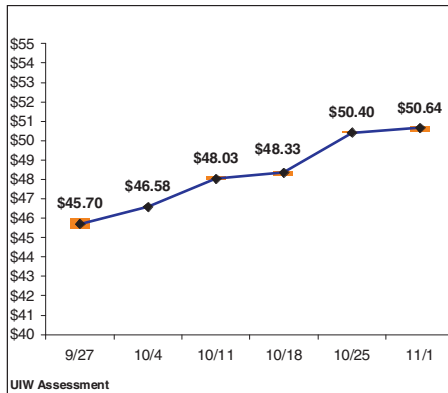


URANIUM INTELLIGENCE WEEKLY

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Vol. IV, No. 44, November 1, 2010

UPP: \$50.64/lb U3O8



The Uranium Price Panel (UPP) represents the average price assessment reported by active spot market participants for a transaction of 100,000 lbs of U3O8 by book transfer on the date given. Bars represent the range of conceivable final averages that might result when random elimination is used to balance market positions within the panel.

WEEKLY ROUND-UP:

Chinese Utilities Push for Bigger Stake in Nuclear Bonanza

- **Chinese utilities are pushing to unseat CNNC and CGNPC as the country's dominant nuclear players.** But their quest appears stalled — at least for the moment (p3).
- **China's push for more uranium has been widely telegraphed through market transactions and international mining investments, but what about its push to develop indigenous resources?** UIW takes a look (p4).
- **The Uranium Price Panel (UPP) reported a spot price of \$50.64/lb U3O8 for Friday, up \$0.24/lb from the previous Friday (p2).**
- **Germany's Bundestag last week voted to approve reactor operating extensions by an average of 12 years.** The Parliament's lower-house action followed a government compromise under which nuclear utilities would face up to €30 billion (\$39 billion) in new financial obligations, most of which would be applied to developing alternative energies. The government is attempting to avoid a vote on the issue in the upper house, or Bundesrat, over which it lost control in elections earlier this year. Bundestag President Norbert Lammert, a leading coalition figure, attacked the decision in today's *Frankfurter Allgemeine Zeitung*, saying the vote was "hardly a shining hour for the work of parliament." The new law faces almost certain constitutional challenge in court.
- **The US State Department believes that Iran's 15% stake in Rio Tinto's Rossing uranium mine is in compliance with the most recent round of UN sanctions, the London-based company said in a statement last week.** Though Iran has owned the stake since before its 1979 Islamic revolution, a US-based advocacy group has been agitating for Rio Tinto to push Iran out. Iran's stake in the Namibian mine "is a direct violation" of the most recent UN resolution, New York-based United Against Nuclear Iran contended in an Oct. 21 letter to Rio Tinto, citing language that Iran "shall not acquire an interest in any commercial activity in another State involving uranium mining, production or use of nuclear materials and technology." The political group, co-founded by senior US diplomats Richard Holbrooke and Dennis Ross, said that "Iranians have access to the facility, sit on the board and are able to acquire valuable technical knowledge."
- **Japan would build Vietnam's second nuclear power plant under a deal signed last week (p5).**
- **India inked an international nuclear liability treaty — long sought by the US — just ahead of President Barack Obama's visit to the country.** But experts say it won't do much to resolve outstanding US vendor issues (p6).
- **Constellation Energy has joined the growing list of US power companies sitting out the US nuclear "renaissance" (p7).** Meanwhile an expansion of natural gas consumption could further erode nuclear growth in the US (p8).
- **In Perspective: Chinese nuclear expert Dr. Wang Haibin argues that China's nuclear developers mostly opt for maximizing profitability over pursuing a policy of self-reliance (p9).** ☼

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MARKET

UPP Price Up 11% Since Mid-September

The Uranium Price Panel (UPP) reported a spot price of \$50.64/lb U3O8 for Friday, up \$0.24/lb from the previous week. If Nukem tried to push down the price at the end of the month as anticipated, it appears to have failed (UIW Oct.25,p2). The UPP price has been rising steadily since Sep. 27 when it was \$45.70/lb.

Omaha Public Power District (OPPD), Duke, and Dominion are all considering bids they recently received on RFPs. And the Tennessee Valley Authority (TVA) is expecting bids back shortly on a long-term supply contract. No word of any utility spot buying, although Cameco reportedly did some buying last week (quantity unknown).

It's unclear yet whether the US Department of Energy (DOE) will continue to use UF6 from its inventory to pay for decontamination and decommissioning (D&D) work at the Portsmouth site. The contract DOE awarded in August to a Fluor-B&W joint venture included a plan for partial payment through uranium transfers worth "approximately \$450M worth of natural uranium hexafluoride (which is in the projected range of a total of 1,500-3,000 metric tons)."

Whether the DOE proceeds with that plan may depend on this week's elections. If the Republicans take the House as expected, they'll have a lot more power over how the DOE operates. Republicans involved in the appropriations process — Congress still has not passed the DOE's budget for this fiscal year, which began Oct. 1 — are reportedly already working on ways to head off additional uranium transfers.

The DOE's most recent UF6 transfer to Usec, which was overseeing the D&D work before Fluor-B&W won the contract, was early last month. UIW had reported at the time that that 245 MTU went at roughly \$135/kgU (UIW Oct.11,p2). It now appears the material went at an average price of \$134.25/kgU.

ConverDyn Tries to Raise Its Prices

ConverDyn informed customers of plans for new fees and a minimum price of \$15/kgU for new contracts. Buyers Monday were skeptical, pointing out that ConverDyn doesn't

dictate prices, it negotiates them. And if no one will buy at \$15/kgU, ConverDyn's plan won't go far.

However, now that the other converters know ConverDyn's pricing strategy, there's nothing to stop them from raising their prices as well — at least to \$14.90/kgU. Given the limited number of converters, it's possible that could happen. And then ConverDyn's demands for at least \$15/kgU wouldn't look nearly as quixotic.

In September, UIW's assessment of spot conversion prices was a wide range: \$9-\$13/kgU. For October, based on conversations with market participants, UIW is adjusting that to \$11-\$13/kgU. With salaried and replacement workers still running the Honeywell plant in Metropolis, Illinois at below capacity, and ConverDyn's latest pricing gambit, that may well rise in November.

