

## The Denuclearization of North Korea: A Critical Analysis of the 1994 Agreed Framework

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### Abstract

*The denuclearization of North Korea, a formalized policy objective of the United States since the signing of the 1994 Agreed Framework, is Washington's singularly most important objective regarding Pyongyang. The Agreed Framework is an accord that provides North Korea two light-water reactors in exchange for the elimination of its capabilities to produce nuclear weapons. However, many debates have arisen over the soundness of this policy option.*

*The purpose of this paper is to assess the viability of the Agreed Framework as a policy option for achieving the permanent or long-term denuclearization of North Korea.*

*The evidence presented in this paper suggests that the Agreed Framework is an unacceptable denuclearization policy option for three reasons: (1) political and economic engagement is currently undesirable; (2) Light-Water Reactors (LWRs) produce fissile material that can be used to create nuclear weapons; and (3) LWRs cannot safely operate on North Korea's decrepit power grid.*

The United States embraces the nonproliferation of nuclear weapons as a vital national interest, and consequently, it aggressively applies its instruments of national power to prevent and deter the proliferation of nuclear weapons. In this endeavor the US has experienced varying degrees of success.

In 1992, during an International Atomic Energy Agency (IAEA) “full-scope safeguards inspection” at North Korea’s Yongbyon Nuclear Research Center, an IAEA team discovered that North Korea had secretly diverted reprocessed weapons-grade plutonium from its five-megawatt nuclear reactor. This discovery prompted North Korea to expel all the IAEA inspectors, cancel all safeguards inspections, and to submit a ninety-day letter of resignation signifying its intent to withdrawal from the Nuclear Nonproliferation Treaty (NPT). Consequently, the US was plunged into a crisis, as it sought to stop an assumed North Korean attempt to produce nuclear weapons.

Although initially unclear exactly how to resolve the crisis, because of the potential threat of a nuclear-armed North Korean regime the US understood the need for action. What followed, over the next two years, was a Clinton administration–led effort to convince Pyongyang to abandon its nuclear weapons program. In October 1994 the US and North Korea signed their first and only bilateral accord, the Agreed Framework.

This event was significant because of international concern over the capabilities of North Korea to separate nuclear weapons-grade plutonium from the antiquated graphite-moderated reactors that were part of North Korea’s efforts to develop a nuclear power program. At the Yongbyon Nuclear Research Center was a plutonium reprocessing facility, two operational graphite-moderated reactors, one five-megawatt electric reactor and one eight-megawatt research reactor, and under construction was one fifty-megawatt graphite-moderated reactor. At Taechon a 200-megawatt graphite-moderated reactor was under construction.

With the signing of the Agreed Framework, both sides agreed to

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The views expressed here are those of the author and do not represent the positions of the United States Army or the United States Government. This article is an extract from his MMAS thesis, which was presented at the Defense Analysis Seminar XI in Seoul Korea, April 29 – May 2, 2002.

cooperate to replace North Korea's two existing nuclear reactors and the two under construction with two light-water reactor (LWR) power plants. Additionally, agreements were made to provide 500,000 metric tons of heavy fuel oil (HFO) annually until the first LWR became operational, move toward full normalization of political and economic relations, and work together for peace and security on a nuclear-free Korean peninsula.

The Agreed Framework is in its eighth year. The LWR project, originally contracted for completion in 2003, is still many years from completion, HFO shipments are habitually delivered late, continued shipments are at risk, and economic and political normalization has not been addressed. Consequently, North Korea's reactor-based nuclear weapons program, though frozen, has not been dismantled. Additionally, because Pyongyang continues to prohibit international inspections, the IAEA is unable to confirm the status of North Korea's nuclear weapons program, and how much fissile material North Korea possesses. Therefore, these and other issues continue to place at risk the successful completion of the Agreed Framework—the US policy instrument for achieving the denuclearization of North Korea. Accordingly, the question of how the US should proceed in this endeavor, so as to effectively achieve this national interest, is one of great national significance.

### **The Agreed Framework Analyzed**

The Agreed Framework is neither a treaty nor a legally binding contract. Its purpose is to facilitate the mutual progress of both the US and North Korea through a series of quid pro quo agreements. For the US, the overarching purpose of this agreement is to eliminate North Korea's ability to manufacture nuclear weapons (denuclearization). For North Korea, the principal objectives are to obtain LWR technology and to establish diplomatic and economic relations with the US. Although there would be no legal ramifications were the US to either alter or abandon the Agreed Framework, any action taken without the consent of North Korea would likely result in a breach of trust, undermining both this agreement and the ability to negotiate any future agreement. The analysis of this policy option centers on obstacles that might prohibit the

completion of the Agreed Framework, where such obstacles may exist, possible options that would not require an amendment to the Agreed Framework, or those that might be considered.

