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The EUP Market Returns

After slumping during the 1996-1997 period, EUP activity has picked up over the past two years as measured by the number of spot and long-term EUP contracts awarded (see chart on page 3).

This raises a host of interesting questions: why has the EUP market returned, what is different about it than the one that existed in the 1994-1995 period, how have utility and suppliers attitudes toward the EUP market changed, and what are the prospects for this market? These questions will be examined below. This topic, which has implications for all three front-end markets, is covered in much greater detail in our latest *Enrichment Market Outlook*.

While there were numerous cases of spot EUP deals before 1994, the long-term EUP market essentially emerged in 1994 when USEC began selling EUP from uranium inventories transferred to it from DOE. Long-term EUP contracts outnumbered spot EUP contracts in

1994, with U.S. utilities being the most active buyers. Long-term buying continued into 1995.

In 1994, UxC conducted a survey of U.S. utility attitudes toward buying EUP that found while U.S. utilities were receptive to buying EUP on both a spot and long-term basis, in the aggregate they wanted to limit these purchases to less than half of open demand. U.S. utilities had the largest demand for EUP given their lower coverage for the front-end components than their counterparts in Europe and the Far East. Moreover, in at least two instances U.S. utilities signed long-term EUP contracts even though their feed requirements were partially covered.

EUP activity dropped off in 1996 and 1997 but began to pick up last year, both in the spot and long-term markets. This increase is due both to supply and demand factors. On the supply side, DOE transferred a substantial amount of natural uranium inventories to USEC, placing USEC in a position to sell larger quantities of EUP. Not wanting this business to go uncontested to USEC, Urenco teamed up with one or more uranium producers to successfully offer EUP to utilities.

On the demand side, electricity deregulation led to a more competitive utility industry, more interested than ever in reducing costs. EUP purchases represented a way of achieving these goals. On the spot market, utili-

ties found that EUP could be purchased more economically than buying separate components. On the long-term market, EUP purchases represented a way of reducing contract administration costs, a feature that was especially appealing to one-reactor U.S. utilities that had smaller contracting staffs.

The change in attitudes towards buying EUP was evident from a survey Ux conducted in February this year. Over half of the utilities that responded (both U.S. and non-U.S.) said that they would be willing to buy EUP to cover all of their needs, and about three-quarters were prepared to fill half of their needs with EUP purchases. Again, the determining factor was price or the overall economics of the purchase.

While the chart discussed above shows the number of long-term EUP contracts awarded in 1998 and 1999 is approaching that in 1994 and 1995, this is not the whole story. For one thing, long-term contracting activity is way down, especially this year, as shown by the chart on page 3. Our records indicate that, from the standpoint of volume, 25% of long-term enrichment contracts awarded by U.S. utilities over the last year and a half have involved EUP. Additionally, while long-term SWU activity has sagged this year, there has been a resurgence in spot activity, with much of this material being supplied in the form of EUP from Western primary enrichers. This is a noteworthy development that is indicative of how competitive the enrichment market has become. Further, in more than one instance an enricher has converted an existing long-term SWU contract to an EUP contract by adding feed to the contract. All of these factors must be taken into account when gauging the supply and demand for EUP.

Looking to the future, it would appear that all of the primary enrichers should be in a position to supply EUP, although at some point USEC will have to form an alliance or acquire uranium reserves once its inventories run down. It is not as clear whether primaries will continue to offer EUP on a spot basis, however. From the standpoint of demand, single-reactor U.S. utilities, which have been the most prominent buyers of EUP on a long-term basis, are being gobbled up as the industry consolidates. Thus, future long-term EUP demand will largely depend on the buying habits of larger utilities, both U.S. and non-U.S. alike.

**Volume 13
Issue 40**

Internet:
www.uxc.com

As published by
The Ux Consulting
Company, LLC

**Weekly
Ux Prices**

U₃O₈
\$9.80
(-0.10)

CIS U₃O₈
\$8.20
(Unch.)

