

[SE3-OR-1] Spent Nuclear Fuel Issues in Korea

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Full Summary

The Republic of Korea was used as an example of how to deal with the universal dilemma of spent nuclear fuel management. Dr. Hwang Yongsoo with the Korea Atomic Energy Research Institute argued that nuclear energy is a “stable, not harmful solution” in meeting Korea’s energy demands, and is in turn, the “best solution.” He noted that the United States also faces the same problem of spent fuel management, which he claims, is why Korea wants to build comprehensive measures to deal with this problem. Dr. Hwang emphasized that Korea is not engaged in research and development with the U.S. for pyro-processing ambitions, but rather, to find a practical solution that can “secure energy security and provide the best methods in protecting the environment.” Therefore, he called for open dialogue that embraces two-way communication to addresses all areas of concern, which is what he claims is a key lesson learned from the Fukushima Daiichi nuclear disaster. Dr. Hwang outlined three areas of need with regards to recycling: 1. The need for “scientific evidence” that shows the safety of nuclear power plants and technical aspects, 2. The need for “authenticity” in explaining the reasons the benefits for not only scientists but for the general public, and 3. The need for “fairness” in comparing “option apple to apple” and the need to develop an international framework to deal with the pros and cons of the Korean solution.

Dr. Jorshan Choi with the Berkley Nuclear Research Center emphasized that the issue of used fuel is not only a Korean issue, arguing that every country operating commercial reactors will face the same problems. He pointed out that used fuel in Korea carries a “very important strategic aspect” in a domestic and international context. Dr. Choi noted that Korea’s 17 PWRs are what most people focus on because of the issue of reprocessing and recycling. He explained that four CANDU reactors use on-site dry casks so the problem is what to do with the 17 PWRs. As a country that has advanced technology and plans to build more reactors, Dr. Choi noted that Korea faces challenges as a PWR exporter. He further explained that Korea carries with it a strategic non-proliferation commitment and needs to address security concerns for reactors located in less stable regions that require special attention due to the security concerns associated with spent fuel. Dr. Choi also stressed that there is no “grave” in the “cradle to grave” concept while claiming that dry cask storage is merely a temporary home that brings with it domestic opposition. He argued that pyrochemistry may be the

option that works on the “grave” aspect while capitalizing on Korea’s technical skills. Dr. Choi proposed that Korea can assume leadership after it works with its customers to deal with storage in a regional setting and reassures final disposition.

Miles Pomper with the Monterey Institute discussed the advantages of a multinational approach to deal with Korea’s spent fuel. He explained that historically, there have been calls in the non-proliferation community to look at a multinational repository, based on the idea that the more countries monitor it the less likely a country will divert the materials. He further explained that it lessens the divide between the nuclear “haves” and “have nots.” Mr. Pomper pointed out that Korea faces political issues with the U.S. as well as domestic politics with regards to spent fuel. Mr. Pomper outlined some options Korea could take beginning with utilizing an interim storage facility at home with an interim storage facility overseas, which is an option he says is most preferred by the non-proliferation community. Another option would be to have a third country like France perform Purex reprocessing, but noted this to be an expensive process that does not resolve the issue of high level waste. Pomper says that the third option would be to build a multinational facility in Korea where one can look at various experiments on spent fuel management and disposal, but pointed out that details need to be hammered out including safeguards and what to do with the materials that come out of the facility.

Answering a question on the urgency for Korea and fast neutron reactors, Dr. Hwang explained that Koreans desire to know the final solution for energy security and safe management of spent fuel, which is why he claims Koreans are eager to talk about recycling and fast reactors. He claims that the storage option is a mere platform that is not eternal. He explained that Korea needs a “broader picture to show why Korea needs that kind of option (recycling) because traditionally, Westerners believe it’s expensive and has proliferation problems.” In other words, Dr. Hwang says a full roadmap is needed for not only storage but also for recycling and final disposition. Dr. Choi added that fast reactors are not readily available like light water reactors, which is the basis for the need to conduct further research.

Regarding a question about the enormous investment required for reprocessing and how to deal with used fuel in ponds that are not self-protecting, Dr. Hwang argued that there is “no best way to assure self-protection from a technical standpoint, but we need security culture development.” He explained that a “hardware approach might be good, but it might not settle all your worries, so we need to develop the 3S’s (safety, security, safeguards).” Moderator Charles McCombie with the Association for Regional International Underground Storage pointed out that he is most concerned about “50 new countries building one new reactor each.”

When asked how pyro-processing plays into exports, Dr. Hwang noted that pyro-processing is currently categorized as Research and Development so it has no relevance with the UAE deal with Korea. In other words, since the UAE deal is a commercial contract, pyro-processing cannot be applied. He further explained that Korea wants to become a global leader and develop a solution not only for Korea but for the rest of the world, pointing out that if the US takes back all the fuel, there would be no problem. Since that is not the case, Dr. Hwang argues that “if we [Korea] build this technique, we can build a political framework.” Dr. Hwang Il-Soon with Seoul National University from the audience stressed that many people overseas are “confused that the US-ROK deal is based on full consensus among the ROK,” but argues that Korean government agencies “do not all agree with each other.” He argued that R&D on pyro-processing is hopeless, which is “why international experts want to turn all high level waste into intermediate.”

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