UIW's assessment of spot enrichment prices for September was \$153-\$154/SWU. Based on conversations with market participants, UIW will leave that range unchanged for October. Urenco USA is slated to return two cascades to service early this month after stopping them over concerns about welds meant to keep them stable in a "worst-case earthquake." The brief outage is not expected to have a significant effect on the SWU price.

Canadian Production, Nigerian Transportation

Cameco announced Monday that the United Steel Workers Local 8914 agreed Oct. 31 to a new, four-year contract, which means that 529 workers at its McArthur River and Key Lake operations will remain on the job. USW members had voted down a previous Cameco offer, in favor of a strike (UIW Oct.18,p3).

Market participants tell UIW that a trader was recently caught short when a shipment from Niger to Comhurex was delayed. The delay may have been caused by a shortage of armed guards for Areva trucks traveling from Niger to Benin. Since the Oct. 16 kidnapping of seven people in the uranium town of Arlit, including an Areva employee and his wife, Areva has reportedly upped the security for the long trip to the Atlantic port (UIW Sep.27,p3). ☹

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URANIUM PRICE PANEL

For the week ended October 29, 2010

Weekly Spot Market Prices

	Change	Nov.		Oct.				Sep.			Aug.			
		1	25	18	11	4	27	20	13	7	30	23	16	9
Price (\$/lb U3O8)	0.24	50.64	50.40	48.33	48.03	46.58	45.70	46.67	47.81	45.50	44.00	45.70	46.25	45.25
Total Assessments	2.00	15.00	13.00	15.00	16.00	12.00	14.00	11.00	14.00	12.00	16.00	12.00	13.00	16.00
% within 1 StDev	-10.26	66.67	76.92	86.67	87.50	91.67	78.57	72.73	64.29	66.67	81.25	75.00	76.92	87.50
Low (\$/lb U3O8)	0.75	49.75	49.00	47.00	47.00	46.00	45.00	45.00	47.00	45.00	44.00	45.00	45.50	44.50
High (\$/lb U3O8)	0.75	52.00	51.25	49.25	49.00	48.00	47.00	48.00	48.50	46.00	44.50	46.75	47.50	46.50
Variability*	0.17	0.32	0.15	0.28	0.22	0.00	0.60	0.50	0.50	0.06	0.10	0.35	0.75	0.39

The Uranium Price Panel (UPP) represents the average price assessment reported by active spot market participants for a transaction of 100,000 lbs of U3O8 by book transfer on the date given. In the UPP, participants are assigned a market position of seller, buyer or intermediate. Each week Energy Intelligence eliminates assessments that are statistical outliers, and double-checks the market position of intermediates. It then uses random elimination to maintain an equal number of buyer and seller assessments in the final average. "Variability" represents the absolute range of conceivable final averages resulting from this random elimination. "High" and "Low" assessments represent the extremes of the non-eliminated market assessments. For a detailed explanation of the price panel methodology, see www.energyintel.com.

China's Utility Powerhouses Push into Nuclear

Although China's nuclear power generation is dominated by two major players, other utilities are pushing for greater involvement — a move which could eventually radically alter the financial and operational underpinning of the country's nuclear industry. But their quest has been delayed, possibly in part because of the jittery nerves of regulators following a fatal accident a year ago at the Haiyang nuclear site, controlled by China Power Investment Corp. (CPI), a relatively new entrant to the scene.

The fact that the pre-eminence of China National Nuclear Corporation (CNNC) and China Guangdong Nuclear Power Group (CGNPC) is being challenged is in large part due to the structural reality of the Chinese electric utility sector:

Although CNNC and CGNPC largely control the nuclear industry, they aren't among the country's five largest utilities, which together represent over half the country's installed electricity capacity (see chart). This honor goes to China Datang, China Huadian, China Huaneng, China Guodian, and CPI.

After the accident at the CPI-led AP-1000 project in Haiyang, at least one utility manager complained that the utility majors were being prevented from increasing their role in nuclear power.

"Administrative measures have been implemented to prevent large power companies to become controlling stakeholders of nuclear power plants," Zhai Ruoyu, the former general manager of China Datang, and also a member of the Chinese People's Political Consultative Conference (CPPCC), told a March conference of the CPPCC and the National People's Congress. This high-profile annual assembly is where major national economic and political decisions are set, and Zhai's criticism of "the monopoly status of China's nuclear power industry" made quite a splash. It was subsequently published not only in Datang's internal magazine, but Zhai was also quoted in the mainstream Chinese media.

This came half a year after the accident at Haiyang, the first nuclear project in which CPI had a controlling stake. The first concrete for Unit 1 was poured in September 2009 and only eight days later five workers died, reportedly because of a scaffolding collapse (UIW May24,p3). Illegal subcontractor conduct in the preparatory work for the project was later found to be at fault.

After this incident, the National Energy Administration (NEA) and the National Nuclear Safety Administration (NNSA) said that new permissions for holding controlling stakes in nuclear projects would not be granted in the near future, according to China Energy News, the official publication of the National Energy Commission and the NEA. While it's not clear how much the accident affected thinking, sources close to the NEA as well as industry experts told the China Securities Journal this March that controlling ownership thresholds in new NEA regulations (currently still being drafted) were unlikely to be significantly lowered.

Carving Up the Market

Most of China's largest utilities are actually descendents of the State Electric Power Corporation, which was split up in 2002 in line with China's "Plant-Grid Separation" reform. The massive state-run company was divided into two grid

corporations and four power generation groups, namely Guodian, Datang, Huadian and CPI. Together with Huaneng, established in 1985, these five largest utilities are all state-owned and headquartered in Beijing. CPI, despite its status as the smallest of the five, inherited all of the State Electric Power Corporation's nuclear assets, thereby becoming the third major nuclear generator after CNNC and CGNPC.

In order to carve into China's rapidly expanding nuclear energy market, the top five aim to boost their individual nuclear electricity generating capacities. For example, Datang plans to

have nuclear generating 9% of its installed capacity by 2015, while Huaneng hopes to own 10% of China's installed nuclear power by 2020.



