to reasonably ensure safety, reliability and performance of Irofs [items relied on for safety] during the design, procurement, and the manufacturing process.”

“Grading evaluations” have been completed for two Irofs, the NRC said. NRC staff and the DCS auditors agreed that “quality level grading determinations lack a standard approach” and that QA requirements “were not being consistently applied.”

Edwin Lyman, a senior scientist with the Union of Concerned Scientists, said that “the foundation of compliance with Part 70” is to ensure QA for plant structures, systems and components, and the NRC memo is saying “the regulatory criteria can’t be met.” He was referring to 10 CFR 70, the part of the Code of Federal Regulations dealing with the domestic licensing of special nuclear material.

Lyman also focused on sections of the report dealing with sole-source foreign suppliers. According to the report, “DCS stated that awards to sole-source vendors have been impeded, due to noncompliant quality assurance programs, language barriers, and the lack of understanding of US technical specifications and the possible use of third-party oversight for prospective vendors.”

The NRC staffers said the question comes down to how DCS obtains the items it needs for the plant. Licensees can meet NRC QA requirements by buying the items from a ven-

dor that meets the NQA-1 standard, a US standard developed by the American Society of Mechanical Engineers, one staffer said. That standard, he said, parallels the requirements of 10 CFR 50, Appendix B, which covers quality assurance criteria for nuclear power plants and fuel reprocessing plants.

The other option is to buy from suppliers that meet the International Standards Organization standard, ISO 9001, the staffer said. That standard is similar to NQA-1, but the two are not completely “aligned,” he said.

If DCS made a purchase from a vendor adhering to ISO 9001, it would have to carry out an engineering evaluation and subject the item to what is known as a “commercial dedication process,” he said. An applicant must use the dedication process whenever it buys an item from a vendor that is not on the applicant’s pre-approved list of qualified sellers, he said.

Either procurement approach is acceptable, said the NRC staffer; the choice between them is an “internal decision” for the buyer to make. Situations like the one described in the memo occur “all the time” in nuclear procurement, he said. A second staffer added that the NRC has its own QA review planned for January, and periodically after that.

Lyman said it was “ridiculous” that NRC had issued a construction authorization for the MOX plant in March 2005 (INRC, 4 April ‘05, 1) and now, 1.5 years later, was finding problems with DCS’ QA. But the staffer said that because the procurement activities covered in the audit are not for items that are needed in the early stages of construction, there is enough time for DCS to resolve the issues raised by the audit.

Because of uncertainties over congressional funding for the project, DOE has deferred the start of construction (NE, 11 Sept., 1).

DCS did not respond to phone calls seeking comment on the QA audit.—*Daniel Horner, Washington*

## Single repository candidate site called unacceptable for society

A key French politician and a Swiss social science professor warned last week that the public will continue to oppose high-level waste repository projects that are imposed with no alternatives.

Francois Dose, Socialist member of parliament from the eastern French district that includes Bure — where Andra has installed an underground waste laboratory and is planning to seek a repository site — told the Eurosafe Forum last week in Paris that people in the area were “offended” by being the only “victims” of the Andra work. Local politicians who accepted the lab work 12 years ago were told there would be at least one other site in France, he said, but it never materialized and now “the population is under pressure from the nuclear industry,” Dose said.

The French parliament in June passed a new waste act

that removes the former goal of multiple candidate sites and sets tight target dates for approving a repository site and beginning repository operations. During the floor debate, however, legislators imposed an amendment that provides for further parliamentary action in 2015, before a repository license can be issued.

Dose called the situation in France “extraordinary” and said Pierre Mendes-France, a respected former prime minister and moderate Socialist leader who defended citizens’ right to contest decisions imposed from on high, “must be turning over in his grave.”

Thomas Flueler of the Institute for Human-Environment Systems at the Technical University of Zurich, said that national radwaste authorities must offer at least two site alternatives. Decision scientists, he said, “tell you that ‘a choice of one is no choice.’” Decision science uses mathematical, statistical and computational models to provide guidelines for management and decision makers.

Flueler has served on several advisory groups dealing with radwaste disposal and on the Swiss government’s Federal Nuclear Safety Commission.

He said the second site alternative must have as good a safety case as the first, with the same decision basis and the same degree of uncertainty or certainty: “Otherwise, it would be unfair.” But he said that could be achieved by using generic data and wouldn’t require “the same amount of boreholes” at the alternative site.

Flueler cautioned, however, that once a process to find a repository site is botched, “you cannot redeem it.” He said Swiss nuclear waste agency Nagra had found that out the hard way with its attempt to site a repository in Wellenberg, which the public rejected.

Nagra President Hans Issler said that in any case, Swiss citizens “know that the answer is always a referendum.” The country is famous for putting hundreds of issues to direct, binding national votes.

Phil Davies, head of waste and nuclear materials strategy at the UK Nuclear Decommissioning Authority, argued that “the most suitable site is not necessarily the ‘best’ geologically. ‘The best’ contains all attributes.” But Flueler said public acceptance ought to take a back seat to scientific qualities in choosing a repository site.

In a separate address to the Eurosafe Forum, Georges Mercadal, chairman of the National Commission on Public Debate and of the special commission that organized a national debate on French waste management policy that ended in January, said one of the basic principles of long-term radioactive waste management should be “territorial equity.” Mercadal said that “you run into big trouble when you have a situation in which some [candidate sites] are abandoned.” People around the remaining site feel like “designated victims, no matter what is in the [technical] case,” he said, calling this a “reflex of rejection.”

Mercadal said the solution that emerged from the French national debate was to go for “perennial storage” of spent fuel and long-lived waste in dedicated facilities. “Perennial storage” is conceived as above-ground or subsurface storage

in engineered facilities that might be monitored and renovated at regular intervals, every 200 or 300 years, for example (NF, 16 Jan. ‘06, 1). “I advised [the government] to conduct research into perennial storage, which would also provide a second site” in France that might receive high-level and long-lived radwaste and take the heat off Bure, he said. But that option wasn’t explicitly mandated in the waste plan approved by the legislature last summer. “I’m not sure” the government and parliament took measures that correspond to what the public expected after the debate, Mercadal said.

Eurosafe, an annual forum sponsored by the French, German and Belgian technical safety organizations — respectively GRS, IRSN and AVN — drew more than 400 participants November 13 and 14 to this year’s symposium, where the opening session and panel discussion were devoted to waste management.

Like the US, France initially planned to investigate two sites for a potential HLW repository — in France, that repository would also take long-lived intermediate-level reprocessing waste — but “lost” one of the sites in the politico-technical process and now has no alternative. The main difference between the two projects is that the US’s underground rock laboratory was built directly in the potential repository site at Yucca Mountain. In France, Andra must now find a site suitable for a repository in the clay formation around the small Bure laboratory. Andra is barred by law from bringing real nuclear material into the Bure lab.

### **‘It won’t work’**

Dose, who after 35 years in public life is not planning to run for office again next year, said it was imperative that time be taken to discuss with the public issues such as the appropriate period for waste retrievability or the appropriate geographic scope for economic and social support around a potential repository — i.e., should compensation go to only the county or counties that actually host the facility, or also to those that are actually affected by it but are across the county line?

If a repository site is decided only on scientific grounds, he said, “I think it won’t work. It can’t be a scientific decision alone. The scientific seal of approval doesn’t make it acceptable.”

Dose said that proponents of a repository must work “quickly” to convince people in his district, and the country, that France needs nuclear power and that nuclear power needs the Bure site. He said that it is misunderstanding of the whole nuclear issue that drives people into fear, even including some doctors near the Bure site who equate the repository with death because the waste would be buried. Opponents play on that fear, and the media flock to “demonstrations with five people,” magnifying that fear, he said. What’s needed are not more “rational” arguments in favor of nuclear power, but to raise the nuclear power issue to an emotional level on the positive side, he said.

