

Policy Forum 97-05: Debating the DPRK-Taiwan Nuclear Waste Deal

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NAPSNet Policy Forum Online #3 -- Debating the DPRK-Taiwan Nuclear Waste Deal

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Northeast Asia Peace and Security Network

"Debating the DPRK-Taiwan Nuclear Waste Deal"

#3 -- March 21, 1997

The is intended to provide expert analysis of contemporary peace and security issues in Northeast Asia, and an opportunity to participate in discussion of the analysis. The Forum is open to all participants of the [Northeast Asia Peace and Security Network \(NAPSNet\)](#) . As always, NAPSNet invites your responses to this report. Please send your responses to the NAPSNet Coordinator at: napsnet-reply@nautilus.org .

DEBATING THE DPRK-TAIWAN NUCLEAR WASTE DEAL

Essay by Peter Hayes; discussion by Gordon Thompson and Peter Hayes

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I. Introduction

The recently announced deal between Taiwan and the DPRK to transport and store Taiwan's low-level nuclear waste in the DPRK has incited a storm of protest from South Korea and has sparked controversy throughout the region.

On March 4, NAPSNet distributed a commentary on this agreement by Dr. Peter Hayes, Co-Executive Director of the Nautilus Institute for Security and Sustainable Development and author of numerous published works on nuclear and security issues on the Korean peninsula. His essay departed from the largely political debate over the issue by introducing a technical dimension regarding the quantities and relative significance of the amounts of radioactive waste involved in the deal. In particular, Dr. Hayes suggested that there is a link between the way the ROK is handling the low level radioactive waste transaction on the one hand, and the implementation of the Agreed Framework and the transfer of light water reactors on the other.

On March 10, NAPSNet distributed a response to Dr. Hayes' commentary by Dr. Gordon Thompson of the Institute for Resource and Security Studies in Cambridge, Massachusetts, along with a reply by Dr. Hayes.

On March 14, the DPRK Mission in New York circulated Dr. Hayes' first essay with a cover note that attacked the ROK criticisms of the DPRK's deal to store Taiwan's nuclear waste, calling them "slandorous" and citing Hayes' article as providing a "correct" understanding of the issue. In response, the ROK Mission in New York reportedly plans to issue the original article with its own cover sheet. NAPSNet has not yet received this statement.

Due to the importance of this issue and the attention the original article has generated from both Korean governments, NAPSNet is re-issuing the original essay by Dr. Hayes, a new technical citation addendum, the response by Dr. Thompson, and Dr. Hayes' reply. We invite readers to form their own judgments as to the content and implications of the arguments.

II. Essay by Peter Hayes

MUCH ADO ABOUT LITTLE RADIATION

by Peter Hayes

The recent deal between Taiwan and North Korea to send some 200,000 barrels of low level radioactive waste to the DPRK for interim storage has become a major cause celebre. South Korea is opposed vehemently to the proposed deal. South Korean activists have traveled to Taipei and been arrested and deported. The South Korean government has issued strong statements against the trade, and called for a new law whereby states moving radioactive waste across borders must apprise other states which might be affected.

The issue is vexed in part because it allows the various parties to the dispute to posture politically, score points, and look good (or bad) without major risk that the confrontation could escalate into conflict. For Taiwan, it is a good way to resolve a domestic problem associated with heavy reliance on nuclear power since the mid-eighties. They really are short of space in Taiwan in which to store the stuff. Dealing with North Korea has become something of a growth industry for Taiwanese business, including trade in clothing manufacture and many other items with the North Koreans. It is also a way for Taiwan to thumb its nose at China by asserting its interests and prerogatives to make its own way in East Asia.