China's Top Power Utilities*

	Total Installed Capacity (GW)
Top Electric Utilities	
China Huaneng Group	104.38
China Datang Corp.	100.17
China Guodian Corp.	82.03
China Huadian Corp.	75.51
China Power Investment Corp.	58.83
Top Nuclear Utilities	
China Guangdong Nuclear Power Co.	7.22
China National Nuclear Corp.	5.08

Note: *As of Dec. 2009.
Source: Company websites, China Nuclear Energy Association, UIW estimates

The biggest obstacle faced by Datang, Huadian, Huaneng and Guodian is obtaining the qualifications that permit ownership control of nuclear plants. The National Development and Reform Commission (NDRC), a powerful macroeconomic agency directly under the Chinese State Council, controls the qualification process. There are no laws governing the decision-making, but an expert familiar with unwritten requirements told China Energy News that utilities must first gain experience running nuclear plants as minority stakeholders — and these utility majors are working hard to accumulate that experience.

China Huaneng already has a 49% equity stake in the Changjiang nuclear power plant currently under construction in Hainan province: two CNP-600s due for commissioning

in 2014 and 2015. Huaneng is also a 5% owner of the Haiyang plant. And once the Shidaowan High Temperature Gas Cooled Reactor Demonstration Project is awarded a construction permit, Huaneng will take the lead in its first nuclear plant with a 50% stake. It will team with CNNC (35%) and Tsinghua University (15%).

China Huadian has cooperated with CNNC in constructing CPR-1000s at the Fuqing nuclear power project in Fujian. It owns a 39% equity position in Unit 1, while the equity arrangements for Units 2 and 3 are as yet unrevealed. And China Datang is the second-largest shareholder of in CGNPC's Ningde nuclear power project, with a 44% equity stake. CGNPC (46%) and Fujian Coal (10%) own the rest of the Fujian plant, which will eventually consist of six CPR-1000s.

In 2004 China Guodian purchased 20% of the equity in the Haiyang AP-1000 project, becoming one of six shareholders in the project's Shandong Nuclear Power Company. While it is unclear how much Guodian spent in that purchase, the project itself is targeted to cost some 100 billion RMB (\$15 billion), and to become China's largest nuclear power project.

Planning Ahead

Once they've established themselves as experienced nuclear players, the utility majors have ambitious plans to move forward. The top four power companies are already cooperating with local governments on site plans and pre-feasibility studies for potential nuclear power projects, many of which are in inland provinces.

Meanwhile, they are awaiting a decision, expected soon, on which of three inland locations for newbuild will receive a construction permit first (Jiangxi's Pengze, likely to be led by CPI, Hunan's Taohuajiang, likely to be led by CNNC, and Hubei's Xianning Dafana, likely to be led by CGNPC). For now it appears virtually certain that one of the three established nuclear operators will have a controlling stake in these operations.

Elsewhere, China Huadian has been actively promoting preliminary work on nuclear power projects in Fujian's Longyan, Henan's Luoyang, Liaoning's Donggang, Hunan's Xiangtan and Guangxi's Laibin sites. Some places in Hebei's Cangzhou are even considered qualified to install further AP-1000s. But so far none of the project proposals have been submitted to the NDRC.

China Huaneng has been working on siting plans in almost ten provinces or cities, such as Anhui's Anqing, Zhejiang's Cagnan, and Jiangxi's Yingtang and Heilongjiang. Datang is interested in siting projects in Liaoning's Zhuanghe, Hunan's Zhuzhou, Anhui's Xuancheng and Heilongjiang's Harbin. The pre-feasibility study of Datang's Yangxi nuclear power project in Guangdong has been approved by the project's review committee, which includes experts in construction, nuclear safety, energy, environmental protection, earthquakes and even meteorology. And the pre-feasibility study for the Xiajiang Nuclear Power Project in Jiangxi, another project in which Datang is investing, has also been completed and reviewed, with a feasibility study on the way.

And finally, China Guodian has finished its pre-feasibility studies for nuclear power projects in Fujian's Zhangzhou and Hunan's Hengyang. In addition, Guodian is also exploring Jiangxi's Poyang, Anhui's Chaohu and some cities in Henan as potential sites for nuclear plants.

After initial site planning and pre-feasibility studies, utilities are expected to submit project proposals and feasibility studies to the NDRC, NEA and to related departments under the Ministry of Environmental Protection, such as the NNSA. The construction permits for nuclear power projects will only be granted when an Environmental Impact Report, Site Evaluation Report and final construction sites are approved. Yet final approval ultimately depends still on the NDRC's whims. ☼

Zhen Li, Chengdu

China Doubling Down on Domestic Uranium Exploration Efforts

While China's two main nuclear utilities have made quite a splash in the past several years through their spot and term uranium purchasing, the country's nuclear industry is aggressively moving forward to not only acquire equity stakes in foreign uranium mines, but to develop China's own domestic uranium production.

State-owned China National Nuclear Corp. (CNNC), which oversees China's fuel cycle activities, moved quickly to step up domestic uranium exploration after the central government first released its mid- and long-term Nuclear Power Development Plan in October 2007. Written by the National Development and Reform Commission, the document outlines a three-pronged strategy for securing uranium through international trading, overseas mining development and domestic exploitation.

The first two legs of this strategy have been much-publicized, from China's uranium acquisitions in Kazakhstan and Niger to its spot purchases and long-term deals with major producers like Canada's Cameco (UIW Jun.8,p2). But China's domestic uranium industry has received much less attention, partially due to the fact that annual output seems stagnant at just under 800 tons of contained uranium (tU) per year. Could the current exploration drive dramatically boost production?

A Countrywide Effort

China has more than 200 proven uranium deposits accounting for 171,400 tU of identified conventional resources, according to the most recent Red Book. But Chinese planners believe there is far more — between 1.2 million and 1.7 million tU of potential conventional uranium reserves, according to "the study of math [statistics] conducted by ... several institutes in China." (This comes from the Red Book, which in turn received its Chinese data from a division of the China Atomic Energy Authority.)

While most of the currently delineated deposits are concentrated in central, southern and coastal China, the major centers of uranium production are likely to be in northwestern and northern China (UIW Jul.26,p4). Among them, the provinces Liaoning, Yunnan, Shaanxi, Jiangxi, Guangdong, Guangxi and Hunan account for 56% of China's known

resources. But northern Inner Mongolia alone has 31,000 tU of proven resources, which at 18% of the country's total is more than any other single province.