### **Alternative in Sweden?**

Josefin Joensson, head of repository safety at the Swedish Nuclear Power Inspectorate, or SKI, told the Eurosafe partici-

pants that by the end of the repository site qualification process in Sweden, the national nuclear fuel and waste management company SKB “will have investigated two municipalities to the same degree.” SKB is investigating the potential for a repository at two municipalities that already have nuclear plants, Oskarshamn, where the Oskarshamn plant is located, and Oesthammar, site of Forsmark. The country is blessed with extensive granite formations, including under its nuclear plant sites.

The SKB project is moving forward. SKB applied for a license to construct and operate a spent fuel encapsulation plant at Oskarshamn two weeks ago. An application for a final repository at one of the two candidate sites is expected by late 2009, she said.

But Joensson also reported that non-governmental organizations in Sweden recently raised a new issue. She said they are suggesting that SKB must present an alternative to the KBS-3 method of deep-geologic disposal that the company has been developing since the 1980s and has vetted extensively. KBS-3 involves, among other things, encapsulating spent fuel in copper-lined canisters.

The organizations say SKB should investigate just as thoroughly such options as disposing of Swedish spent fuel in deep boreholes or sending it abroad for disposal, she said (see next story).

“It’s a challenge,” Joensson said. “In Sweden we thought we already had cleared the method that was going to be used. Now the NGOs claim we need an alternative method.”

Nagra’s Issler said politicians had told the Swiss company that they need to have alternatives. That’s why Nagra will present two potential sites for a repository in a clay sediment formation. But Issler said it’s important to “give a region time to follow what we are doing” and to gain trust in the experts conducting the work, so “at the end, we can show the process was transparent.”—*Ann MacLachlan, Paris*

## SKB convinced bedrock disposal of spent fuel beats deep borehole

With a license application for a final spent fuel repository set to be filed by the end of 2009, SKB Chief Executive Officer Claes Thegerstroem remains convinced that storing spent fuel in bedrock is preferable to using deep-borehole technology.

“We have studied this [borehole technology] for years, and the conclusion is that it’s not viable,” he said in an interview November 7. “We don’t have the technology to do it now.”

The Swedish Nuclear Fuel & Waste Management Co., or SKB, applied to the government November 8 for a license to operate an encapsulation facility for spent fuel, the first step in commercial operation of a spent fuel repository using the KBS-3 system.

Under the system, spent fuel is encapsulated in steel canisters covered by copper shells. Canisters are then moved into repository chambers 500 meters deep in bedrock and surrounded by bentonite clay.

The government won’t act on the encapsulation facility license application until after 2009, when Thegerstroem said SKB plans to apply for the repository license. The Swedish Nuclear Power Inspectorate, or SKI, which is responsible for making recommendations on the license applications to the government said it expects to have its opinions ready around 2012.

SKB’s application for the encapsulation facility, which would be an expansion of the work done at the test facility in Oskarshamn, sparked protests from various groups that maintain the KBS-3 system might not be the best choice for spent fuel disposal.

Johan Swahn, manager of the Swedish NGO (non-governmental organization) Office for Nuclear Waste Review, or MKG, said that the organization believes deep borehole disposal of spent fuel is more environmentally friendly than a repository.

But Thegerstroem said that a bedrock repository allows for more control in placing spent fuel canisters than would a deep borehole system, in which spent fuel would be placed 4 kilometers underground.

“With deep borehole, a canister could get stuck at 3 kilometers and it might not be possible to move it or retrieve it. That’s not a very good situation,” he said.

“I think that some of these organizations would like to see another 10 or 15 years of research and the whole thing postponed,” he added, “but we can’t do that. We have an obligation to deal with the spent fuel now, not leave it for future generations.”

Thegerstroem said SKB’s repository license application will most likely specify that canisters be placed vertically in the repository, although the company also is studying horizontal placement.

Thegerstroem said a horizontal system would mean less bedrock would have to be excavated and would therefore have less of an environmental impact than a vertical system. But he said SKB would probably not be able to determine if the horizontal placement is feasible by the time a repository license application is submitted.

If the repository is licensed for vertical placement, there is a question about whether a new or modified license would be needed if SKB were to change to horizontal storage. “We hope that the government will allow SKI to deal with that type of operational issue,” Thegerstroem said. In general, he said, SKB is weighing how specific the repository license application should be.

“There are complicated legal issues,” he said, “as there were with the wording of the encapsulation facility license application.”

SKB is considering both Oskarshamn and Oesthammar, where the Forsmark nuclear plant is located, for a repository. Sources have told Platts repeatedly that the repository will be at Oskarshamn, but Thegerstroem maintained “it’s still completely open.”

SKB said at the beginning of the month that both sites are geologically feasible but that more study needs to be done. Thegerstroem estimated that another year of site work

needs to be done and that it will take about a year after that to analyze the findings.

If Oesthammar is chosen, encapsulated fuel would be transported from Oskarshamn by sea, something Thegerstroem said “in a sense is easier than transporting unencapsulated spent fuel. We transport spent fuel naked, in normal transport containers.”

SKB has a specially outfitted ship, Sigyn, to bring spent fuel from Swedish reactors to the CLAB interim spent fuel storage facility at Oskarshamn.

Besides approval from the government, under Sweden’s nuclear law, SKB also needs environmental court approval and various approvals from local authorities for both the encapsulation facility and the repository.

The environmental court system is fairly new in Sweden. Rather than make their own decisions, the courts have referred several cases involving nuclear plant licensing and uprating to the government this year and, until the government’s clarification this summer, there was uncertainty about whether SKI still had the definitive say on safety issues.

Swahn said that MKG believes the encapsulation facility license application violates Swedish environmental law, because it is part of the KBS-3 system that includes the repository and that both license applications should have been made together.

Thegerstroem said a court review of the encapsulation facility and repository licenses will venture into uncharted territory but he believes that by 2009 SKB can marshal sufficient information to get approval.

Nor is he concerned that recent problems at Swedish nuclear plants, notably Forsmark, will have a negative effect on the applications.

“There’s a very different attitude about nuclear today than during the referendum time,” he said. Swedes voted in 1980 to phase out nuclear power but then went on to complete and operate units under construction at that time. Ten of the country’s 12 reactors are still operating.

In addition to the encapsulation facility and the repository, SKB also plans to operate a plant for assembling canisters. That would not be considered a nuclear facility.

Thegerstroem said SKB believes it can maintain better quality control with its own plant.

The copper and steel components of the canisters would be put together at the plant and, possibly, the bottoms of the canisters welded on, he said. The tops would be sealed at the encapsulation facility using a technique known as friction-stir welding, which SKB tests indicate makes a better seal than traditional welding.—*Ariane Sains, Stockholm*

## Chernobyl might oust Framatome, hire Holtec for spent fuel storage

Sergey Parashin, director of the Chernobyl exclusion zone, told a press conference in Kiev November 13 that a contract with Areva NP, formerly Framatome ANP, for the

construction of a facility to store Chernobyl spent fuel will be canceled and that most likely Holtec International will finish the so-called ISF-2 project.

Sources close to the project cautioned, however, that nothing is decided yet, including how to free the European Bank for Reconstruction and Development, or EBRD, and the Chernobyl Nuclear Power Plant from the contract signed in 1999 with Framatome for the design and construction of the storage facility. Because of technical problems and legal disputes, Framatome has done essentially no work on the facility since 2003.

Parashin, who administers the zone on behalf of Ukraine’s Ministry of Emergencies, added that Kiev wants Framatome to “pay for its mistakes” on the project. The extent of damages, he said, would be determined by experts of the EBRD and, if necessary, by a European arbitration court.

Parashin said Holtec had proposed a “very fast and simple” solution. He added that a competing offer from a Russian consortium led by Atomstroyexport had been discarded because of uncertainties in its price bid.