For North Korea, the issue is simple: they get a lot of money for storing the stuff. There is a lot of isolated territory in North Korea that is unusable for habitation or production. They do not have a problem with civil opposition to official government policies. Admittedly, the DPRK does not have a nuclear waste industry, and generally, its management of toxic and hazardous wastes is very poor. Often, these wastes are dumped into groundwater or mixed with municipal wastes in landfill outside the major cities. These poor practices do not augur well for the sound management of Taiwan's nuclear wastes in North Korea- but then, North Korea is struggling to survive economically and they have few other assets which attract fast cash.

For South Korea, there is genuine alarm on the part of the popular environmental groups and in the public at large. The issue is a two edged sword for South Korea, however. They can point to yet another dramatic negative development in North Korea which demonstrates yet again how evil is the regime north of the DMZ-which is useful at a time when Kim Young Sam is under great political pressure. But South Korea itself has a lot of low level-and much more high level-nuclear waste piling up, with nowhere to put it.

It is worth dwelling for a moment on some technical realities that bear on the policy implications of this issue.

Taiwan's first reactor started operating in 1977. Today, it has six power reactors with a combined capacity of 4.9 gigawatts of electricity. For its part, South Korea has 11 reactors on line with a combined capacity of about 9 gigawatts of electricity.

At a standard rate of 655 cubic meters of low level waste per year of operation of a gigawatt sized reactor (including crud produced in spent fuel as well as reactor operations), Taiwan today has about 90 percent of the accumulated low level waste as is found in South Korea. Specifically, we have calculated from the size of reactors and time when each came on line in each country that Taiwan today has about 45,000 cubic meters of low level waste, whereas South Korea has about 50,000. Thus, if Taiwan is to ship all of its cumulative low level waste from operating reactors to North Korea, the North will end up holding about the same amount (by volume) low level waste as South Korea.

This looks dramatic until put into perspective. Volume doesn't matter much when it comes to nuclear waste. Radioactive materials do. Each year, a gigawatt sized reactor generates about 600 million

curies of radioactive isotopes a year in the form of high level waste of a small volume. But, the combined radioactivity contained in South Korean reactor cores and spent fuel ponds is much bigger-about 150,000 times as much-than the low level waste which Taiwan plans to ship to North Korea.

The real issue in both North and South Korea is not low level waste, but high level waste in spent fuel ponds and in reactor cores.

In North Korea, the spent fuel from its small research reactor is being canned by combined teams of American and North Korean technicians, and eventually will be shipped out of North Korea. North Korea is not producing more radioactive waste today and will not produce more until KEDO completes the promised two light water reactors. At this time, North Korea has no more idea about what it will do with its high level nuclear wastes at that time than does the South, Japan, or any other state operating nuclear power plants.

Indeed, one of the assumptions of their original 1985 contract with the former Soviet Union was that the supplier would take back the spent fuel. In 1991, I asked a representative of North Korea's Ministry of Atomic Energy Industry what they planned to do with their nuclear wastes from their two indigenous nuclear power plants. He replied that they did not have a policy yet. Perhaps today they assume that the suppliers of the light water reactors will see it in their political-security policy to take the light water reactor spent fuel back, again relieving the North of the responsibility to store and ultimately dispose of the radioactive wastes.

Meanwhile, South Korea and Japan are generating ever-growing quantities of spent fuel at their reactors, where it is stored on site. Neither country has a technical solution for this growing problem, other than increasing the racking density of the on-site storage system. Each year, South Korea's 11 reactors generate about twenty thousand times as much radioactively toxic materials as all the low level waste from Taiwan to be sent to the DPRK.

South Koreans are right to be concerned as to whether the North has the technical and managerial capabilities to manage even low level radioactive wastes. But this same concern should also drive the South also to address the real source of radioactive risk-the vulnerability to attack and of accidental release of high level wastes and reactor cores at home in the South itself.

The South cannot have it both ways. If it wants to build light water reactors in the North, then it will have to help the North to create the institutional infrastructure needed to run the nuclear fuel cycle, including low and high level nuclear waste management to international standards.