Also, much of the country remains to be explored. "China's uranium has been completely surveyed in an area of less than one-third of the land area of the country, and it is mainly concentrated in central and eastern regions, with a very low degree of exploration in western regions. Provinces such as Tibet, Qinghai and Inner Mongolia almost have never been explored," Zhou Xiujie, an energy researcher of China Investment Consulting Co., told UIW.

With exploration proceeding apace, the numbers are shifting quite rapidly. The Red Book data is valid through the end of 2008 and much has happened since. In 2009, CNNC commenced new uranium exploration in northwestern China's Xinjiang province, which already has one ISR mine operational since 1993. This May, CNNC set up six regional radioactive geological exploration bureaus to conduct local uranium exploration with the government's Mining and Metallurgy Bureau. China Nuclear Geology (CNG), an affiliate of CNNC, is responsible for planning, organizing and implementing the exploration effort as well as the subsequent data management.

Exploration and Production Challenges

As in many countries, the nuclear fuel cycle is an extremely sensitive subject in China, which doesn't allow foreign countries to explore for uranium. However, Wang Yiren, the vice director of what is now the State Administration of Science, Technology and Industry for National Defense, said in a 2008 press conference that foreign experts are welcome to assist in China's government-led exploration effort.

Indeed, since 2007 the CNNC's Beijing Research Institute of Uranium Geology has invited uranium experts from Russia, Canada and Pakistan to China to provide training to Chinese exploration staff. The institute also hosts annual academic conferences and regularly invites international uranium experts.

Besides exploring more of the country, Chinese geologists know they must dig deeper — literally. "China needs to improve the depth of uranium exploration," Zhou Xiujie, the energy researcher, told UIW. "China's proven uranium deposits are less than 500 [meters in] depth, and only in some areas in Jiangxi province are the exploration depths as much as 1,000 meters. Yet the world's uranium ore bodies are concealed deposits, and endogenous uranium ore deposits' [depths] are up to 2,000 meters."

The process of bringing uranium resources into actual production can take years, say Chinese planners. It's generally believed that it takes about a decade to conduct geological exploration through to formal submittal of the reserves. After this, construction of Chinese uranium mines can take up to four years.

Moreover, much of the delineated uranium in China is low-grade (with the majority of deposits ranging from 0.05% to 0.3% contained uranium), and is relatively spread out — i.e., not in large deposits. It remains unclear to what extent China is developing or importing innovative exploitation methods to produce yellowcake from these reserves. ☼

Silvia Yu, Shanghai

Hanoi Awards Second Nuclear Plant to Tokyo

Japan appears to have won the right to build Vietnam's second nuclear power plant, the southeast Asian country announced last week as it further firmed up its nuclear plans. This was a widely anticipated victory for Tokyo, which adopted a "Team Japan" approach to reactor export marketing after losing out to Russia for Vietnam's first plant (UIW Jun.7,p6).

The Vietnamese government "affirmed that on the basis of examining the proposal from the Japanese side the Vietnamese Government had decided to choose Japan as the cooperation partner for building two reactors at the second nuclear power plant site in Ninh Thuan Province," a joint statement released Sunday said. This came after an Oct. 31 Hanoi meeting between Vietnamese Prime Minister Nguyen Tan Dung and Japanese Prime Minister Naoto Kan.

The two governments also announced the conclusion of negotiations on a bilateral nuclear cooperation agreement to be signed "at the earliest possible date." But details of which technology will be used at Ninh Thuan were not made clear, implying that the process of selecting between Japan's three main vendors (Toshiba, Hitachi and Mitsubishi Heavy Industries) lies ahead.

A higher priority was establishing the Japanese government's willingness to meet Vietnam's broader requirements including assistance in conducting a feasibility study for the project, "low-interest and preferential loans," technology transfer, worker training, "cooperation in waste treatment" and "the stable supply of materials for the whole life of the project." The two governments have tasked relevant agencies to work together toward signing the documents necessary to fulfill these promises.

The announcement came after the conclusion of the annual meeting of the Association of Southeast Asian Nations (Asean) and a number of other high-profile partnerships. Most significantly, Japan agreed to build a high-speed rail project linking Vietnam's largest cities, and it won a partnership to mine rare earth metals in Vietnam.

Vietnam "is a country that has been growing very conspicuously in Asean, and in that respect Vietnam does need electrical power and railway connections, and Japan also needs various resources," Kan said at an Oct. 30 press conference. "Therefore Japan providing cooperation to Vietnam will be positive for Vietnam but also for Japan."

The rare earth metals deal underlines the geopolitical nature of the bilateral deals: Both Japan and Vietnam are currently engaged in territorial disputes with regional superpower China, and Japan's dispute has in the past month escalated to the point where China has barred shipments of Chinese rare earth metals to Japan. Hanoi and Tokyo are therefore natural partners in an effort to counterbalance Beijing's growing power.

Russian Plans Made Official

A similar motive underlies the existing Vietnam-Russia nuclear power agreement. That moved forward Sunday with the signing of a construction contract for two Russian

VVER-1200s in Ninh Thuan, signed by Vietnamese President Nguyen Minh Triet and Russian President Dmitri Medvedev.

“This is work that will unfold over decades and will promote innovative development in both countries,” Medvedev said in an op-ed Saturday in Vietnam’s Nhan Dan newspaper. “Russia has unique modern technology in nuclear energy and has built up vast experience of building these kinds of facilities. I am sure that developing this sector in Vietnam will have a positive effect on national economic growth and your country’s image in the world.”

Though the two countries’ finance ministries met together in September to discuss the mechanisms for Russian financial support for the Ninh Thuan plant, neither side has released details about how the project will be paid for (UIW Sep.7,p5).

Vietnam hopes to have its first two nuclear plants built by 2025 with a total installed capacity of 8 gigawatts. This is part of a strategy to both diversify the country’s electricity production and reduce its dependence on imports. At the end of 2009, Vietnam had available electric generating capacity of 18.4 GW, of which 32.7% was imported, 33.3% was from hydro, and 11.6% was from coal. Much of the country’s power independence will come from dramatically boosting its coal-fueled electricity production.

According to an August presentation by an executive at Electricity Vietnam, the country’s state-owned utility, Vietnam projects total capacity of 65 GW in 2020, and 125 GW in 2030. Coal-fired power would make up over one-third of Vietnam’s power by 2015, and remain at those levels. Hydro would stay at roughly its current percentage of generation, and nuclear energy’s contribution to the total would gradually climb to 10% by 2030, after Russia’s first reactor goes on line in 2020. ☼

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India’s Signing of the CSC: Much Ado About Little?

