KAZAKHSTAN'S URANIUM INDUSTRY AND NUCLEAR NONPROLIFERATION

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The opening of the International Uranium Enrichment Center in Angarsk, Russia in early December 2010 was a milestone in Kazakhstan's efforts to pursue a parallel policy of promoting peaceful nuclear energy while opposing nuclear arms proliferation. Kazakhstan's state-controlled nuclear complex, Kazatomprom, was a co-founder of the fuel bank concept along with Russia. Kazatomprom is likely to be a major beneficiary of the IAEA and western sponsored nuclear fuel bank idea, given that Kazatomprom has grown in just over a decade from its beginnings as a disorganized collection of inefficient and unprofitable Soviet-era mines and factories to become the world's largest producer of uranium ore for nuclear power reactors.

BACKGROUND: The uranium fuel bank brings to life the proposal advanced by Russia's Vladimir Putin in January 2006 to create a uranium fuel reserve to provide developing countries with non-discriminatory access to low-level nuclear fuel for power generation. The goal is to promote nuclear power while freeing countries from having to maintain a costly and hazardous full fuel cycle. Access to nuclear fuel for developing countries is not a new idea. It was part of the "Atoms for Peace" plan proposed to the UN by Dwight Eisenhower in 1953. But during the Cold War countries with advanced nuclear technology were hesitant to hand over the closely controlled technology to an independent international organization. The gathering technological and political sophistication of the International Atomic Energy Agency (IAEA), the end of the Cold War, the rising price of gas and oil, and the growing concern with reducing carbon emissions have combined with skyrocketing demand for energy resources in Asia to refocus attention on nuclear power.

The concept of a fuel reserve is important because it makes it possible to ensure access to nuclear fuel for electric power generating nuclear reactors while keeping the technology for uranium isotope separation — uranium enrichment — under international supervision. A very small proportion, less than one percent, of naturally occurring uranium is capable of sustaining the nuclear chain reaction that would fuel a nuclear explosive. Uranium enrichment is the key process. Producing high enriched uranium (HEU) on a large, industrial scale was one of the largest scientific hurdles in the historical development of nuclear weapons. But the same technology that produces HEU when used on lower scale produces low enriched uranium (LEU), the fuel used in the most common form of nuclear power reactor. Consequently, the technology that can derive the peaceful benefit from uranium for electric power generation is essentially the same as that which can be used for producing nuclear weapons.

The countries that developed the advanced technologies at the early stage of the nuclear history are well aware of the costs and dangers of the technology. No country is more aware of the dangers than Kazakhstan. The first Soviet nuclear detonation in August 1949 took place in Kazakhstan. Between that test and the end of

testing in 1991, Kazakhstan endured about 460 nuclear detonations. In his first official act as Kazakhstan's president in 1991, Nursultan Nazarbayev signed a decree permanently closing the country's nuclear testing range. Kazakhstan has become one of the leading countries in promoting both nuclear power and nuclear security.

IMPLICATIONS: Kazakhstan is a stakeholder in the opening of the nuclear fuel bank, holding 10 percent of the corporate shares. Kazakhstan will be a beneficiary of the control over nuclear materials if it succeeds in parlaying its mineral riches into a high-tech niche in world commodity markets. The International fuel bank itself is not likely to have much of a price effect on uranium because it is designed as a stop-gap measure to develop the nuclear power sector but avoid enrichment and spent-fuel reprocessing. The idea is that the country can be confident that it will not be politically manipulated in order to obtain nuclear fuel. According to the fuel bank arrangement, if a consumer country feels pressured out of the market it may apply to the IAEA to purchase the uranium fuel delivery at market prices.

While the fuel bank is not expected to have a price effect, rising demand for uranium on the international market is likely to bid up the price of commercial uranium ore and services. In the past, uranium was so closely held by national governments that its market value was at best a hypothesized shadow price. Information on uranium reserves, mining, conversion from pitchblend to uranium hexafluoride, fuel fabrication and spent fuel reprocessing was not commercially available. Prices gained more meaning as the Soviet Union disappeared. During the late 1980s uranium ore was priced at about US$ 18 per pound. In 1989 the price plunged to less than US$ 10 and remained there until 2004 when it began to rise and then with the rise in oil the uranium price skyrocketed to above US$ 136 per pound. It has since declined to US$ 62 per pound. Many traders expect uranium prices to hold steady or rise gradually in the future.

The traders' anticipations are based upon the interpretation of depressed prices in the past resulting from decommissioning large numbers of Soviet-era nuclear warheads. In 1993 the U.S. began purchasing blended-down weapons-grade uranium from Russia for use in U.S. nuclear reactors. Over the course of the program a total of 500 tons of blended LEU was marketed through the U.S. agent, USEC Corporation. The fissile material capable of 20,000 Soviet-era nuclear warheads supplied electricity to roughly ten percent of U.S. demand, which left the western uranium market depressed for two nearly decades. In 2013 this U.S. Department of Energy-sponsored "Megatons to Megawatts Program" is scheduled to come to an end as the Russian counterpart, Rosatom, will not renew the contract.

Uranium prices are also expected to rise due to rising demand. The nuclear industry has been experiencing a "renaissance" of public support for carbon-free nuclear electric energy. Popular anxieties that rose after the 1979 Three Mile Island accident and the 1986 Chernobyl accident have begun to fade as the rising demand for electric power has encouraged countries around the world to diversify into nuclear power. The World Nuclear Association, a producer-sponsored independent research organization, anticipates a steep increase in fuel demand in the years ahead. Worldwide, 441 nuclear power plants are now in operation and another 63 are under construction. Scores more are being discussed, most of which will be in Asia. Kazakhstan's uranium industry is rising to

(Reuters)

meet that demand. Kazatomprom was established only in 1997. It was pieced together from the remnants of the Soviet-era nuclear complex located in Kazakhstan. The early days of the industry were difficult as tight competition came from the technically proficient Russian uranium facilities. The main market obstacles came from protectionist policies in Europe and the U.S. That situation has now changed.

In Kazakhstan the uranium industry is seen as both commercial and strategic. Kazakhstan's government has taken direct control over the industry. Kazatomprom was pulled under the control of its new owner, Samruk Kazyna, Kazakhstan's sovereign wealth fund. Kazatomprom's production more than doubled in just a few years, making Kazakhstan the largest uranium ore producer in 2009. Kazatomprom management was changed. A wave of new deals brought in foreign partners as subsidiaries acting essentially as contractors rather than equity holders. This arrangement is designed to bring in foreign technical expertise but to do it in a way that the industry can be controlled for the managers' long-term purposes. For instance, Uranium One, a large Canadian-based mining firm was brought in to develop a number of Kazakhstan's underdeveloped mining sites. In late December 2010 a controlling interest in Uranium One was bought out by ARMZ (Atomredmedzoloto), a Russian government-controlled mining corporation. Rather than selling ownership shares, Kazatomprom has chosen the credit path, putting out a US$ 500 million Eurobond issue in May 2010 that was quickly scooped up in western credit markets.

CONCLUSIONS: Kazakhstan has assumed a leading position in nuclear nonproliferation efforts and in the uranium industry, and is a signatory to the Nuclear Non-Proliferation Treaty. It is a member of the IAEA and has signed the IAEA Safeguards Protocol and the IAEA Additional Protocol, committing it to stringent IAEA oversight, including comprehensive declarations, reporting, and site-access obligations. At the same time, Kazakhstan has emerged as the largest uranium producer in the world and is moving quickly to becoming a supplier of nuclear fuel and nuclear power services to countries around the world.

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