If the argument in this commentary is correct--that the low level nuclear waste issue is blown all out of proportion relative to the real issue--spent fuel and reactor cores on both sides of the DMZ--then this whole episode reveals more about ROK ambivalence to deal with the full implications of transferring light water reactors to the North than it does about radiation hazards per se.

But if reduction of nuclear risks is the priority, then the focus of public discussion should be on how to reduce South Korea's dependence on an energy strategy which generates more and more high level radioactive wastes at home for which no technical solution exists.

III. Essay Addendum

The following references were used in the technical analysis underlying the preceding essay:

American Physical Society, "Report to the APS by the study group on nuclear fuel cycles and waste

management," *Reviews of Modern Physics*, volume 50, number 1, part II, January 1978.

US Energy Information Administration, "Nuclear Power Generation and Fuel Cycle Report 1996," DOE/EIA-0436(96), US Department of Energy, Washington DC, October 1996.

K. Lee, "Radioactive Waste," in J. Dennis, edited for Faculty Members at MIT, "The Nuclear Almanac: Confronting the Atom in War and Peace," Addison-Wesley Publishing Co, Reading Massachusetts, 1984, pp. 259-282.

IV. Response by Gordon Thompson

PUBLIC CONCERN ABOUT THE TAIWAN-DPRK RADWASTE DEAL: AN OPPORTUNITY

by Gordon Thompson

Taiwan is planning to ship a reported 200,000 barrels of low level radioactive waste to the DPRK, in a deal that may be worth 230 million US dollars. This deal has become a cause celebre in South Korea, and the ROK government strongly opposes the deal. Is this high degree of public and governmental concern justified? Can the concern be directed to productive purposes?

Peter Hayes of the Nautilus Institute has pointed out that the radioactive content of the Taiwan-DPRK shipment will be much smaller than the radioactivity that already exists in spent nuclear fuel and reactor cores in Taiwan, the ROK and elsewhere. Hayes has further pointed out that reactors, spent fuel stores and other nuclear facilities are liable to sabotage, armed attack or an accident, potentially leading to a large release of radioactivity. These points are valid. But, does it follow that public and governmental concern in the ROK is mis-directed, because it is focused on a minor threat while greater threats lurk in the background? I prefer to view the concern as an opportunity.

There are reasons to be concerned about international shipment of radioactive waste, including: (i) the potential for environmental contamination during shipment, or in the receiving country; (ii) the principle that richer countries should not exploit poorer, badly governed countries as dumping grounds; (iii) the potential for diversion of radioactive material to terrorist or military purposes; and (iv) the potential to mask illicit transfer of fissile material. An international regulatory regime is needed to address such matters. Parts of that regime are in place, but other parts do not yet exist. Creation of the missing parts is a worthy goal in itself, and public concern can promote the achievement of that goal.

In addition, people are surrounded by threats, big and small, ranging from nuclear proliferation to climate change. Too often, people and governments react to these threats by ignoring them. Thus, if people do take an interest in some threat, I believe that their interest should be welcomed, and opportunities for productive expression of that interest should be offered to them. In the case of the Taiwan-DPRK radwaste deal, public concern could be highly productive if it leads to strengthening of the international regulatory regime for radioactive and nuclear materials. That regime applies to a variety of threats, ranging from reactor accidents to misuse of fissile material. The regime needs strengthening in many ways.

V. Hayes Reply to Thompson

Gordon Thompson's points are well taken. And indeed, eventually it is inevitable that a global or regional regulatory regime will be established to deal with the low and high level radioactive wastes accumulated to date, as well as those which will be generated in the future.

As is well known, the various technical solutions to dealing with such wastes indefinitely in interim storage facilities, wherever they are located and whichever technology is used, all suffer from a fundamental flaw: the need for human management for tens and hundreds of thousands of years. In short, the institutional correlate of long-term storage is to create institutions of unparalleled longevity and power to protect the site.