The choice of a new contractor, once finalized, must be approved by the Assembly of Contributors of the EBRD. The bank’s Nuclear Safety Department manages the project as part of a larger program to deal with the legacy of the 1986 Chernobyl reactor accident. The program is funded by 28 countries and the European Commission.

The EBRD has revived its Nuclear Safety Review Group, or SRG, which last met two years ago, to assess Holtec’s proposal to install a fuel drying facility and storage hall within the buildings already erected by the Framatome consortium. The SRG received Holtec’s technical dossier a few days ago and is slated to deliver its verdict November 29. The donors’ assembly is scheduled to meet December 14 to make its decision, according to officials involved with the project.

Completion of work under the July 1999 contract was originally scheduled for March 2003. After the seventh supplementary agreement, completion was expected in August 2005. The consortium includes Framatome ANP (leader), Campenon Bernard-SGE, and Bouygues Travaux Publics.

### Painful

If the job is awarded to Holtec, it will mark the end of what has been a painful experience for Areva, which inherited the ISF-2 contract when it incorporated 66% of Framatome ANP in 2001. Despite changing the management of the ISF-2 project, Areva has not been able to resolve a dispute with the Ukrainians over the technical specifications of the spent fuel and the licensability of its proposed technical solution. Its cost estimate for the project has risen from an original Eur 68 million to upward of Eur 165 million, potentially as high as Eur 232 million (Nucleonics Week, 25 Nov. ‘04, 12).

Framatome ANP’s trading name was changed to Areva NP this year, but contracts still bear the Framatome name.

The ISF-2 is meant to store 22,500 spent fuel rods from the Chernobyl-1, -2, and -3 RBMK units, which are shut down, pending a definitive solution. Chernobyl-4 was the site of the world’s worst nuclear power accident.

Originally, the plant's first spent fuel storage module was expected to be in service in 2001. But by 2003 the technical and legal problems had proven so formidable that Areva stopped onsite work except for civil structures, which were the task of Campenon Bernard and Bouygues.

The first spent fuel was removed from the reactor pool at Chernobyl-3 last December 5, but it had to be moved to the old Soviet-era ISF-1 away-from-reactor spent fuel storage facility because ISF-2 wasn't available (NW, 22 Dec. '05, 12). ISF-1's design lifetime expires in 2016. Ukrainian politicians have railed against Framatome's failure to finish the facility, saying it prevented the country from decommissioning the three reactors by the scheduled deadlines (15 Sept. '05, 10).

The main problem Areva/Framatome encountered on the ISF-2 project arose from the discovery that a significant percentage of the Chernobyl fuel elements were not leaktight, in addition to 19 heavily degraded elements that one source describes as "spaghetti." Experts from the Chernobyl plant, which is the customer, couldn't identify which elements contained water and which didn't. That led Framatome to assume that all fuel was leaking and to propose fuel storage cartridges with porous patches instead of leak-tight seals, in order to allow built-up pressure to escape and avert cartridge rupture.

Framatome has claimed the original technical specifications were misleading. "We were asked to build a dry storage facility for dry fuel," as Joel Pijselman, senior executive vice president, services of Areva NP, puts it. Framatome had proposed to use the Nuhoms horizontal modular storage technology which it licensed from the now-defunct Vectra in the early 1990s. Transnuclear, another unit of Areva but from the group's Areva NC (formerly Cogema) sector, bought the Nuhoms technology when Vectra went bankrupt in late 1997 (NF, 17 Nov. '97, 1).

### **Eur 210 million?**

The Ukrainian side first proposed canceling the Framatome contract to the Assembly of Contributors in London June 27.

In November 2003, in a seventh amendment to its contract, the French company agreed to share the extra cost of redesigning ISF-2 with Chernobyl, with the Ukrainians paying Eur 10 million of a total Eur 50 million (NW, 8 Jan. '04, 8; and 25 March '04, 7). Areva constituted a provision of Eur 45 million in its 2003 accounts to cover its share. In accepting part of the cost, Areva acknowledged that Framatome ANP had failed to include explicit reservations about technical specifications of the Ukrainian fuel in the original contract. Siemens AG holds a 34% share in Framatome ANP.

After the conclusion of Amendment 7 in late 2003, Areva/Framatome asked for another Eur 75 million in addition to the Eur 90 million of Amendment 7, for a total of Eur 165 million. However, that proposal still covered only the dry fuel and not the 5% of the fuel rods with water in the cladding. An official close to the EBRD said Areva this year had said it needed an additional Eur 50 million to cover all the fuel. That would bring the project total to over Eur 210 million, more than three times the original bid.

Meanwhile, Chernobyl contracted with Holtec for about Eur 3 million to study the feasibility of using its forced gas dehydration system on the RBMK fuel and to prepare a safety case for loading the dried fuel into the Nuhoms shielded canisters.

Late last year, the EBRD commissioned the Swedish Nuclear Fuel and Waste Management Co., or SKB, to analyze whether the new technical approach proposed by Framatome was feasible, to estimate the cost of completing the project, and to advise on liabilities.

A source close to the matter said the study had concluded that the fuel could not be loaded into the Nuhoms canisters. Vladimir Antonets, acting minister of emergency situations in Ukraine, told the press conference this month that SKB judged that Framatome had "applied a storage technology that they didn't master."

Another source said that Framatome had adapted the original Nuhoms basket concept to put the long RBMK fuel rods in individual canisters, which he said posed a problem. In contrast, the source said, it appeared that the safety case could be made for loading the fuel into Holtec's double-walled casks.

He said more than Eur 80 million has already been spent on the ISF-2 project. The buildings can be reused, but the internal configuration will have to be modified if Holtec is chosen, the source said.

Igor Gramotkin, director general of Chernobyl NPP, said that Holtec estimates it will take \$200 million to complete ISF-2 with its technology.

### **Holtec design**

Antonets expressed hope that operations on ISF-2 will be resumed in 2007 and finished by the end of 2010. An EBRD official called that an optimistic schedule that could work only if all goes smoothly between now and then.

Holtec is proposing a new canister design that can be used to store RBMK fuel, incorporating overpacks already manufactured by Transnuclear/Areva/Framatome, according to Holtec's project manager Vince Bilovsky. The company also is proposing modifications to the processing facility and hot cell that are about three-quarters built, he said in a telephone interview.

He said the biggest technical issue that stalled the original contract was the inability of Framatome's drying system to remove all the water from pinholes and hairline cracks in the RBMK fuel. Holtec recently completed the study of its dehydration system, including a mockup test in June and July that Bilovsky said showed even the waterlogged holes could be dried using the Holtec system.

After the success of that test, Bilovsky said, Holtec began work in early July on a study to plan modifications and the process required to implement Holtec's system and new canister design, including all safety-related aspects of the project. That study has been under review by plant managers since October 17, he said.

Holtec received initial comments from the plant last week and will meet with plant officials to discuss the study

this week. Based on the comments he has seen, Bilovsky said he thinks one revision will clarify any outstanding issues.

The EBRD's SRG will meet November 29 in London to discuss Holtec's proposal and to provide guidance. Bilovsky said he expects the December 14 donors' meeting to result in a recommendation to hire Holtec and that a contract could be awarded by early in first-quarter 2007.

Holtec will also meet with the Ukrainian regulator in the next six weeks to present the conceptual design, he said.

Vince Novak, director of EBRD's Nuclear Safety Department, told Platts that a major advantage of the Holtec proposal is that it covers all of the Chernobyl fuel, wet and dry, except the 19 heavily damaged elements that have never been part of the ISF-2 scope.

EBRD's Novak said in a telephone interview that the Holtec proposal was judged to have "no fundamental safety flaws," but it had to be complemented and "properly costed," and safety issues, including licensing of the double-walled container in Ukraine, had to be addressed before a decision can be made. A source with the SRG said the expert group had asked Holtec for additional information and was awaiting the company's reply last week.

### Freeing Framatome

In addition, the question remains of how to extract Areva/Framatome from the contract, if the donors agree to switch to Holtec. Novak and others involved said Holtec's proposal and supplementary information total more than 1,000 pages.