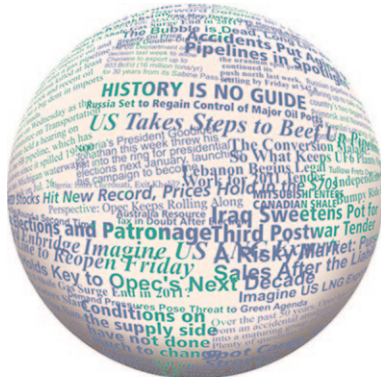
After years of pushing Delhi to sign its preferred international nuclear liability treaty, the US last week finally got what it wanted — perfectly timed ahead of President Barack Obama’s pending arrival in the Indian capital Nov. 6. The move was enthusiastically welcomed by the US nuclear industry lobby as a presumptive step toward promoting nuclear commerce between the US and India, but that reaction appears unfounded. Experts say the signing won’t resolve liability issues that might prevent US vendors doing business in the subcontinent.

On Wednesday in Vienna, India’s resident representative to the International Atomic Energy Agency (IAEA), Dinkar Khullar, signed the Convention on Supplementary Compensation for Nuclear Damage (CSC). The CSC is supported by the US as an alternative to other nuclear liability treaties. The US believes these other treaties provide an inadequate international framework for coverage in case of a nuclear accident (UIW Jul.27’09,p3).

The Washington, D.C.-based Nuclear Energy Institute “hailed” the signing in a press release. “This is an important multilateral treaty to foster commerce in nuclear energy technology that can help India and other nations reliably meet rising electricity demand with safe, advanced-design facilities that do not emit greenhouse gases during electricity production,” the release said. In India, an unnamed “senior official” told The Hindu newspaper last week that, “Now there is nothing which stands in the way of American companies having commercial negotiations for the sale of their reactors.”

But the significance of the signing is probably exaggerated. For starters, there’s nothing forcing Delhi to ratify the treaty. And as The Hindu noted last week, “Indian officials say this [ratification] is unlikely to happen soon.” The US

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itself took nine years to move from signing to ratification. Fourteen countries — including the US — signed the treaty in 1997 and 1998, but only four have so far ratified it: Morocco and Romania in 1999, Argentina in 2000 and the US in 2008.

Even if India does ratify the CSC, the treaty still cannot take effect as things stand now. For that to happen, five countries with at least 400,000 units (400 GWt) of combined installed nuclear capacity must ratify it. India would fulfill the five-country criterion, but not the capacity requirement.

Furthermore, any hope that India's latest move will resolve US vendor concerns over India's domestic nuclear liability law appears to be unfounded. "The CSC is intended, it specifically says in Article 2, Section 1, to supplement local laws," not to supplant them, explained George Borovas, a partner in Pillsbury's London office who heads the law firm's International Nuclear Projects team. "If there are any perceived issues with the national legislation, purely by signing the CSC it's not going to change that," he said.

The treaty requires signatories to declare that their domestic laws comply with a set of requirements set out in the document's Appendix A, Borovas said. India passed a domestic nuclear liability law earlier this year, but US vendors say it doesn't do enough to shelter them from liability in the event of a serious accident. They want all lawsuits "channeled" to the operator — in this case, the Nuclear Power Corporation of India, Limited (UIW Oct.4,p8). If India's domestic liability law fails to meet the requirements of the CSC's Appendix A, as the US might well argue, the CSC provides no mechanism for settling such disputes. ☼

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Constellation Bows Out Of Nuclear Renaissance

Constellation Energy's agreement to sell its stake in Unistar, its newbuild development joint venture, to its partner Electricite de France (EDF) leaves one more major US utility sitting out the US nuclear renaissance. Exelon, Progress Energy, FPL and Entergy have also delayed or backed away from newbuild plans, although none has moved as definitively as Constellation.

Utility executives, analysts and ratings agencies are becoming increasingly pessimistic about newbuild in the US because of factors including rising reactor construction cost estimates, slumping electricity demand, Congress' inaction on putting a price on carbon, and low natural gas prices (see story).

EDF has not said publicly whether it intends to continue developing new reactors in the US through Unistar without Constellation. When asked by UIW, a company spokeswoman declined comment. However, a person close to the situation said, "EDF believes in the benefits that new nuclear will bring to the United States and remains committed to making new nuclear a reality."

Through Unistar, the French utility has been one of the main drivers of what exists in the way of an American nuclear resurgence: it has been involved in one way or another with more than one-quarter of the 38 reactors for which companies have submitted — or announced plans to submit — construction and operating license applications (COLAs) to the US Nuclear Regulatory Commission (NRC).

If EDF pulls the plug on Unistar — either formally and publicly, or by quietly cutting financial support for it — that would also be a blow to Areva, since Unistar's projects account for the majority of plans to build the French vendor's EPRs in the US. Areva said in a statement last week that it was "closely monitoring the progress of discussions between EDF and Constellation ... and their impact on the Calvert Cliffs 3 project." Besides Calvert Cliffs, Unistar's involvement in nuclear projects also has extended to Nine Mile Point (Pennsylvania), Bell Bend (Indiana) and the scrapped effort at Callaway (Missouri), as well as even less-advanced efforts at the Hammett (Idaho), Payette (Idaho), Pueblo (Colorado), Amarillo (Texas) and Piketon (Ohio) sites.

The Calvert Cliffs 3 (CC3) project in Maryland is the most advanced of Unistar's ventures and is a finalist for a US Department of Energy loan guarantee. It appears the project can continue without Constellation if EDF decides on that course. Unistar's ownership change is unlikely to prompt a review from the Maryland Public Service Commission and shouldn't hamper the NRC's review of the CC3 license application (although EDF will have to find a new American partner before it can actually receive a license).

So far, it's not clear what effect the ownership change will have on the loan guarantee review. When asked, a DOE spokeswoman offered UIW a vague, boilerplate statement, and refused to clarify it. "The Department was pleased to learn that Constellation and EDF have reached an agreement which should keep the Unistar project on track," she wrote in an e-mail to UIW. "We will continue to work with all of the parties involved as part of a broad effort to restart the nuclear industry and create thousands of clean energy jobs."