NEWS BRIEFS

Criticality accident in Japan—On September 30, there was a criticality accident at the Tokaimura facility where fuel for Joyo, Japan's experimental fast breeder reactor was being processed. Three workers received severe exposure to radiation, while a number of others received some exposure.

The accident occurred when about 16 kilograms of uranium at an enrichment level of 18.8 percent U²³⁵ were transferred to a sedimentation tank designed for a much smaller volume of fissile material. While complete information is not available, it appears that a chain reaction was started, generating considerable heat, and steam carrying fission products into the environment. Recurrent criticality events may have occurred as the mixture cooled and reheated. What made the criticality event more likely was the large amount of uranium at an enrichment level much higher than is used in the commercial fuel cycle and the presence of water that facilitated the chain reaction.

Unfortunately, news media have not distinguished between the experimental breeder fuel processing at Tokai village involving uranium that was close to weapons grade (20% U²³⁵) and processing of ordinary reactor fuel which has enrichment levels of 5 percent or less, exciting unfounded fears about commercial facilities in the U.S. and Canada. There has not been a criticality event in a facility processing ordinary reactor fuel.

MSNBC Nuclear Energy Survey—While MSNBC.com users read the stories about the nuclear accident in Japan last week, the online service also allowed them to take part in a survey on nuclear power that it had started before the accident. The survey itself ended up on the website's Top 10 stories with more than 7,100 people answering the six questions asked. The results through Friday appear in the box above and the live survey can be accessed on MSNBC's web site at: http://www.msnbc.com/modules/surveys/032699_nuclearLong.asp

Connectiv selling nuclear stake to PSEG Power and PECO Energy—Connectiv Inc. has agreed to sell its interest in three nuclear power plants to PSEG Power and PECO Energy Company (PECO). Connectiv's ownership interests will be sold for approximately \$20 million, plus reimbursement of actual fuel inventory at closing. The deal is subject to receipt of various federal and state regulatory approvals.

Connectiv's 15 percent interest (328 megawatts) in Peach Bottom Units 2 and 3 will be sold in equal shares (7.5% each) to co-owners PSEG Power and PECO, each of which currently owns about 43%. PSEG Power re-

Nuclear Energy: A MSNBC reader survey

Twenty years after the accident at Three Mile Island, the use of nuclear power remains a controversial issue. Do you think nuclear energy is safe? Would you live near a reactor? Voice your opinions in our survey.

MSNBC reader responses (7,113 respondents as of 10/1/99)

- 1. Do you think nuclear energy is safe?**
60% Yes – 32% No – 8% Not sure
- 2. Do you think new plants should be licensed?**
71% Yes – 24% No – 4% Not sure
- 3. Would you live in a community with a nuclear power plant?**
52% Yes – 41% No – 7% Not sure
- 4. Are you satisfied that the industry has learned from Three Mile Island?**
54% Yes – 34% No – 12% Not sure
- 5. Do you believe government regulators can effectively monitor the nuclear industry?**
48% Yes – 41% No – 11% Not sure
- 6. Would you be willing to pay more for an energy-efficient society?**
64% Yes – 22% No – 14% Not sure

* Percentages may not total 100% for each question due to non-responses.

portedly agreed to pay \$5.1 million plus the book cost of nuclear fuel, estimated at \$12.4 million, for its 7.5% interest (164 megawatts) in the two units.

PSEG Power also agreed to purchase Connectiv's 14.8 percent interest (328 megawatts) in Salem Units 1 and 2, of which it currently owns about 43% interest. A five percent interest (52 megawatts) in the Hope Creek nuclear plant will also be sold to PSEG Power, increasing its ownership there to 100 percent. The company reportedly agreed to pay \$10.3 million for the Salem and Hope Creek interests plus nuclear fuel, estimated at \$32 million.

As part of the agreements, PSEG Power and PECO will assume full responsibility for the decommissioning of all three nuclear stations. The sale is scheduled to close by mid-2000.