Besides the safety guidance from the SRG, Holtec must answer questions asked by the Chernobyl PMU and the bank must "clarify the situation with Areva," he said.

Novak said there were only two solutions: an amicable settlement, or arbitration.

"We've got to sort it all out before mid-December," he said last week.

Areva NP's Pijselman said that Areva had "spent substantial sums of money" on the project and had received customer advances. But he said he couldn't assess the bottom line of the ISF-2 affair for Areva until "I know the position of the client and the banks concerning the respective roles of all parties."

Still, the Holtec proposal appears to cost about as much as Framatome's current estimate, taking into account dollar-euro exchange rates and the fact that civil structures already exist on the site.

This led Gramotkin to conclude last week that Framatome's original bid represented "dumping." Framatome has steadfastly maintained that the customer and the EBRD's Project Management Unit, or PMU, did not provide it with the correct information on the fuel at the outset, and Pijselman has even suggested that the PMU should bear part of the liability for the ISF-2 fiasco.

In 1999, Framatome bid against the engineering company SGN, a unit of Cogema, for the ISF-2 work. At the time, Framatome management was fighting government plans to merge Framatome into the Areva group that was to be domi-

nated by Cogema, including Anne Lauvergeon who remains at the helm of both Areva NC and the Areva group.

Pijselman, a former SGN executive with extensive experience with spent fuel facilities, was brought in after the merger to handle Framatome's service division and has spent considerable time and effort on the ISF-2 case.

The SGN bid, at the time, was about 20% higher than Framatome's, according to a knowledgeable source.

—Ann MacLachlan, Paris; Alexei Breus, Kiev; Maureen Conley, Washington

## Reid might slow Yucca Mt. program, but project will survive, sources say

Though opponents of DOE's repository project at Yucca Mountain, Nevada have likened Senator Harry Reid's rise to majority leader next year to the final nail in the project's coffin, nuclear industry officials and other supporters have countered that Reid could likely slow, not kill, the program.

Reid has been an unrelenting opponent of DOE's plans to dispose of 70,000 metric tons of utility spent fuel and defense high-level waste in his home state of Nevada, maintaining that the repository DOE plans to build at Yucca Mountain is neither safe nor wanted.

As majority leader come January, Reid's responsibilities will include gatekeeper to the Senate floor as he decides which bills move to the floor for a vote. Last week, after he was elected to the top Democratic post in the Senate, Reid stressed in a press statement that he remains committed "to putting Nevada's priorities at the top of the list" and that, more than ever, he'll leverage his leadership position "to keep Nevada from becoming the nation's nuclear dumping ground."

But while some nuclear industry officials said that Reid's increased clout could make congressional efforts to push the DOE waste program forward more difficult, they maintained it will survive.

Reid has been supportive of nuclear energy, Nuclear Energy Institute spokeswoman Patricia Conrad said two days after the November 7 elections that put Democrats in control of both the House and Senate. She said NEI is interested in working with Reid to find a solution to the country's spent fuel storage problem.

Though Reid has repeatedly called for leaving the irradiated fuel at reactor sites, he also supports controversial provisions in the Senate energy and water funding for fiscal 2007 that could create up to 31 federally owned away-from-reactor spent fuel interim storage facilities.

Some 3,000 jobs in Nevada are related to the Yucca Mountain repository project, according to Nuclear Waste Strategy Coalition Administrator Martez Norris. She said the program pumps about \$130 million to \$180 million a year into the state economy in terms of jobs and grants. The coalition, a multi-state organization comprised of industry and state officials, supports the Yucca Mountain project. "I

really cannot see why he would kill it," Norris said. "Why kill the goose that lays a golden egg?"

In addition, DOE already is eight years behind schedule in meeting a contractual obligation that required it to begin disposing of utility spent fuel in 1998. By the time a repository begins operation in 2017, as DOE projects it will, the removal of spent fuel from reactor sites will be 19 years late. The delay, meanwhile, is costing taxpayers millions of dollars in court-ordered damages to utilities, and congressional Democrats and Republicans alike have expressed concern about the federal government's growing liability.

Likewise, with operating power reactors in 31 of the country's 50 states, some believe that Reid cannot afford to make Yucca Mountain strictly a Nevada issue.

It can't just be "kill Yucca," according to one nuclear industry lobbyist, who said that the shift in power in both the House and Senate reinforces the need for a bipartisan and comprehensive solution to the spent fuel storage issue.

Senator Pete Domenici, who next year will be the ranking Republican on the Senate Energy and Natural Resources Committee that he now chairs, last week indicated that he hopes to move his nuclear waste bill next year. Speaking at an American Nuclear Society conference earlier this month in his home state of New Mexico, Domenici said that the Yucca Mountain project has to be put back on track. "We need Yucca Mountain," he said. "And, at the same time, we must complete the necessary first steps that bring nuclear recycling back to our country. To say it will be tough is an understatement."

Domenici's waste bill reflects his assertion that a comprehensive waste program must involve more than Yucca Mountain. His bill leaves open the possibility that DOE's new Global Nuclear Energy Partnership program, which is aimed at closing the nuclear fuel cycle in the US and abroad, could complement the repository program by reprocessing and recycling commercial spent fuel. A reprocessing/recycling program is seen by some supporters as a way to reduce both the volume and radiotoxicity of waste disposed of at Yucca Mountain.

Reid, according to one industry source, shares Domenici's interest in reprocessing. And some sources suggested that GNEP could provide Reid with an opportunity to slow down the Yucca Mountain project.

### Grass-roots opposition

Governors of 18 states — including Illinois, which is home to 11 operating power reactors, more than any other state — last week told key House and Senate appropriators that they opposed the Domenici-Reid interim storage language in the Senate FY-07 energy and water funding bill. "Shifting the federal program's focus away from a repository to the construction, licensing, and operation of many interim storage sites across the country could harm disposal efforts irreparably, resulting in such temporary facilities becoming de facto final resting places for nuclear waste," the governors said in a November 16 letter.

The bill would direct DOE to site a storage facility in

each state with operating power reactors, or alternatively regional facilities. DOE, they asserted, would be given the authority to do that "without the consent and over the potential objections of governors." The governors said that "is wholly unacceptable to our constituents and us," adding that an issue as complex and controversial as spent fuel storage should be part of an open public debate. "In order for any federal proposal addressing nuclear waste storage to succeed, states must be full and equal partners in the process," they said.

NWSC members share those concerns, Norris said, and plan to meet with congressional staff in late November to urge that the language be deleted before the bill is rolled into omnibus legislation.

### Some question marks

Though FY-07 began October 1, FY-07 appropriations bills for several federal departments, including DOE, have not yet cleared the Senate, and lawmakers are funding those departments at pro rata FY-06 levels under a continuing budget resolution that expires November 17. A second CR is expected to be approved.

DOE spokesman Allen Benson said last week that the Yucca Mountain project remains on track to submit a repository license application to NRC by the program target date of June 30, 2008. The program is receiving sufficient funds under the CR to continue work on the application, he said. However, Benson added, program changes would have to be made if the final FY-07 appropriation comes in below the Bush administration's \$544.5 million request. Under the House-passed funding bill, the program would receive the full amount. However, the Senate bill, which has not yet moved to the floor for a vote, would fund the program at \$494 million.

Separately, Reid announced last week that he will not chair the Senate Appropriations Subcommittee on Energy and Water Development, where he now is the ranking Democrat. Senator Byron Dorgan of North Dakota will chair that panel, sources said. Though Reid will not have a seat on the Appropriations Committee next year, he has vowed to continue his push to cut repository program funding.

For the most part, the change in leadership on the committee level in both the House and Senate will make Democrats who are somewhat supportive of nuclear power the chairs of nuclear-related panels. No drastic shifts in attitudes are foreseen in the House (Nucleonics Week, 2 Nov., 1).