The (Partial) Divorce

Constellation and EDF announced Tuesday an agreement to end weeks of bitter public feuding (UIW Oct.18,p3). The two companies agreed to end their newbuild joint venture, but have not severed their partnership in existing reactors. EDF still owns a 49.99% ownership stake in Constellation's nuclear business.

In last week's deal, EDF got Constellation's 50% of Unistar, leaving the French company as the sole owner. EDF also got potential new nuclear sites at Constellation's Calvert Cliffs, Nine Mile Point, and R.E. Ginna nuclear plants in New York. Crucially, EDF also got a commitment from Constellation that the Baltimore-based utility wouldn't exercise a put option and force EDF to buy 11 fossil fuel generation plants worth about \$450 million for \$2 billion (UIW Oct.18,p5).

In return, EDF paid Constellation \$140 million, and transferred back 3.5 million of its shares in Constellation, which were worth about \$110 million. It also gave up its seat on Constellation's board. Not announced was whether EDF agreed to terms attached to Constellation's Oct. 15 letter giving Unistar until Jan. 1, 2016 to pour "safety-related concrete" for the reactor "pursuant to a COL [construction operating license] issued by the NRC [Nuclear Regulatory Commission]" or transfer back the properties for both CC3 and CC4 (for apparently nothing). ☞

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Gas Boom May Thwart Nuclear Renaissance

Large discoveries of shale gas in the US could lead to an expansion of natural gas consumption over the next decade that could derail a much-heralded "nuclear renaissance" and hamper the development of renewable energy.

The Obama administration's 2009 stimulus package allocated billions of dollars in loan guarantees to help fund construction of new nuclear plants as well as wind and solar projects. But many of the programs associated with the stimulus package are winding down now, while natural gas prices continue to fall, making other forms of energy less competitive.

Last month, Constellation Energy Group canceled plans to build a new nuclear reactor in Maryland, saying strings attached to a government loan — in the form of a credit subsidy cost — added nearly a billion dollars to the project (see story).

With benchmark natural gas prices at the Henry Hub in Louisiana currently in the low \$3/MMBtu range and gas storage levels near record levels, utilities are being forced to weigh the economics of competing sources of electricity generation.

"With gas at its current price, it is very hard to justify the economics to customers to build [nuclear plants]," Jeffrey Holzschuh, chairman of the Morgan Stanley Global Power and Utility Group, told an energy forum sponsored by the magazine *Atlantic Monthly* on Tuesday.

"All the capital is up front and the benefits are on an operating basis; with gas it's not that way, the construction costs are much smaller," Holzschuh added.

Utilities and businesses are more confident that there will be abundant supplies of gas for decades to come after estimates of US potential gas reserves increased last year by almost 40% to 2,000 trillion cubic feet — about 100 years of supply. The dramatic increase reflected the addition of shale gas reserves in the US Southwest and Northeast that had previously been technically unrecoverable.

"You will see a lot of gas, not a lot of nuclear and not a lot of coal," said Eileen Claussen, president of the Pew Center on Global Climate Change. "The dash to gas is not good if it's the only thing you do," she added.

The problems facing nuclear power and renewable energy are compounded by the fragile state of the financial markets as they recover from the deepest recession in decades, making financing for energy infrastructure "less liquid, less available and more expensive," said Holzschuh.

Constellation serves as a prime example. As a private-sector merchant generator, it was facing a much higher subsidy fee than utilities that had better access to cheaper government-backed credit because they are regulated by state utility boards.

"What the government is asking us to pay to get the guarantee, like points on a loan, would have killed the economic case entirely," said James Connaughton, executive vice president of corporate affairs for Constellation. "It made it more expensive and more risky."

The cost challenges are a key reason why advocates of nuclear and renewable energy lobbied aggressively for a price to be imposed on carbon emissions during the last session of Congress — a move that would have made coal and gas more expensive in relative terms.

The Republicans are expected to make substantial gains during next week's midterm election, possibly delaying legislation to put a price on carbon for several years. ☞

Bill Murray, Washington

Profits Outweigh Self-Reliance as China's Nuclear Industry Expands

Security considerations remain an important feature in China's nuclear industry, but as Dr. Wang Haibin argues below, China's nuclear developers more often than not opt for maximizing profitability rather than pursuing a policy of self-reliance. Dr. Wang is an assistant professor at Tsinghua University School of Public Policy and Management.

China's nuclear power industry has entered a stage of fast development, with 24 reactors now under construction, representing a combined capacity of 27.08 GW — more by far than in any other country. China's importance to the nuclear industry should therefore be measured not only in terms of its domestic, but also its global, impact.

In its zeal to move forward, the Chinese nuclear industry faces two competing forces — the desire for self-reliance, or *Zizhu*, on the one hand and, on the other, for profit maximization. *Zizhu* equates to security. It says that China should firmly focus on developing indigenous R&D and manufacturing capabilities. However, recent developments suggest that *Zizhu* might not be as important to Chinese nuclear planners as is commonly assumed and that economic considerations — profit maximization through enlarging business scale and other efforts — are of greater importance. Even when self-reliance is at work, economic considerations are the main driving force.

Three examples provide a demonstration of this tendency. The first involves China's approach to uranium enrichment, the second concerns the fate of the CNP1000 and the third relates to the AP1000 in China.

At present, China has enrichment facilities in Hanzhong, Shaanxi province, and Lanzhou, Gansu province. China's EUP capacity is roughly 1.1 million SWU annually. But as a result of its ambitious nuclear energy development plan, China will probably need at least 10 million SWU in 2020. Without an expansion of production capacity, China's domestic EUP supply will meet only 11% of its forecast demand in 2020.

There are two solutions to fill the gap: constructing more uranium enrichment facilities in China or importing more nuclear fuel from other countries. Obviously, the first approach better suits supply security. While some expansion is envisioned, it is not enough to meet forecast EUP demand some years out (UIW Jul.26,p3).

In fact, China prefers the second approach, which was reflected in a proposal to jointly develop nuclear fuel facilities in Kazakhstan with the Kazakhs, including, evidently, an enrichment plant. While the future of an enrichment venture is unclear, that it was even proposed demonstrates a case where economic considerations overrode security of supply as the main driver of China's approach to meeting future EUP demand.