Germany's VEBA and VIAG finalize merger plans—The boards of German utilities VEBA and VIAG met on September 26 to finalize plans for a \$14.6 billion merger to create Europe's second-largest electricity supplier. VEBA will contribute about 67 percent and VIAG 33 percent to the value of the merged company. The new company will have a new name, which will be announced in the next several months, and will be headquartered in Düsseldorf. The new energy group will result from the merger of PreussenElektra (VEBA)

NEWS BRIEFS cont...

and Bayernwerk (VIAG) and be headquartered in Munich. The new group will leap ahead of Germany's RWE AG, but still trail Electricité de France (EDF) in terms of electricity generating capacity in the European power market. EDF has been aggressively seeking to expand outside of France, purchasing London Electricity late last year, and German companies have come under pressure to consolidate to better compete.

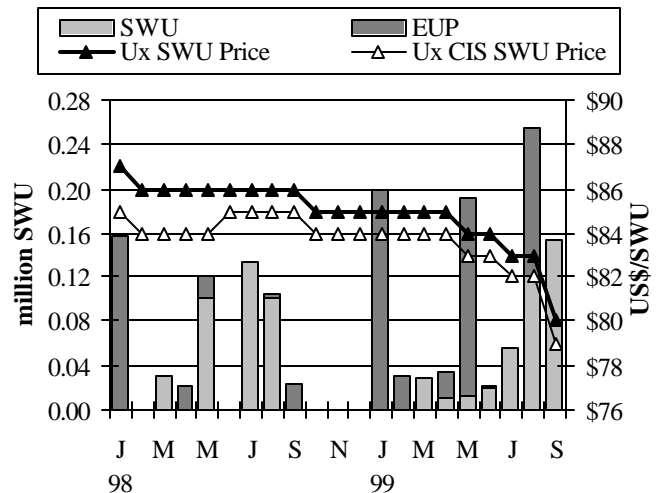
The companies' proposal reportedly calls for shareholders to vote on the merger early next year so that the new conglomerate could start business by mid-2000. The plan must be approved by the Bavarian state government, which owns 25.1 percent of VIAG. The state government wants to sell its VIAG stake by 2003, but also wants to protect VIAG's 20,000 employees in Bavaria. The merger also requires the approval of anti-trust authorities.

Slovakia and Bulgaria primed to shut down reactors in exchange for EU membership—

On September 28, Slovakia informed the European Union (EU) that it plans to shut down Bohunice Units 1 and 2 in another step to join negotiations for EU membership. According to EU spokesman Jean-Christophe Filori, Slovak officials to the European Commission said that the two VVER-440 reactors would close in 2006 and 2008, respectively. An agreement on nuclear reactor closures with Slovakia was a precondition to open formal membership talks. In support of the move, Filori said the Commission was prepared to provide financial aid to help meet the cost of closing down the two reactors.

In separate related news, Bulgaria has indicated that it may shut down Kozloduy Units 1 through 4 before their lifespans expire if the EU helps finance the action. The report did not reveal how much the shutdown would cost. The closure dates are to be negotiated in one month with the EU, and Bulgaria plans to build a new reactor to replace lost generation from the reactors slated

Ux Spot SWU Prices vs. Volume by Form



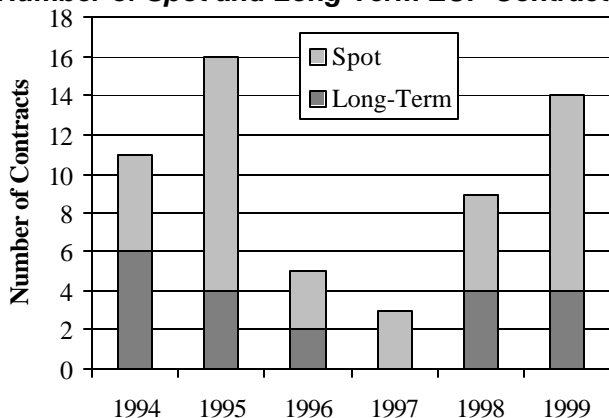
for shutdown. Bulgaria's Premier Ivan Kostov said the decision to shutdown the VVER-440s will be "made in accordance with our strategy and the financial support that we'll get."