A big upset is possible in the Senate, however, where Senator Barbara Boxer of California will chair the Environment and Public Works Committee next Congress. Boxer, who is not a friend to nuclear power, replaces Senator James Inhofe of Oklahoma at the helm of the committee with oversight over the NRC and the Environmental Protection Agency. Inhofe has been supportive of nuclear power and of the Yucca Mountain project. With Boxer as chair, things on that committee could be "turned upside down," according to one lobbyist.

In addition, the list of the panel's subcommittee chairs

that Boxer released last week shows that she also will chair the subcommittee with jurisdiction over NRC.

Kevin Kamps of the advocacy group Nuclear Information and Resource Service this month called Boxer the strongest non-Nevada opponent of the Yucca Mountain project and stressed that she opposes the EPA's proposed 1-million-year radiation protection standard for a Yucca Mountain repository. By law, the NRC licensing regulation for Yucca Mountain must reflect the EPA standard.

Separately, Senator Jeff Bingaman of New Mexico will chair the Senate Energy and Natural Resources Committee, where he currently is the panel's ranking minority member. Bingaman will be "more patient" than Domenici has been on nuclear waste legislation because of the political and technical problems that have stymied the program, committee minority press secretary Bill Wicker said this month.

—*Elaine Hiruo and Daniel Whitten, Washington*

### Spent fuel cask developments

## NRC discontinues Holtec review

NRC's Division of Spent Fuel Storage and Transportation told Holtec International November 16 it was discontinuing its review of an amendment seeking higher heat loads and an underground option for the Hi-Storm 100 spent fuel storage system. The decision was based on a determination that Holtec's response to a second request for additional information, or RAI, did not resolve all of NRC's structural questions. These outstanding issues are "significant enough we didn't feel they could be resolved through another RAI," an NRC official said last week. The concerns relate to the methodology used to demonstrate the underground system will perform adequately during an earthquake.

The agency plans to meet with Holtec in the next few weeks to discuss options for moving forward, including withdrawing the application in its entirety, or withdrawing just the portion relevant to the underground design. Should Holtec choose the second option, the official said, NRC could still approve a limited amendment to increase the system's allowable heat load, assuming the parties can close all outstanding thermal issues. The issues have been the subject of ongoing discussions as Holtec prepared and ran additional computer calculations to demonstrate that heat transfer within the system meets NRC's requirements. Holtec has been working on a supplement since meeting with NRC September 8, when agency staff said they did not agree with the methodology Holtec had been using. The cask vendor is expected to submit the supplement shortly.

## NRC issues proposed criticality fix

NRC issued a direct final rule and a proposed rule November 16 to clarify when criticality control requirements apply in the spent fuel pool under 10 CFR Parts 50.68 and 72. The rule would amend Part 50.68 so its requirements do not

apply to "fuel within a spent fuel transportation package or storage cask when a package or cask is in a spent fuel pool."

The change is needed to avoid applying two different sets of criticality control requirements for spent fuel within a package or cask in a spent fuel storage pool, NRC said. Part 72 relies on soluble boron in the pool but does not credit burnup, while Parts 71 and 50 require analysis without boron. Part 50 credits burnup; Part 71 currently does not. NRC determined in a 2005 regulatory issue summary that licensees had to comply with criticality control requirements of both Parts 50 and 72 when spent fuel is being loaded into a storage cask in a storage pool. The direct final rule indicates fuel can be safely stored in the pool under Parts 50, 71, or 72.

The final rule will become effective January 30 if NRC does not receive significant adverse comments by December 18. Should it receive such comments, NRC will withdraw the direct final rule and finalize the proposed rule following the traditional comment resolution process.

The change is expected to help about a dozen PWRs that would otherwise need to conduct site-specific criticality evaluations before using generically licensed spent fuel storage casks. Utilities have estimated the required analyses and licensing actions would cost about \$500,000 a piece.

## Commission rebuffs Mothers for Peace

San Luis Obispo Mothers for Peace did not meet the standard NRC has set to determine whether to reconsider its earlier decisions, the commission said in a November 9 order rejecting the intervenor group's second bid for an injunction to keep Pacific Gas & Electric from moving spent fuel to its independent spent fuel storage installation, or Isfsi. Mothers for Peace filed for reconsideration in September after the US Court of Appeals for the 9th Circuit issued a mandate formalizing a June decision that vacated the environmental analysis NRC published in support of the Diablo Canyon Isfsi license.

In an order explaining its decision, the commission said issuance of the mandate on September 12 was not a sufficient development to warrant reconsideration of its earlier decision to deny the group's initial request for an injunction in July. Mothers for Peace filed that request after the court ruled that NRC had erred by refusing to consider the potential environmental impacts from a terrorist attack as part of its analysis under the National Environmental Policy Act, or NEPA.

Commissioner Gregory Jaczko concurred in part, noting that Mothers for Peace's arguments do not establish the basis for reconsideration. But Jaczko also reiterated views he expressed when he dissented from the commission's decision in the first injunction request, saying he continues "to believe that the agency should conduct a review of the impacts of terrorist attacks on nuclear facilities as part of a NEPA analysis."

In August, PG&E asked the Supreme Court to review the 9th Circuit decision. Mothers for Peace and NRC have until December 1 to respond.—*Maureen Conley, Washington*

## NRC cites TN for violation over Part 72.48 crane modification

NRC cited Transnuclear Inc. earlier this month for one severity level IV violation of 10 CFR Part 72.48, following an inspection of the cask vendor's justification for removing 25 tons of shielding from a dry storage transfer cask at Omaha Public Power District's Fort Calhoun nuclear power plant.

Under NRC's enforcement scheme, a level IV violation is the least serious and no fine will result. Also last week, NRC issued a Regulatory Issue Summary, as directed by the Commission, to convey lessons learned from the Fort Calhoun experience.

NRC's November 9 inspection report said the violation is based on three instances where TN failed to seek an amendment to the certificate of compliance, or COC, for the Nuhoms-32PT storage system. Under 10 CFR Part 72.48, cask designers and utilities can make minor design changes without prior NRC approval, so long as they meet certain requirements. Among those, a change cannot be made under Part 72.48 if it alters anything in the COC or if it constitutes a change in the NRC-approved methodology.

NRC conducted the inspection in August after identifying issues with the 72.48 evaluation during an April pre-loading inspection at Fort Calhoun. Under the evaluation, TN justified modification of the 100-ton transfer cask to meet the 75-ton weight limit of Fort Calhoun's crane. As a result of concerns NRC raised during the pre-loading inspection, OPPD delayed cask loading so it could seek an exemption from Part 72.48 and obtain NRC approval to use the lighter weight transfer cask. NRC granted a very limited exemption in July (NF, 31 July, 11), allowing OPPD to use the modified cask to load four dry storage canisters with old, cold fuel.

The inspection report noted several issues that would have resulted in additional violations if the cask had been used for loading without the exemption NRC ultimately granted. The report said NRC found "numerous weaknesses" in TN's technical evaluation that led the vendor to incorrectly conclude that the cask could be used without a COC amendment or exemption.

TN President Tara Neider said in a telephone interview last week that the report is "a fair assessment of where both parties stood on the issues," suggesting NRC "looked at things very closely" because the change was so major. She added that TN officials "spent a lot of time discussing each of these issues with NRC. We don't necessarily agree with their point of view on everything; however, I don't think there is any point in fighting over these issues anymore." TN has 30 days to respond to the report.

Fort Calhoun nuclear licensing supervisor Tom Matthews told Platts the utility is looking at the report, declining to comment further. During a meeting with NRC in September on options for a future loading campaign, OPPD officials said they would like to meet again once the inspection report was released. A meeting has not yet been scheduled.