Meanwhile, an agreement reached Nov. 10, 2008 between China National Nuclear Corp. (CNNC), China's Guangdong Nuclear Power Corp. (CGNPC) and Kazatomprom links development of Kazakhstan's uranium mines and new reactors in China (UIW Nov.3'08,p3). By 2013, the jointly owned Ulba Metallurgical Plant of Kazakhstan will begin exporting nuclear fuel to China, eventually becoming the major nuclear fuel supplier for China's NPPs. In exchange, Kazatomprom receives shares of China's nuclear fuel fabrication facilities or of its NPPs.

On the reactor front, CNNC had been keen to create its own brand of advanced second-generation reactor — the CNP1000, retaining intellectual property rights — and building two initial units based on the design at Fangjiashan, Zhejiang province, during the 11th Five Year Plan (2006-2010). But in 2007 the government abandoned the model in favor of the CPR1000, which is being widely deployed by CGNPC, and like the CNP1000 derived from the French M310 but with less local content.

Why abandon the reactor with the most local content? According to one senior expert at CNNC, the application of foreign technologies (AP1000, EPR) or to a greater degree the CPR1000 left no room for the CNP1000 — a symbol of China's nuclear power self-reliance enterprise, or *Hedian Zizhuhua*.

Finally, there are three AP1000 reactors under construction at Sanmen and Haiyang provinces, all of which officially support the "Self-reliance Program for the Third Generation Nuclear Power Technology." More importantly, all 28 nuclear reactors that will be built in China's hinterland provinces in the near future will be AP1000s.

The dominance of AP1000 and the CPR1000 versus the CNP1000, with its greater degree of local content, demonstrates that China attaches more importance to economic considerations than to security at this stage of its NPP construction program.

In conclusion, security considerations, which are mainly embodied in self-reliance agendas, are less important to China's nuclear energy development than economic opportunities presented through partnerships with overseas vendors and developers. ☸

BRIEFS

FRANCE

Areva generated consolidated revenues of €6.168 billion (\$8.6 billion) in the first nine months of 2010, up 6.3% from the same period in 2009. The state-controlled company said it expects “strong growth in net income” for the year. The main growth drivers so far this year have been Areva’s reactors and services group, which reported revenues up 11.5% year-on-year, and its back-end group, which saw a 7.1% rise in revenues. “The [new-builds] business reported strong growth attributable to significant progress on all major reactor construction projects,” according to Areva. Revenue from the mining and front-end group, on the other hand, was essentially flat, rising from €2.368 billion in the first nine months of 2009 to only €2.401 billion in the same period this year, with the difference probably explained by foreign exchange fluctuations worth €49 million in Areva’s favor. Areva said it had seen “strong sales growth” in mining, including “a 16% increase in volumes sold and a 3% increase in average uranium sales prices,” offset by a “seasonal decline” in enrichment and fuel sales.

INDIA

The Nuclear Power Corporation of India Ltd. (NPCIL) last week signed a memorandum of understanding with the government-backed Power Finance Corporation Ltd. (PFC) that would help finance NPCIL’s ambitious new-build program. Following the MOU, PFC intends to offer debt and equity financing as well as “consultancy services” to NPCIL “in order to facilitate NPCIL’s large capacity addition programme.” PFC has long served as the financial backbone of the Indian power sector, and maintains an asset base of 856 billion rupees (\$19.26 billion). NPCIL Chairman and Managing Director SK Jain told India’s DNA Money in 2008 that while much of the funding for NPCIL’s expansion will come from the Indian market, it “may also have some amount of external commercial borrowings” as well as contributions from “short-term funding agencies such as the Exim Bank and the Power Finance Corporation. We have had discussions with some foreign banks too ... and they are quite eager to extend help.”

KAZAKHSTAN

Kazatomprom Chairman Vladimir Shkolnik and Areva Chief Executive Anne Lauvergeon signed an agreement last week in Paris to establish a new fuel fabrication joint venture. The new company, 51%-owned by Kazatomprom and 49%-owned by Areva, “is to build” a new fuel assembly manufacturing line with a capacity of 400 metric tons per year, based at Kazatomprom’s Ulba facility, according to a joint statement issued by the two companies. The facility is scheduled to start operating in 2014. In October 2009, the two companies established a joint venture called Ifastar, which was to consider building a fuel assembly line of the same description at Ulba, and marketing integrated fuel packages to Asian utilities (UIW Nov.16’09,p10). According to last week’s statement, Ifastar will now be limited to a marketing role.

NAMIBIA

China’s Sichuan Hanlong Group is putting \$5 million into Australia’s Marenica Energy to help the uranium explorer finance a prefeasibility study for its Namibian Marenica project, which it estimates could eventually produce some 3.5 million lbs U3O8 per year (UIW Oct.11,p9). The group is a privately held company with investments ranging from alcohol and real estate to mining and power production. Through its subsidiary Hanlong Energy, the group’s investment will be in the form of both debt and equity, Marenica announced today. The money was desperately needed by cash-starved Marenica to complete a prefeasibility study of mining the 138 million lb U3O8 deposit. The two companies also signed a memorandum of understanding that could lead to future agreements, including an investment by Sichuan Hanlong in a definitive

feasibility study, a further investment in Marenica and a potential uranium offtake agreement. “As a private Chinese company, this initial investment in Marenica provides Hanlong with an excellent opportunity to become a participant in and join the global uranium network,” Hanlong Energy Managing Director Steven Xiao said in a statement.

NIGER

The senior management of Korea Hydro & Nuclear Power (KHNP) swept into Niamey last week, and not only firmed up a uranium supply contract with the government, but also offered to assist the West African country in a possible nuclear power plant. “Niger has huge natural resources as well as potential opportunities for development,” KHNP President Kim Jong Shin told reporters, according to APA News. “The Korean company is not only here to purchase uranium.” The contract for some 400 tU per year from 2010 to 2020 between KHNP and Niger’s Sopamin is actually the same one from March 2009 (UIW Mar.23’09,p4). KHNP is merely stepping in for the original Korean customer, state-owned Korea Resources. This appears to be part of a centralization of the Korean nuclear industry under Korea Electric Co. (Kepeco), the parent company of KHNP. Kepeco took a major step nearly a year ago by winning the UAE reactor contest, and is now making an aggressive effort to market its reactors in countries like Turkey and South Africa. While a Niger reactor deal would be a major victory for Kepeco, it’s unclear how serious Niger — one of the world’s poorest countries — is about advancing nuclear power.