The problem I was pointing is that South Korea is attacking this particular manifestation of this profound problem in ways which may undermine another important policy objective: the implementation of the US-DPRK Agreed Framework which, in turn, is the key to the achievement of nuclear non-proliferation goals in the Korean Peninsula, and arguably, the East Asian region.

As I said in my essay, I do not underestimate the challenge to the DPRK to manage these low level radioactive wastes. There are many indicators that toxic waste management in the DPRK is very poor by any standard. In one well known site outside Pyongyang, for example, a lead-acid battery factory has dumped its wastes down a well and contaminated the groundwater. However, cooperating with the DPRK to ensure that adequate standards are met and the requisite siting and management practices are in place would be a more productive approach to ensuring proper waste management practices are in place in the North as well as keeping the Agreed Framework intact, than attacking the DPRK for engaging in nuclear waste commerce.

Indeed, it is worth remembering that it was South Korea's President Park Chung Hee who originally proposed (in 1977, if I remember correctly) that Cheju Island in South Korea might serve as a regional radioactive waste repository. It is Japan which sends large quantities of plutonium around the world in concentrated form and has proposed seriously dumping high level wastes in torpedoes aimed at the seabed of the North Pacific. It is China and Russia and the United States which are toying with various schemes to ship high level wastes to continental Asian storage sites for a fee.

If, as Gordon Thompson suggests, the DPRK-Taiwan low level radioactive waste deal stimulates serious discussion and proposals for a regulated trade and a regional consensus as to how to deal with these wastes, fine--although the political obstacles to such regional cooperation on such a "hot" issue will make it extremely difficult to realize such a scheme in practice.

However, such proposals are premature, for two reasons. First, the natural proclivity of the state agencies responsible for such wastes--and their political masters--will be to put these wastes "out of sight, out of mind." In practice, this means in places and countries with isolated, geologically stable territory with low population densities, an adequate technological infrastructure, and no tradition of civil society opposing official policy. North Korea is an optimal site on these criteria. A necessary (but not sufficient) attribute of any sound radioactive management scheme is that it be subject to critical oversight by civil society. In the DPRK, there are no non-governmental organizations capable of independently monitoring and verifying that interim waste storage is being conducted properly. The same issue arises potentially with schemes to put the stuff in inner Siberia and China.

Second, if a regional scheme for nuclear waste storage is established in spite of all the obstacles, then it will encourage the growth of nuclear power in the region, and thereby the generation of more and more radioactively toxic materials. From an environmental perspective, it may be much safer to keep these materials well dispersed at reactor sites in storage ponds, rather than collect them all in one site, in order to minimize both transport hazards on the one hand, and the probability of a catastrophic release involving the spent fuel of many reactors on the other.

Thus, such multinational or regional nuclear waste storage schemes should be contingent to the creation first of a consensus that a non-nuclear energy future is preferable, and to adoption of energy plans to effect the transition away from dependence on nuclear power and to sustainable

energy futures -- thereby slowing and ultimately halting the further accumulation of nuclear wastes.

At that time, a global search for the safest site to store radioactive waste should be undertaken, with fair compensation to those willing to host such an intractable problem. The owners of this site will be in a position to charge a very large fee for this service because of the very long timelines involved in managing nuclear wastes. Such an arrangement should not be pre-empted by short term solutions or by going down the path of least resistance. The DPRK-Taiwan deal is not particularly helpful in moving in this direction. But nor is it very problematic in terms of the big picture of dealing with radioactive wastes.

Meanwhile, we have to avoid a second Korean war, along with the huge environmental consequences of such a conflict--including the likely targeting of spent fuel and reactors in North and South Korea. Thus, my argument that South Korea must attend to the full implications of creating a nuclear fuel cycle in the North-- which will endow the North with an adequate system to handle small amounts of radiation in low level waste; or admit that it does not intend to fulfill the commitments entered into under the KEDO. After all, radiation is radiation, whether it comes from Taiwan, or from a South Korean light water reactor transferred to North Korea.

In short, South Korea has to make up its mind.

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