Neider said the report "gives us a very clear path as to where we need to go with" amendment 11 to the Nuhoms system, which TN is scheduled to discuss with NRC December 5. Neider confirmed amendment 11 will seek generic approval of the lighter-weight transfer cask, in addition to cleaning up the tech specs. At the September meeting, Neider said the amendment would be submitted before April. Last week she said TN was getting the amendment done as quickly as it can, but wants its owners group to concur on operational changes before submitting the amendment to NRC.

NRC officials warned at the meeting that an amendment proposing tech spec changes and generic use of the lighter weight transfer cask would require lengthy review and most likely could not be approved in time to meet OPPD's need for loading additional dry storage casks before a spring 2008 outage.

The report found TN violated Part 72.48 when it modified the procedure sequence to allow water in the dry storage canister to be pumped out earlier in the loading process. NRC found that this change "adversely affects the assumed initial cladding temperature used to calculate the [technical specification] allowed drying times," the report said. That temperature should have been higher than the 215 degrees F that TN assumed in its licensing basis, resulting in a shorter time limit for vacuum drying than what is currently in the tech spec, NRC said.

NRC also found that the modification would have violated the tech spec that limits dose rates. To compensate for the reduction in shielding, TN designed additional temporary shielding to be used during portions of the loading sequence. With the additional shielding, the modified cask provides comparable shielding to the original transfer cask, but when the supplemental shielding is not in place the dose is two orders of magnitude higher, NRC said. The report stated that the tech spec does not recognize the use of supplemental shielding and TN therefore should have sought an amendment.

The transfer cask dose rate is used to guard against misloading. But tech spec dose rate limits become "meaningless as they would be exceeded from the very start, and more importantly, they no longer provide relevant values for meeting" the tech spec objectives, NRC said. TN should have requested a third COC amendment to address this concern, NRC said.

NRC further noted that, had OPPD used the transfer cask without first obtaining an exemption, NRC could have issued another violation of Part 72.48 because TN's evaluation contained "unapproved departures from methods of evaluation described" in the licensing basis. In one example, NRC faulted TN for not recognizing the structure of the modified cask was significantly different from the original, resulting in a change in how the fluent thermal modeling code is used to define boundary-condition temperatures for the transfer cask. NRC also said that changing the sequence of loading operations so that water is removed sooner changes the thermal evaluation methodology for determining the maximum fuel cladding temperature during vacuum drying.

## RIS conveys lessons learned

Separately, NRC published on November 15 a Regulatory Issue Summary (RIS 2006-22, "Lessons Learned from Recent 10 CFR Part 72 Dry Storage Campaign") on insights gained from the Fort Calhoun experience. It added that the commission expected that such issues, if practicable, should be resolved in advance of fuel movement through the normal licensing process.

NRC also said it holds site-specific and general licensees responsible for meeting the regulatory requirements, even though contractors may perform Part 72.48 evaluations. While NRC said staff will continue to accept and process exemption requests, "licensees and COC holders should be aware that they can make processing of an exemption request more timely by limiting exemption requests to what is absolutely needed." OPPD's request to limit the exemption to four casks, limit the decay heat, and maximize the cooling time for the fuel to be loaded, enables staff to shorten its review time, NRC said.

NRC said lead times on the order of five years are needed when planning for dry storage, allowing time to identify large plant modifications, such as crane upgrades, and any required licensing actions. Utilities should also set aside sufficient time and resources to ensure the overhead crane and supporting structure meet the licensing basis requirements before loading storage casks, it said.

The agency also noted that alterations to the operating sequence can affect tech spec conditions, and said it will work with the Nuclear Energy Institute to revise guidance for using Part 72.48 to make design changes.

—Maureen Conley, Washington

## Pakistan ... from page 1

mous," requiring an addition of at least 8,800 MW of power reactors by 2030 to be able to generate just over 5% of the country's electricity with nuclear energy. "Any holding back on the economic front or creation of barriers on the nuclear energy front would be counterproductive and disastrous for us, undermining our efforts to defeat the scourge of terrorism, which thrives on economic deprivation," UI Haq said.

Thus far, President George W. Bush has said that the US will not favor giving Pakistan an exception to NSG rules such as the one his administration seeks for India (NF, 2 March, 6). US government officials attended the Brussels seminar but kept a low profile. A US source in Washington said that "spin doctors in Pakistan" recently told Pakistani media that Hungary had spoken out in favor of nuclear cooperation with Pakistan during an official diplomatic visit by Hungarian leaders to Islamabad. US sources said that the US government wanted to "avoid something like that happening now" as the US Congress takes up the US-India deal.

Late November 16, the Senate approved legislation to implement the India deal. The House approved its version of the bill in July. The two chambers now must work out their

differences in a House-Senate conference.

The reason given by the US for hesitation to support a Pakistan NSG exception "is A.Q. Khan," Shanbaz said, referring to a nuclear supply network run by Abdul Qadeer Khan of Pakistan, "but that's now history." A senior Western export control official attending the seminar said that "Pakistan is correct that the solution to the problem of states like Pakistan and India which are outside the nuclear trade regime has to be non-discriminatory and global. But I think it will take maybe seven to 10 years" before the world is ready to include Pakistan in it, despite the "remarkable progress" Pakistan has made since it began rethinking how it protects its nuclear assets, beginning in 2000.

While Shahbaz said that Pakistan does not in principle object to the US-Indian agreement, he said that Pakistani experts have raised certain issues that would likely be debated in the US, at NSG, and elsewhere before a US-Pakistani deal would be approved. In particular, he said, "there is concern in some quarters in Pakistan that, if India obtains know-how through trade with NSG parties, that know-how will find its way from its civilian program into India's military program because separating India's civilian and military activities will be very difficult."

Separately, he said, "NSG parties should be aware that, when NSG was established in the mid-1970s, that happened as a direct response by NSG parties to the Indian test. So NSG should think twice if it is now getting prepared to make a single exception for the very state that called NSG into existence."

## Israel and NSG

Thus far, the Western export control official said, of the three states with nuclear weapons capabilities that never joined the Nuclear Nonproliferation Treaty — India, Israel, and Pakistan — only Israel has submitted a letter to NSG and the IAEA volunteering to adhere fully to NSG export control rules. India and Pakistan have said that they are implementing similar control rules to those of NSG, "but unlike Israel they won't sign the letter making the commitment," the official said.

He and other diplomatic sources said that both India and Pakistan are holding back, for political reasons, from committing themselves to adhering to NSG rules. "Both would gain favor in NSG if they did it, but both of them want to be sure in advance they will get some political benefit if they do it," the official said.

## No to no first use

UI Haq said last week that, India's May 1998 nuclear weapons test "destabilized the region" and therefore Pakistan had to test immediately "to restore the strategic balance."

One serious effect of the Indian decision to test, Shahbaz said, was that "after we responded by testing back, India lost its conventional superiority for good." India's armed forces dwarf Pakistan's, he suggested, but after the tests India can

no longer attack Pakistan with conventional forces without risking that Pakistan will respond with a nuclear attack.

"For this reason, Pakistan cannot accept a policy of no first use of nuclear weapons" were that to be proposed by India or other parties, Shahbaz told Platts. "There is now no longer the possibility of a conventional [military] exchange [of fire] between Pakistan and India. With nuclear weapons, we are both living in relative peace." Given the history of the Cold War, he said, "you in Europe should understand that."

As has been made clear by decision makers in the US and China, he said, "the problem with a no-first-use policy is that it is not verifiable."—*Mark Hibbs, Brussels*

## US, Pakistan don't agree on NSG terms covering China

Pakistan and the US do not agree how to interpret rules laid down by the Nuclear Suppliers Group regarding terms under which China is permitted to export additional power reactors to Pakistan, senior US and Pakistani officials told Platts last week.

Under contracts and a nuclear cooperation agreement between Pakistan and India — which predates a 1993 NSG guideline requiring IAEA full-scope safeguards be in place in a recipient country before an NSG member may export nuclear goods to it — China is exporting the 325-MW Chasnupp-2 PWR to Pakistan. First concrete for the reactor was poured last December and the unit is expected to be finished in mid-2011 on the basis of NSG trigger-list items exported from China to Pakistan, said Parvez Butt, a former chairman of the Pakistan Atomic Energy Commission and now a senior adviser to the Pakistani government.

