

# A look ahead at some fuel issues for 2010

BY RICK MICHAL

FOR A LOOK at fuel issues in 2010, we turned to Edward Kee, vice president of NERA Economic Consulting and a specialist in the electricity industry, including nuclear power. He has recently advised various parties involved in the development of new nuclear power plants on a range of topics, including financing and loan guarantees, nuclear fuel cycle, national nuclear infrastructure development, and nuclear project procurement. Before becoming a consultant, he was a merchant power plant developer and a nuclear power plant engineer.

Kee said that he expects that 2010 will bring little real change in nuclear fuel prices—currently around \$45 per pound  $U_3O_8$ —because there will be no real change in the nuclear fuel market's fundamentals of supply and demand.

Despite the global activity in developing new nuclear plants, Kee said, it will take a few more years before these new plants will be completed and will add to the demand for nuclear fuel. At the same time, he said, higher uranium spot prices over the past five years have stimulated uranium exploration and production and will likely result in modest increases in world uranium supply.

Uranium prices began to increase from long-term low levels in 2003. By 2007, uranium spot prices reached record levels—peaking at over \$135 per pound  $U_3O_8$ —as traders reacted to news stories about supply disruptions and potential demand growth. The flooding at the Cigar Lake and Ranger uranium mines in 2007 suggested major disruptions in supply at the same time that more than a dozen U.S. companies prepared to file applications for new nuclear plants with the Nuclear Regulatory Commission and as China's new nuclear power program moved forward.

“Traders saw uranium spot prices going up and indications that suggested higher spot prices in the future, and they bought

*Don't look for the spot price of uranium to change much in 2010, says an expert in the field.*



The National Enrichment Facility, located near Eunice, N.M., and operated by LES, is nearing completion. (Photo: LES)

uranium,” Kee said. This buying pushed spot prices higher until the bubble burst. It is telling, he added, that bankrupt Lehman Brothers had a half-million pounds of uranium on its books well after uranium spot prices had dropped. Also telling is that U.S. utility uranium purchases in 2007 were at prices well below the reported spot price.

Regarding uranium supply and demand around the world, Kee noted that India has been buying uranium since nuclear trade agreements were signed about a year ago. After years of operating its nuclear power plants with a shortage of nuclear fuel and little indigenous uranium, India appears to be building a stockpile of uranium.

China is also buying uranium and investing in uranium mines to ensure the availability of nuclear fuel for the new nuclear power plants it is building. “There will be a big demand from China for uranium as a result of its large nuclear power plant build,” Kee said. “China is going to be a major factor in the global nuclear fuel markets.”

Australia, a major uranium supplier, is rethinking its ban on sales of uranium to India unless India signs the Non-Proliferation

Treaty. Australia is allowing additional mines to be developed, with the potential to increase world uranium supply, and is also engaged in a debate about the use of nuclear power plants to limit carbon emissions.

Kee also talked about three new uranium enrichment plants that are being built or planned in the United States—LES's National Enrichment Facility in New Mexico (LES is a wholly owned subsidiary of Urenco), Areva's uranium enrichment plant in eastern Idaho, and USEC's American Centrifuge Plant (ACP) in Ohio. The LES and Areva plants will use Urenco's centrifuge technology. Once the LES and Areva centrifuge enrichment plants begin operation, Kee said, USEC's remaining inefficient gaseous diffusion enrichment plant in Paducah, Ky., may no longer be competitive.

A fourth new enrichment plant—one that would be built by GE Hitachi Global Laser Enrichment LLC in Wilmington, N.C.—would use a laser enrichment technology that Kee feels may be a bit farther away from commercial feasibility than the proven centrifuge technologies.

*Continued*

Much of USEC's current enrichment capability comes from its role in the international Megatons to Megawatts program under which high-enriched uranium (HEU) from dismantled Russian warheads is down-blended into low-enriched uranium (LEU) that USEC sells for use in commercial nuclear power plants in the United States. USEC acts as the executive agent for the U.S. government in this 20-year, \$8-billion program to make purchases from the Russian government entity Techsnabexport (TENEX). According to USEC, by the end of September 2009, 375 metric tons of weapons-grade HEU had been recycled into 10 868 metric tons of LEU, which is the equivalent of eliminating 15 000 nuclear warheads.

When this program ends in 2013, USEC hopes to have its new ACP in operation, according to Kee. The ACP has the potential to be competitive with the Urenco enrichment plants, or to be even "a little more efficient and a little cheaper" than the Urenco technology, Kee said. USEC, however, ran into problems in obtaining a Department of Energy loan guarantee for the ACP project in 2009. While the DOE postponed making a final decision on USEC's loan request until 2010, a loan guarantee for the ACP project is far from a sure thing. "USEC's future is tied to the ACP," Kee said. "If the ACP project does not get a DOE loan guarantee, USEC's future is uncertain."

On the other hand, if the ACP project proceeds along with the two other U.S. centrifuge enrichment projects, there may be a temporary oversupply of enrichment capacity until new U.S. nuclear power plants are completed, Kee said. While some new U.S. nuclear plants may be under construction by 2013, none will be completed until 2017 or later. Adding to the potential for U.S. enrichment overcapacity are GE Hitachi's laser enrichment facility, which may be in operation by 2014, and the direct sale of Russian LEU to U.S. nuclear utilities by TENEX after 2013.

Turning to the subject of spent nuclear fuel, Kee said that he considers on-site storage to be "safe, easy, and relatively inexpensive." If uranium prices go high enough, the reprocessing of spent nuclear fuel may be an economic alternative, and spent fuel may have value. Kee also noted that some fast reactor designs are able to burn spent light-water reactor fuel. "Given the potential value of used reactor fuel, putting whole fuel assemblies in the Yucca Mountain repository made little sense to me," he said.

Kee expects that uranium market fundamentals and prices should remain relatively stable in 2010. After the Russian HEU deal expires in 2013, however, and as new nuclear units around the world commence operation a few years later, the fundamentals of supply and demand may drive uranium prices up. **■**