Northeast Utilities pleads guilty to nuclear violations—

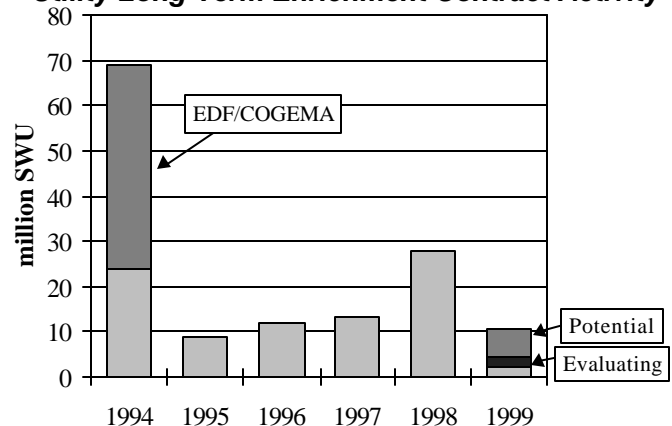
Northeast Utilities (NU) will pay \$10 million after two of its subsidiaries pleaded guilty to 25 felony counts of making false statements to federal nuclear regulators and environmental violations at the Millstone nuclear power plants in Waterford, Connecticut. The \$5 million to be paid by Northeast Nuclear Energy Co. is the largest civil or criminal penalty in the history of the commercial nuclear power industry. And, the \$5 million to be paid by the Northeast Utilities Service Co. is the largest criminal penalty ever to be paid in a Connecticut environmental case.

NU lied about the qualifications of 19 candidates seeking to become licensed operators of nuclear plants. The false claims came to light when six out of seven candidates for licenses at Millstone Unit 1 failed their exams administered by the Nuclear Regulatory Commission in Dec. 1996. In addition, NU violated the Clean Water Act by failing to report the routine dis-

Number of Spot and Long-Term EUP Contracts



Utility Long-Term Enrichment Contract Activity



NEWS BRIEFS cont...

charge of hydrazine into Long Island Sound. The company also violated the act by knowingly diluting the chlorine samples of its plant discharges with seawater.

Kazak EUP 'scope' inquiry extended—The U.S. Department of Commerce (DOC) has decided to extend to October 20 its deadline for deciding whether to conduct a 'scope' inquiry in determining if enriched uranium (EUP) in Kazakstan is subject to the Russian suspension agreement. On Sept. 21, DOC indicated it would need another 30 days to arrive at a decision.

Last week, USEC Inc. filed two complaints with the U.S. Court of International Trade. The first complaint argued that DOC was in error when it excluded "bypass" uranium in the scope of its decision on uranium from Kazakstan. In the second complaint, USEC claimed that the International Trade Commission (ITC) was also in error when it decided that imported Kazak uranium did not cause or threaten material injury to the U.S. industry.

Cameco to repurchase shares—Cameco Corporation announced Sept. 27 that it filed a notice of intention with the Toronto and Montreal stock exchanges to make a normal course issuer bid—allowing the company to purchase shares at market price with a stated limit over a defined period (one year). This is the first time Cameco has initiated such a purchase program since the company became public in 1991. The bid enables Cameco to buy up to 2,885,168 of its common shares, which accounts for 5% of the 57,703,374 issued and

outstanding common shares of the company. The period in which purchases can be made began on Thursday, Sept. 30, 1999 and runs through Friday, Sept. 29, 2000.