On December 13, 2001, I asked Ambassador Thomas C. Hubbard if the Agreed Framework was achieving its intended purpose. He stated, "The Agreed Framework was designed to freeze North Korea's existing nuclear program, and it has done that." He went on to discuss how there are yet a number of unresolved issues, such as IAEA inspections, dismantling of the nuclear reactors, and the relinquishing of the canned fuel rods.<sup>1</sup> In line with Ambassador Hubbard's statement, it is important to understand that when the Clinton Administration wrote the Agreed Framework, it was only intended to address North Korea's efforts to proliferate nuclear weapons. Specifically, the immediate focus of the agreement was the elimination of Pyongyang's weapons-grade plutonium production capability, which was to be followed by North Korea's recommitment to the NPT. Re-embracing this treaty would also precipitate the renewal of IAEA led full-scope safeguards inspection, a process that would verify North Korea's holdings of weapons-grade plutonium (Pu-239) and ensure the cessation of all nuclear weapons production capabilities. Additionally, the Agreed Framework obligated Pyongyang to commit to the North-South Joint Declaration on the Denuclearization of the Korean Peninsula and to begin an era of reciprocity with South Korea.

### ***Planning Assumptions for the Agreed Framework***

Larry Nicksch, Asian Affairs Specialist for the US Congressional Research Service, in 1995 identified three assumptions that the Clinton administration used when developing the Agreed Framework. In a paper prepared for the International Workshop on the US-South Korea Alliance, Nicksch stated the following:<sup>2</sup>

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1 Thomas C. Hubbard, "Korea of the future: An update on US-Korean relations, new economic opportunities, Korea in the Asian region," Speech delivered for the International Relations Council and the Korea Economic Institute, December 13, 2001, in cooperation with the University of Kansas, the Korean-American Society of Greater Kansas City and the World Trade Center of the Greater Kansas City Chamber of Commerce (Kansas City Missouri: The Westin Crown Center).

Behind the Administration's [Agreed Framework] policy lies a layer of assumptions concerning North Korea's motivations and its future. One assumption emphasizes the defensive nature of North Korea's actions. Pyongyang, it is argued, acts out of fear of being dominated by South Korea even when it commits egregious acts. . . .

Another set of assumptions stresses the inevitability of future change in North Korea. Such change, Administration and State Department officials believe, will improve the security situation on the Korean peninsula and will render relatively unimportant the questions of North Korea's past plutonium and atomic bomb production and the implementation of Pyongyang's obligations related to inspections, fuel rod removal, and dismantlement of nuclear installations. [This] set of assumptions stresses the inevitability or high likelihood of North Korea instituting economic reforms and opening up to the outside world. . . .

The third variation is the most far reaching: the North Korean regime faces a certain collapse and will be replaced by a more reasonable successor. . . .

Looking at these assumptions eight years after the Agreed Framework was signed, the second and third seem to be invalid. First, the death of Kim Il Sung in 1994 was not the catalyst for much change, and it did not lead to a disintegration of the North Korean government. Rather, it simply initiated the nation's first, peaceful transition of national power. Second, North Korea, rather than opening its economy to the world, has become a "beggar nation." Third, North Korea shows few signs of becoming a responsible member of the international community.

Because the planning assumptions have yet to be validated, it is plausible to infer that the Agreed Framework, as a policy option, is a questionable or weak way to achieve the US main policy objective—the permanent or long-term denuclearization of North Korea. In fact, this analysis suggests that the Agreed Framework cannot be fully implemented and thus cannot achieve its main objective. In particular, it appears impossible for the US to do what the Agreed Framework

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2 Larry Niksch, *The Agreed Framework: View from Washington* (Carlisle, PA: US Army War College, Strategic Studies Institute, 1995), p. 9.

commits it to do. If the assumptions underlying an agreement have been shown to be false, and the agreement itself cannot be implemented, there is reason to question continued reliance on that agreement as a way to achieve the policy objectives it was originally designed to reach. The findings are articulated in the next several paragraphs.

### ***Elimination of North Korea's Nuclear Weapons***

Articles One, Three, and Four of the Agreed Framework are specifically designed to achieve the critical policy objective of eliminating North Korea's nuclear weapons program. Article One has a short-term focus, emphasizing first the freezing of specified nuclear reactors and facilities followed by their eventual dismantling. Article Four takes the long-term approach by eliminating North Korea's nuclear weapons program through comprehensive IAEA full-scope safeguards inspections. Article Three of the Agreed Framework calls for "both sides to work together for peace and security on a nuclear-free Korean peninsula," which includes "steps to implement the North-South Joint Declaration on the Denuclearization of the Korean Peninsula." This Joint Declaration, which was finalized on January 20, 1992, was more stringent than the IAEA safeguard requirements. It contained a commitment by both North and South Korea not to manufacture, possess, store, or acquire nuclear weapons; it also prohibited either side from having nuclear reprocessing or uranium enrichment facilities. However, since late 1992, the North-South Joint Declaration has been dormant because of Joint Declaration-related disputes that resulted in the cancellation of inspections by the Joint Nuclear Control Committee.<sup>3</sup>

Many factors have delayed the implementation of the Agreed Framework, one of which was North Korea's initial rejection of Korean Electric Power Company as the LWR contractor. Further complications have delayed the LWR program to the point where the first reactor building is not scheduled for construction until August 2002,<sup>4</sup> eight years after the signing of the Agreed Framework.

