English for Negotiations
Week 1: Overview

The story of the US-South Korea nuclear deal begins here. Nuclear Energy. It powers about 10% of the world's electricity. Global population growth, climate change and overdependence on foreign oil are driving the case to increase nuclear power and spurring international cooperation and commerce in nuclear science and technology.

Proponents claim that nuclear energy is sustainable and clean because its contribution to carbon emissions in the atmosphere is minimal. Many nations are depending on it to meet the energy demands of their burgeoning populations.

However, there's a dark side to nuclear energy. We have no solution for dealing with the 250,000 tons of nuclear waste, nuclear energy's safety and security issues, or outlier states who might use their civilian nuclear energy programs to produce nuclear weapons. Negotiation tables around the globe are struggling to balance the world's need for energy and the dangers that nuclear energy poses.

In this course, you will learn the language of negotiation in the context of a bilateral, or two-way, dialogue between the United States and Republic of Korea, the ROK also known as South Korea.

The original agreement of 1956 has been superseded by the current Agreement, which was adopted in 1972 and amended in May 1974. It was set to expire in March 2014. However, in April 2013, both countries agreed to a two-year extension of the current agreement. The Obama Administration must consult with Congress on extending the existing agreement to ensure no interruption to ongoing cooperation and discussions. During this period, the United States and the ROK will continue negotiations to finalize a successor agreement.

Discussions on the successor agreement began on October 25, 2010, in Washington, DC. According to the US Department of State, Deputy Foreign Minister for Multilateral and Global Affairs Cho Hyun led the Korean delegation, and Department of State Special Advisor for Nonproliferation and Arms Control Robert Einhorn headed the US delegation. Both sides presented their positions and discussed the schedule and venue for continuing consultations for a new civil nuclear cooperation agreement. Both sides expected that the new agreement would ensure the continuance of their bilateral cooperation in atomic energy, which has been taking place for more than fifty years. The two sides also discussed a proposed joint study of options for disposing of reactor spent fuel, including pyroprocessing, a new technology under development. They agreed that technical experts would meet soon to work out the scope of the study and schedule for completing it."

By September 2012, the talks had stalled. According to an Arms Control Today article, the two sides were, and continue to be, at an impasse over Seoul's interest in developing full nuclear fuel cycle technologies, including uranium enrichment and reprocessing. Both these stages in the nuclear fuel cycle raise concerns about nuclear proliferation.

When uranium is mined, it contains about 0.7% of the isotope Uranium 235, or U-235. This isotope is responsible for sustaining a chain reaction—both in a nuclear reactor for nuclear energy and in a nuclear bomb. Most nuclear reactors require that the percentage of U-235 be increased to 3% or 5%--that is, enriched—in order to create a sustained chain reaction in the reactor. However, once a country has mastered the technology to enrich uranium to this level, it is very close to having the capability to enrich to more than 90% U-235, the level necessary to develop a nuclear bomb.

Nonproliferation experts are also concerned about another stage in the "closed" nuclear fuel cycle: reprocessing. After uranium has been used in a reactor for a number of years, it is removed and stored in pools of water to cool. This used fuel—also known as spent fuel—contains about 1% U-235, almost 1% plutonium and 4% fission products, which are highly radioactive. Reprocessing allows a country to recycle the fuel to be used again in the reactor, theoretically reducing the amount of waste that must be stored. However, a state can also divert the plutonium into a weapons program.

For example, North Korea's main nuclear reactor can potentially yield a maximum of 27–29 kilograms of plutonium. In 2006, it was estimated that North Korea could produce 0.9 grams of plutonium per thermal megawatt every day of its operations. The material required to make a single bomb is approximately four to eight kilograms.

South Korea wants to pursue a type of reprocessing known as pyroprocessing, which the ROK claims is significantly more proliferation resistant than conventional reprocessing. Some U.S. officials disagree with that claim, saying that pyroprocessing is the same as reprocessing. Seoul contends that pyroprocessing, a technique pioneered by U.S. national laboratories, does not yield a product suitable for nuclear weapons and should not be restricted in the same way that traditional reprocessing is. In particular, officials from The Korea Atomic Energy Research Institute argue that pyroprocessing should not even be considered reprocessing because South Korea does not plan to separate pure plutonium from spent fuel, as is done in traditional reprocessing, but to leave it mixed with other transuranic elements. Many U.S. officials and nonproliferation experts disagree with this assessment. They note that pyroprocessing provides only a "modest improvement in reducing the proliferation risk" and that a state aiming to separate out the plutonium to produce nuclear weapons would need a short timeframe to do so.[1] U.S. officials also believe that instituting safeguards to prevent future diversion of sensitive materials would be too difficult, and concerns remain that any relaxation of U.S. rules on this issue would harm Washington's global and regional nonproliferation efforts.[2]