Butt spoke at a seminar on Pakistan and nuclear export controls that the London-based South Asian Strategic Stability Institute held last week in Brussels.

When China joined the NSG in 2004, both it and Pakistan argued that the contract to build Chasnupp-2 was "grandfathered," and therefore not subject to the NSG rule requiring full-scope safeguards. The US and some other NSG parties disagreed, but they consented to allow China to export the reactor to Pakistan as a singular exception, US officials said. Then, and now, US officials said recently, the US position is that NSG policy does not allow China to export any additional power reactors to Pakistan unless Pakistan implements full-scope safeguards.

Asked whether under current international trade rules Pakistan may obtain further reactors from China, Butt said that "a grandfather can have many wives," but declined further comment.

Other senior Pakistani officials, however, spelled out to Platts that, under Pakistan's interpretation of the NSG guidelines and terms of Pakistan's commercial relationship with China, there should be no objections by NSG to any further power reactor exports by China to Pakistan.

Nonetheless, these senior officials denied a November 16 AP wire service report that asserted that Chinese President Hu Jintao will announce major new nuclear cooperation projects with Pakistan this week when he visits Islamabad. The report cited unnamed analysts in Beijing.

One Pakistani official said that there will be no such announcement by Hu. "We don't need any announcements like this to have additional nuclear cooperation with China," he said. Pakistani officials in recent weeks have said that PAEC and Chinese counterparts have held discussions about the possibility of future imports of additional reactors, including the CPR-1000, a model on the drawing board at the Shanghai Nuclear Energy Research and Design Institute (Nucleonics Week, 5 Oct., 1). "We have an existing cooperative relationship with China and we continue to talk to them about future nuclear cooperation," the Pakistani official said. He suggested that IAEA member states had asked Pakistan about rumors and media reports in Pakistan that China would announce more nuclear cooperation soon. "The answer is no," he said.

One senior Pakistani nuclear official told Platts that China "has been very careful and reluctant" to signal to the outside world that it wants to step up nuclear trade with Pakistan.

Chinese, Pakistani and Western diplomatic sources last week told Platts that China is clearly very interested in exporting more nuclear equipment to its longstanding ally Pakistan. But most suggested that Hu would refrain from announcing any firm additional plans to deliver more reactors to Pakistan because that could inflame debate at NSG, and in the US Congress, about the fate of the US-India nuclear deal, at a time when the Bush administration wants US lawmakers to quickly approve the deal before Congress adjourns. China, too, has reason to believe it may profit indirectly from the US-India deal and has no intent to disturb the political approval process for the controversial bilateral arrangement.

Thus far, diplomatic sources said, Pakistan has said that commercial contracts as well as cooperation agreements justify continued reactor exports to Pakistan from China. But, a former US official said, during internal NSG deliberations on the matter since 1993, "whenever [Pakistan and China] are asked to show documentary evidence that contracts exist for such projects, they don't produce the paperwork." While the US interprets NSG guidelines as excluding new Chinese nuclear trade with Pakistan, he said, "in the view of some [NSG experts] it is a legal grey area, and there is no consensus."

One Vienna official said that China "in the long term wants to keep supplying reactors to Pakistan" and has made statements during NSG meetings suggesting that it would support the US-India deal provided it establishes criteria for making an exception to NSG trade guidelines and is "non-discriminatory." During recent discussions with NSG members in Vienna, Pakistani officials said last week, Pakistan made the same argument in favor of an NSG nuclear trade exception for Pakistan.—*Mark Hibbs, Brussels*

## Fuel bank ... *from page 1*

George W. Bush and Russian President Vladimir Putin — is to provide an incentive to refrain from uranium enrichment and spent-fuel reprocessing to countries that have civilian nuclear programs.

In a November 8 “pre-solicitation notice” (<http://www.fbo.gov/spg/DOE/PAM/HQ/DE%2DAC55%2D07NA25729/SynopsisP.html>), NNSA said it “plans to issue the RFP [in] late December 2006 or early January 2007 and execute a contract [by] approximately April/May of 2007.” NNSA said it anticipated starting HEU shipments within two months of the award and completing them in about three years. Downblending would be finished in about four years, NNSA said.

James Cornell, the president and CEO of Nukem Inc., said last week the timetable “might be a little ambitious” but was “probably pretty close.”

The contract is expected to have a “period of performance” of five years, as it will “cover all services through delivery to the storage facility and conversion to UF<sub>6</sub>” of the material, the notice said. The contractor also would be required to provide all materials and equipment, including uranium blendstock, NNSA said. The HEU would be blended down to 4.95% U-235, NNSA said.

The contractor would be entitled to a “fixed portion” of the downblended LEU “for its own use or sale.” Much of the blended-down material can be used as working inventory, but the contractor must retain 40 mt of 4.95% enriched UF<sub>6</sub> to be “available for recall” within 30 days by DOE, the notice said. “Any or all” of the inventory can be recalled with 180 days’ notice, NNSA said.

Cornell said the “barter” arrangement was convenient for DOE “budgetwise,” because the department would not have to request congressional appropriations. He noted that DOE had used similar arrangements with USEC in the past.

Last fall Energy Secretary Samuel Bodman announced the US would use the 17.4 mt, which had been declared surplus to US defense needs, to jump-start the fuel bank (Nucleonics Week, 29 Sept. ‘05, 1). To date, the US is the only country to make a specific commitment to the fuel bank. Russia has indicated it might transfer some LEU, but not from blending down HEU (NF, 25 Sept., 1).

### Concept “feasible,” ElBaradei says

In October 23 remarks at Georgetown University in Washington, ElBaradei argued that the fuel bank plan is “feasible.” An important step, he said, is for countries to “de-link” enrichment and reprocessing capabilities from the concept of deterrence, he said. The sense of security needs to be provided in other ways, he said.

When the question of whether or not to pursue such fuel-cycle capabilities becomes a “purely economic issue,” there is “a lot of merit” in the fuel-bank approach, which also provides a “boost” to the nonproliferation regime, he said. But he acknowledged that precise answers are still lack-

ing for such key questions as “the shape of the system” and who the providers and recipients will be.

A proposal crafted earlier this year by the governments of six countries — France, Germany, the Netherlands, Russia, the UK and the US — that have commercial enrichment industries established a three-tiered system for fuel supply (NF, 28 Aug., 3). After a special meeting in Vienna in September on fuel assurances, the IAEA secretariat now is charged with coming up with proposals for the agency’s Board of Governors to consider next year.

But Harold Bengelsdorf, a former US official who is now a consultant specializing in fuel-cycle issues, last month called the six-nation proposal “very thin gruel.” At an October 17 meeting of a US-Russian panel examining the “internationalization of the civilian nuclear fuel cycle,” he said, “I wouldn’t want to be in the IAEA secretariat with that mandate.” In his prepared remarks, Bengelsdorf said that it is “incumbent upon the sponsors to be far more specific as to what they now hope to achieve in the next few months.”

The question of who would provide whom with material also raises complex implementation questions, participants in the October 17 meeting said. Under US law, US fuel can be exported only to a country that has an agreement for civilian nuclear cooperation with the US, and each export must be licensed. Retransfers are subject to similar requirements.

Since some of the countries that would be potential recipients of the fuel could well be ones that are not US allies, and therefore probably would not have nuclear cooperation agreements with the US, they might not be eligible for fuel bank supplies that came from the US, some analysts have said. That problem would be more severe if the US remained as the only contributor to the fund, because some of the countries seen as potential contributors have export restrictions that are less stringent than the US’s.

At the meeting, Bengelsdorf noted that the US has an agreement for cooperation with the IAEA and suggested that that pact might provide a vehicle for the kind of transfers envisioned under the fuel bank plan.