Ux Month-End Spot U₃O₈ Prices, Volume, Leadtime and Number of Transactions

| Month | Ux Price | | Volume | Average | # of Trans |
|---------|-------------------------------|--------|--|-----------------|------------|
| | U ₃ O ₈ | CIS | (mill lbs U ₃ O ₈ e) | Leadtime Months | |
| Oct '98 | \$9.25 | \$8.75 | 1.6 | 4.3 | 4 |
| Nov | \$8.75 | \$8.10 | 0.9 | 8.5 | 2 |
| Dec | \$8.75 | \$8.10 | 1.5 | 8.0 | 5 |
| Jan '99 | \$10.50 | \$8.75 | 3.8 | 7.9 | 16 |
| Feb | \$10.50 | \$8.75 | 0.8 | 11.0 | 4 |
| Mar | \$10.85 | \$8.50 | 3.6 | 8.5 | 6 |
| Apr | \$10.85 | \$8.50 | 1.9 | 7.1 | 7 |
| May | \$10.65 | \$8.50 | 1.5 | 10.0 | 5 |
| Jun | \$10.40 | \$8.40 | 2.5 | 5.3 | 11 |
| Jul | \$10.30 | \$8.20 | 1.1 | 5.0 | 2 |
| Aug | \$10.10 | \$8.20 | 2.7 | 9.3 | 5 |
| Sep | \$9.90 | \$8.20 | 0.6 | 3.0 | 2 |

September Spot Statistics

| | September 1999-YTD | |
|--|--------------------|-------|
| U ₃ O ₈ e Volume (million lbs) | 0.6 | 18.6 |
| # Transactions | 2 | 58 |
| Avg. Quantity | 0.3 | 0.3 |
| Avg. Leadtime (months) | 3.0 | 7.7 |
| U ₃ O ₈ | 0.3 | 10.2 |
| UF ₆ | 0.3 | 6.0 |
| EUP | 0 | 2.4 |
| U.S. Buyers | 0.6 | 9.2 |
| Non-U.S. Buyers | 0 | 9.4 |
| Non-CIS Origin | 0 | 11.9 |
| CIS Origin | 0.6 | 6.7 |
| Actual Demand Purchases | 0.6 | 17.8 |
| Discretionary Purchases | 0 | 0.8 |
| 1999 Delivery | 0.6 | 11.0 |
| 2000 Delivery | 0 | 7.6 |
| SWU Volume (000 SWU) | 154 | 970 |
| Conversion Vol. (000 kgU in UF ₆) | 115 | 4,634 |

Ux Price Definitions

The Ux Prices indicate, subject to the terms listed, the most competitive spot offers available for the respective product or service, of which The Uranium Exchange Company (Ux) is aware. The **Ux U₃O₈** price includes conditions for quantity, delivery timeframe, origin and location considerations while the **Ux CIS U₃O₈** price is the most competitive price for deliveries up to six months forward without regard to specific quantity or location. Both U₃O₈ prices are published weekly. The **Ux Conversion** price considers spot offers for delivery up to twelve months forward. The **Ux UF₆** value represents the sum of the conversion and U₃O₈ components as discussed above and, therefore, does not necessarily represent the most competitive UF₆ offers available. The **Ux SWU** price considers spot offers for deliveries up to twelve months forward. The Conversion, UF₆ and SWU prices are published the last Monday of each month.

The Ux Prices represent neither an offer to sell nor a bid to buy the products or services listed.

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THE MARKET

Uranium—The Ux Spot Price fell \$0.10 to \$9.80 per pound, as the restricted market is still searching for a bottom. The Ux CIS Price remained at \$8.20. A U.S. utility came out with a small EUP request last week, pushing the current number of active requests to six, involving almost 3.5 million pounds U₃O₈ equivalent, all but one of which can satisfied with purchases of EUP. One of these spot requests also has a long-term delivery option, bringing the current formal long-term activity to five utilities evaluating almost 8 million pounds.

In September, the industry average price (IAP) for the restricted market fell by \$0.21 to end the month at \$9.86 per pound. The Ux U₃O₈ Price fell \$0.20 to \$9.90 per pound. The TradeTech restricted price ended the month at \$9.75. The Nukem price range dropped to \$9.85-\$10.15 and the NuclearFuel price range in effect at the end of the month was at \$9.60 to \$10.00.

The unrestricted prices exhibited little movement during the month, with Ux, TradeTech, and NuclearFuel unchanged. Nukem reported the only change, with its price range dropping from \$8.20-\$8.45 to \$8.00-\$8.20. The unrestricted IAP fell slightly to \$8.18 per pound.