UNITED STATES

Just days before its third-quarter earnings announcement and the national elections, Usec announced “significant progress” in its move to secure a \$2 billion Department of Energy (DOE) loan guarantee for its American Centrifuge Plant in Ohio. The DOE has “largely completed its initial technical review” and “provided USEC with a draft term sheet that will serve as a framework for discussions between USEC and DOE” on the Bethesda-based enricher’s loan guarantee application. A DOE spokeswoman would neither confirm nor deny the accuracy of Usec’s statements, but Ohio Democrats touted Usec’s announcement. “We’ve fought long and hard to build this facility here because it means thousands of good Ohio jobs,” said Gov. Ted Strickland, who’s in a tight re-election race. The DOE’s July 2009 request for Usec to withdraw its application because of technical and financial issues sparked criticism of the Obama administration from Ohio residents who believed that as a candidate Barack Obama had promised to get Usec the loan guarantee (UIW Aug.3,p3).

UNITED STATES

Nuclear Regulatory Commission (NRC) Chairman Gregory Jaczko has defended his decision to start shutting down his agency’s Yucca Mountain project review before its proponents have exhausted all options for keeping it alive. In an Oct. 20 letter, seven Republican members of the House Committee on Appropriations’ energy and water subcommittee, which oversees the NRC’s budget, called Jaczko’s actions “premature and partisan.” It warned that “If continued, your actions may seriously erode the NRC’s relationship with this subcommittee.” Last week, Jaczko said his decision to direct his agency’s staff to begin “an orderly closure of the program,” was “consistent with NRC’s obligation to spend funds prudently ... pending final budget action by Congress.” He insisted that because the NRC is “thoroughly documenting the staff’s technical review and preserving it,” it can respond if Congress or the courts revive Yucca. The Obama administration has nearly zeroed out Yucca funding in the proposed FY-11 budget (which began Oct. 1); both a court and the NRC haven’t ruled on whether the Department of Energy can withdraw its application to the NRC for a license to operate the facility. ☻

ENERGY INTELLIGENCE URANIUM MARKET UPDATE

For the week ended October 29, 2010

Previously known as the Nukem Weekly Report and the Nukem Price Bulletin

Monthly Spot Market Prices

	Change	2010									
		Oct.	Sep.	Aug.	Jul.	Jun.	May	Apr.	Mar.	Feb.	
Uranium (\$/lb U3O8)											
Low	+1.00	46.00	45.00	44.00	41.50	40.50	40.50	40.50	40.50	41.25	
High	+3.50	50.50	47.00	46.25	43.00	41.75	41.75	41.75	42.00	42.25	
Conversion (\$/kgU)											
Low	+2.00	11.00	9.00	10.00	6.00	6.00	5.50	5.50	5.50	5.50	
High	-	13.00	13.00	12.50	11.00	7.50	7.50	7.50	7.50	7.50	
Enrichment (\$/SWU)											
Low	-	153.00	153.00	153.00	153.00	153.00	149.00	157.00	157.00	158.00	
High	-	154.00	154.00	155.00	155.00	158.00	157.00	159.00	159.00	160.00	

No Spot Bids and Offers

No Term Bids and Offers

Term Evaluations

Buyer or Seller	Category	Due by	Uranium Qty. ('000 lbs U3O8)	Conversion Qty. ('000 Kgs U)	SWU Qty. ('000 SWU)	Form	Delivery	Origin
Buyer:	US Utility	11/2/2010	2,800			U3O8	2012-2022	US Legal
Buyer:	US Utility	10/22/2010	500-600			U3O8 or UF6	2012/13-202016/18	US Legal
Buyer:	US Utility	10/25/2010	1,500			U3O8 or UF6	2015-2018	US Legal
Buyer:	US Utility	10/25/2010	1,000			U3O8 or UF6	2012-2014	US Legal
Buyer:	US Utility	10/22/2010	2,000			U3O8	2013-2019	US Legal

Spot Evaluations

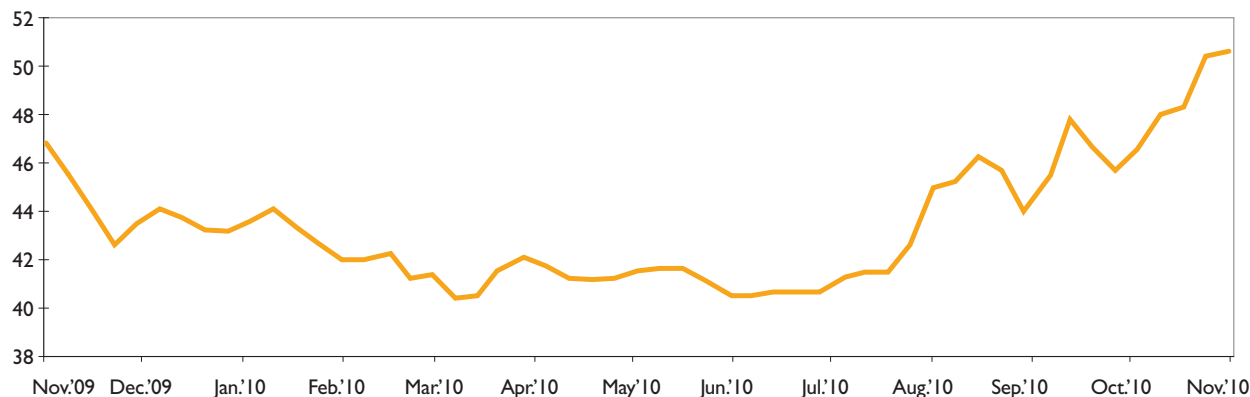
Buyer or Seller	Category	Due by	Uranium Qty. ('000 lbs U3O8)	Conversion Qty. ('000 Kgs U)	SWU Qty. ('000 SWU)	Form	Delivery	Origin
Buyer:	US Utility				230	EUP	May-11	Unknown
Buyer:	US Utility	10/25/10		180		U3O8	2011	US Legal

No Spot Transactions

No Term Transactions

(\$/lb U3O8)

Uranium Price Panel Over the Previous Year



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