In an interview last week, attorney James Glasgow of the Morgan Lewis law firm agreed. In the past, he said, the US and the IAEA have entered into “project agreements” — described in Article XI of the IAEA statute — with certain countries that are IAEA members. Such arrangements, in conjunction with the US-IAEA agreement, were the basis for US supplies of reactors and enrichment to countries such as Mexico and Yugoslavia, which did not have bilateral cooperation agreements with the US, he said.

If the fuel-bank concept is implemented by the US and other countries, they “don’t have to reinvent the wheel,” he said. “I’m not saying it’s seamless, but if you want a model, that’s the one I’d use,” Glasgow said.

Under IAEA project agreements, the “supplying member” can establish the export conditions, and the US has insisted on the same ones stipulated in the Atomic Energy Act, he said.

Glasgow stressed that fuel assurance arrangements, including fuel leases, should draw upon established com-

mercial arrangements for the supply of uranium and related fuel cycle services.

### Assembly bank advocated

Valentin Ivanov, a member of the Russian Duma and a former first deputy minister of atomic energy, raised a more fundamental objection, saying that banking enriched uranium would not be an adequate assurance. The bank would have to provide finished fuel assemblies; anything else would be just "intermediate steps," and would foster "skepticism" among potential recipients, he said.

James Timbie, a senior adviser to US Under Secretary of State for Arms Control and International Security Robert Joseph, acknowledged that "if what you're designing is a fuel supply process," then it does have to "deal with everything." But, he argued, if the purpose is to provide assurances, it does not have to be as comprehensive.

Also, he said, the proposal is focused on enrichment because "it's enrichment we are asking countries to forgo." He also said that banking fuel assemblies would be impractical because they are unique not only to reactor types, but to individual reactors. But, he said, fuel fabrication would be "excellent" as a "subsequent step" for the international centers.

Another broad political objection to the current approach came from Lawrence Scheinman, a former Clinton administration official now with the Center for Nonproliferation Studies, who said more attention needed to be paid to notions of "equity" and "non-discrimination." He was referring to distinction between countries designated under the envisaged international system as suppliers of enrichment and reprocessing, and those designated as recipients.

Bush's February 2004 proposal, which lays out the concept of assured fuel supplies as a reward for renouncing enrichment and reprocessing, and the Global Nuclear Energy Partnership proposed two years later both rest on that distinction, he said.

Bengelsdorf also cited that issue as a potential obstacle to political acceptance of the fuel bank. He urged the US government to stay away from "stark definitions" that create unfavorable "bloc dynamics." He commented, "Unless we get past this, the prospects in the IAEA might not be that good."—*Daniel Horner, Washington*

## U market ... *from page 2*

Vasquez property.

The lower-than-expected production at Vasquez is attributable to "the unique geochemical composition of the Vasquez ore body," URI said. It said it would stop drilling new wellfields at Vasquez and would only continue mining at the existing six wellfields "as long as they generate positive results on an operating basis."

New URI President Dave Clark told investors November 15 that URI is no longer just an in situ leach uranium mining company, but a company that "explores, develops, and mines uranium." URI November 10 announced it was evalu-

ating the feasibility of developing a conventional mining and milling complex in New Mexico at properties there that are not amenable to ISL mining. URI said it owns 183,000 acres of mineral holdings in New Mexico at mine sites that include Crownpoint, Nose Rock, and Roca Honda. Up until the early 1980s, these mine sites, under previous owners, had produced about 4 million lb U3O8 a year, URI said.

But some analysts said the cost to rehabilitate those mine sites, plus the cost to build a conventional mill in New Mexico, could easily total more than \$100 million. But the biggest challenge would be overcoming expected opposition in the state, including from many elected officials, to a resumption of uranium mining, the analysts said.

### UrAsia signs five new contracts

UrAsia Energy Ltd. announced November 9 that it has entered into five new uranium supply contracts with North American utilities, with supply coming from the company's Akdala uranium mine in Kazakhstan. UrAsia has a 70% interest in the Betpak Dala Joint Venture, which has a 100% interest in the Akdala uranium mine. UrAsia said the contracts are for a total purchase of about 5.75 million lb U3O8 during the period 2007 to 2016. The contracts range in length from three to nine years, UrAsia said, with the quantity of material ranging from 600,000 lb to about 2.2 million lb.

Phillip Shirvington, president/CEO of UrAsia, said the company "is experiencing strong demand from North American and European utilities for long-term contracts for delivery into an increasingly tight market. As a result, the company has been able to secure its five new sales contracts in the past month when the market has tightened significantly following primary supply concerns." No details about contract terms were released, but some analysts said that UrAsia may have been willing to sign market-related contracts with no ceiling price and no floor price, or a very low one. Many producers have been raising the floor prices in their contract offers, much to the consternation of utility buyers.

UrAsia said the Akdala mine is currently producing at an annual rate of about 2.6 million lb, with UrAsia's share about 1.8 million lb. The company said it has sold all its 2006 production, the latest sale being to an Asian utility (rumored to be the Chinese) of an additional 600,000 lb under a contract signed earlier this year.

### Exelon provides uranium data

Exelon indicated in a November 6 filing with the US Securities and Exchange Commission that it has contracted to meet all of its 2009 uranium requirements and just about all of its 2010 requirements. Earlier this year, it indicated it had unfilled requirements in 2009-2010 of more than 11 million lb. Exelon also indicated in a chart that its unfilled uranium requirements for 2011 are about 4 million lb.

Exelon indicated that the prices it will be paying for uranium through 2011 would be significantly below projected market prices. For instance, Exelon indicated that the uranium price it will pay in 2007 will be about 30% of its projected market price.

Over the longer term, Exelon has raised its expectation of where the market price of uranium will eventually settle. Earlier this year, it indicated it expected that new uranium production would result in the price retreating to the \$20-\$25/lb range. In its latest filing, Exelon said that it now expects that range to be \$25-\$35/lb.

Exelon also indicated in the SEC filing that about 19% of its fuel costs in 2006 went for uranium purchases, the same percentage as in 2005. However, enrichment purchases in 2006 constituted 40% of fuel costs; in 2005, enrichment purchases constituted 34% of fuel costs, Exelon indicated. The cost of fabrication, however, decreased as a percentage of fuel costs, down to 14% in 2006 from 17% in 2005, according to its SEC filing.—*Michael Knapik, Washington*

## Governors may ask IAEA to explain its position on TC for Iran reactor

The Department of Legal Affairs at the IAEA may be asked by the Board or Governors or its members to explain why it is prepared to provide technical cooperation, or TC, to Iran for a heavy water reactor at Arak, which has raised proliferation concerns by the governors, Vienna board member sources told Platts.

During a Board of Governors meeting this week, the governors will consider an Iranian request for specific safety-

related assistance to be provided by the IAEA to the reactor under the TC program.

Last week, US government officials alerted outside contacts and the media that they were alarmed by the Iranian request and sought to debate, and defeat, the issue before the board convened. According to board sources, the UK government has requested that the IAEA legal department explain its position on the matter, after it learned that both the deputy director general responsible for TC and Director General Mohamed ElBaradei apparently were prepared to comply with Iran's request.

According to board officials in Vienna, the UK was informed that, if the board expressed a desire for a legal comment from the IAEA, the comment would be provided. The US and UK oppose the IAEA providing TC for the Arak reactor project because, for nonproliferation reasons, the governors have previously expressed concern about the status of the project. The US and UK governments, officials said, fear that the Arak reactor is intended to be used for plutonium production by Iran.

According to board sources last week, it is possible that lack of consensus on the issue would force a vote of the board's 35 members during this week's meeting. Iran claims that objections by the US and UK discriminate against Iran's peaceful use nuclear program. Western governments critical of Iran say instead that in requesting safety assistance Iran is seeking to provide a harmless gloss to a program that is meant for non-peaceful use.—*Mark Hibbs, Brussels*

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