Conversion—Offers for conversion continued to be competitive last month, especially where UF₆ is involved. After receiving aggressive rebids to its original request, the U.S. utility seeking 86,000 kgU as conversion services has withdrawn. The Ux Conversion Price

fell last month to \$2.95 per kgU, breaking the \$3 barrier. The TradeTech price dropped to \$2.90. The Nukem price range was unchanged. The IAP fell \$0.09 to \$3.23/kgU.

Enrichment—One U.S. utility entered the market last week seeking over 20,000 SWU as EUP or SWU. With this addition, there are now four U.S. utilities actively pursuing spot requests of almost half a million SWU that can also be taken as EUP.

After falling slowly throughout the year, spot enrichment prices fell dramatically at the end of September with all three indices showing large drops. The Ux SWU and CIS SWU prices fell to \$80 and \$79 per SWU, respectively. This \$3 decrease in prices marks the largest single-month drop since Ux has started reporting spot SWU prices. TradeTech also recorded a \$3 drop in its restricted price down to \$81, and a \$4 drop in its unrestricted price to \$79. Nukem's upper price range fell \$6 to \$80. Its lower range fell to \$79, resulting in just a \$1 price span, the narrowest this range has been since November 1991. The resulting restricted IAP fell \$4 to \$80.33 per SWU and the unrestricted IAP fell \$3.67 to \$79 per SWU.

| Ux Spot Prices | |
|---------------------------------------|---------------|
| Weekly (10/4/99) | |
| U₃O₈ | \$9.80 |
| Quantities: 3-500,000 | |
| Delivery: 6 months | |
| Origin/Location: | |
| Open/U.S. convertor | |
| Non-CIS/All others | |
| Matched/Any location | |
| CIS U₃O₈ | \$8.20 |

| Industry Spot Prices | | | | | | | |
|---------------------------------------|-------------|-------|-------|-------|--------|--------|-------|
| | NuclearFuel | | NUKEM | | TRADE | Ux | Avg. |
| | Low | High | Low | High | TECH | | |
| Weekly (10/4/99) | | | | | | | |
| U ₃ O ₈ (\$/lb) | (10/4) | | | | (9/30) | | |
| Restricted | 9.50 | 9.90 | — | — | 9.75 | 9.80 | 9.75 |
| Non-restr. | 8.00 | 8.40 | — | — | 8.20 | 8.20 | 8.20 |
| Month-end (9/30/99) | | | | | | | |
| U ₃ O ₈ (\$/lb) | (9/20) | | | | | (9/27) | |
| Restricted | 9.60 | 10.00 | 9.85 | 10.15 | 9.75 | 9.90 | 9.86 |
| Non-restr. | 8.00 | 8.40 | 8.00 | 8.20 | 8.20 | 8.20 | 8.18 |
| Conversion (\$/kgU) | — | — | 3.20 | 4.50 | 2.90 | 2.95 | 3.23 |
| UF₆ (\$/kgU) | | | | | | | |
| Restricted | — | — | — | — | 28.40 | 28.82 | 28.61 |
| Non-restr. | — | — | — | — | 24.35 | 24.37 | 24.36 |
| SWU (\$) | | | | | | | |
| Restricted | — | — | — | 80.00 | 81.00 | 80.00 | 80.33 |
| Non-restr. | — | — | 79.00 | — | 79.00 | 79.00 | 79.00 |

Note: Definitions of these prices vary among companies. They are listed strictly for comparison purposes and are in U.S. dollars. Nukem's SWU price shows limits on its price range.

September Spot Market Activity



The Ghosts & President Clinton

One night, Bill Clinton was awakened by George Washington's ghost in the White House. Clinton saw him and asked, "George, what is the best thing I could do to help the country?" "Set an honest and honorable example, just as I did," advised George.

The next night, the ghost of Thomas Jefferson moved through the dark bedroom. "Tom, what is the best thing I could do to help the country?" Clinton asked. "Cut taxes and reduce the size of government," advised Tom.

Clinton didn't sleep well the next night, and saw another figure moving in the shadows. It was Abraham Lincoln's ghost. "Abe, what is the best thing I could do to help the country?" Clinton asked. "Go to the theatre," said Abe.