Should South Korea begin developing a pyroprocessing capability, it would not only raise concerns about the production of plutonium, but it would also violate the Joint Declaration of South and North Korea on the Denuclearization of the Korean Peninsula. Under this joint declaration, "the Democratic People's Republic of Korea (DPRK) and the Republic of Korea (ROK) agree not to test, manufacture, produce, receive, possess, store, deploy, or use nuclear weapons; to use nuclear energy solely for peaceful purposes; and not to possess facilities for nuclear reprocessing and uranium enrichment." The US fears that South Korea's violation of this agreement would signal a green light for North Korea to continue pursuing its nuclear weapons program.

In the meantime, however, South Korea has two compelling reasons to pursue this technology. First, according to CNS experts writing for the Asia-Pacific Journal, as of 2010, its 23 nuclear reactors providing power to the South Koreans produced some 10,761 tons of spent fuel, which is 79 percent of its total storage capacity. It is expected that the Kori, Ulchin, and Yonggwang nuclear sites will all reach capacity by 2018.[46] By the end of the century (assuming the new planned reactors come online), the cumulative amount of spent fuel produced by South Korean reactors is expected to exceed 110,000 tons. In order to dispose of such a large amount of spent fuel in a single site, some South Korean experts have claimed that an underground repository (and an exclusion zone surrounding the site) would need to cover as much as 80-square kilometers, an area considerably larger than Manhattan.[47] With the small geographical area and dense population of South Korea, finding sites for underground storage is a major challenge, involving many stakeholders from the local populations who resist turning their homes into nuclear dump sites to the government which must find workable solutions. Nevertheless, Korea plans to complete 18 new nuclear power plants by 2030.

The other reason that South Korea wants to develop full fuel cycle capabilities is related to its goal of capturing 20 percent of the global nuclear reactor market, becoming the third-largest supplier of such technology. In 2009, a South Korean consortium was awarded a contract of some $20 billion to build four nuclear

[1] Robert Bari *et al.*, "Proliferation Risk Reduction Study of Alternative Spent Fuel Processing Technologies," BNL-90264-2009-CP, 2009. Further details are in section 4.1.9.

[2] Interview with senior U.S. government official, August 23, 2010. U.S. officials also believe that limitations on reprocessing under the 1978 Nuclear Nonproliferation Act and the North-South denuclearization agreement apply to pyroprocessing.

power plants in the United Arab Emirates. According to the World Nuclear Association, the South Korean Ministry of Knowledge Economy (MKE) “declared in January 2010 that it aimed to achieve exports of 80 nuclear power reactors worth $400 billion by 2030. "Nuclear power-related business will be the most profitable market after automobiles, semiconductors and shipbuilding," It said, adding that: "We will promote the industry as a major export business." South Korea is also marketing to Turkey, Jordan, Romania and Ukraine, as well as South East Asian countries. In addition to exporting reactors, it also plans to enter the $78 billion market for the operation, maintenance and repair of reactors.

The current U.S.-ROK nuclear agreement, which expires in 2014, does not allow South Korea to reprocess spent fuel. As the two sides negotiate a new agreement, Seoul hopes Washington will ease the restrictions. As part of the current negotiations for the new nuclear cooperation agreement, the U.S. and South Korea have agreed to examine ways to deal with South Korea’s spent fuel challenge. An ongoing joint study, which was agreed to in 2010 and formalized in 2011, is analyzing pyroprocessing and the development of safe and comprehensive ways of dealing with spent fuel.[3] While the study is supposed to consider a wide range of alternatives, overwhelming emphasis has been placed on the technical and economic feasibility and nonproliferation suitability of pyroprocessing.[4] The technology-sharing agreement is important for moving forward on the overall nuclear cooperation deal; however, from the US standpoint, even in the most optimistic scenario, pyroprocessing and the associated fast reactors will not be an available option for dealing with South Korea’s spent fuel on a large scale for several decades. Many observers say they expect to see more progress this year, after the U.S. and South Korean presidential elections.

[3] “South Korea, US agree to start joint study on nuclear fuel reprocessing,” Yonhap New Agency, April 17, 2011.

[4] “South Korea, US move forward on nuclear pact,” *Korea Herald*, 30 December 2012