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3 Michael J. Mazarr, *North Korea and the Bomb: A Case Study in Nonproliferation* (New York: St. Martin's Press, 1995), p. 87.

4 Marc Vogelaar, *The Future of KEDO*, p. 1, available at <http://www.kedo.org/future.htm>.

In addition to problems constructing the LWRs, KEDO has also faced hurdles in delivering the agreed 500,000 tons of HFO annually to North Korea. Since the beginning, this task has been plagued by funding resistance from the US Congress. In accordance with the Agreed Framework, the US has the principal responsibility for paying for this oil, and, given the size of the US federal budget, these expenditures constitute a relatively small amount of money. However, because Congress is skeptical of the Agreed Framework and considers it a form of appeasement, it has delayed funding for nearly every shipment. Increases in the cost of HFO have also added to Congress' disdain of the Agreed Framework. Congressional unhappiness is sure to increase in the future because the cost of safely storing, shipping and disposing of North Korea's spent fuel rods, and dismantling North Korea's existing nuclear facilities will likely bring total US expenditures under the Agreed Framework to more than \$1 billion.<sup>5</sup>

Another set of problems has to do with inspections. Despite the spent fuel rods at Yongbyon having been canned, they have yet to be inspected or disposed of properly. The dismantling of the frozen reactors and facilities are contingent on the completed construction of the first LWR. Completion was originally planned for 2003, but various project delays have precluded the LWRs from being completed until no earlier than 2009.<sup>6</sup> Finally, the long-term assurance of North Korea's cessation of its nuclear weapons program requires the IAEA to complete its comprehensive full-scope safeguards inspections. According to the original time line, these inspections were to be completed in 2003 along with the completion of the LWR project, but since these inspections are connected to the completion of the first LWR, these inspections are not likely to be completed any sooner than 2009.

As the IAEA requires three to four years to complete its full-scope safeguards inspections, KEDO has demanded that North Korea allow IAEA inspectors to begin their work now.<sup>7</sup> North Korea is denying access

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5 Joel Wit, "Viewpoint: The Korean Peninsula Energy Development Organization: Achievements and Challenges," *Nonproliferation Review* (Winter), p. 67.

6 *Tokyo Shimbun*, December 29, 2001.

7 It took the IAEA over three years to complete inspections of South Africa's nuclear program, a country that was cooperative with the Agency. Henry D. Sokolski, *Neglected Steps: The AF's Nonproliferation and Nuclear Safety Provisions*

to IAEA inspectors based on the wording of the Agreed Framework, which states that “when a significant portion of the LWR project is completed, but before delivery of key nuclear components, North Korea will come into compliance with its safeguards agreement.”<sup>8</sup> From North Korea’s perspective, since only preliminary work has been completed, its position is justified under the terms of the *Reactor Supply Agreement*. Besides Pyongyang’s right to refuse inspections under the agreement, it is likely that their unwillingness to allow inspections is fed by a fear that “early” compliance with safeguard provisions will leave KEDO with no incentive to complete the project. KEDO, on the other hand, has two worries. The first concern is that billions of dollars will be wasted if the project nears completion and North Korea resists becoming safeguard compliant. The second concern is that if inspections are not initiated soon, there will be a long delay between the completion of the nuclear reactor and delivery of the key nuclear components,<sup>9</sup> ultimately extending the cost of the overall project.<sup>10</sup>

Another obstacle to completing the Agreed Framework is the requirement contained in the *KEDO-DPRK Reactor Supply Agreement* for North Korea to, “assure that appropriate nuclear regulatory standards and procedures are in place to ensure the safe operation and maintenance of the LWR plants.”<sup>11</sup> However, because of the decrepit state of North Korea’s power grid, the LWRs could not be operated safely.

### ***Nuclear Regulatory Standards and Procedures and DPRK Problems***

The two nuclear regulatory standards that principally cover the safe

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(Washington DC, 2001), p. 2, available at <http://www.wizard.net>.

8 A significant portion of the LWR project, referenced in Article III(c) of the Reactor Supply Agreement is defined in Annex 4 of the same. Holistically speaking the definition of the term requires completed construction of the turbine building, and reactor building and containment structure to the point suitable for the introduction of components of the nuclear steam supply system.

9 Wit, “Viewpoint,” p. 67.

10 This concern is a little suspect. If the first LWR will not be completed until 2009, logically inspections could be initiated in 2006 and still be completed by the time the LWR is completed.

11 See KEDO-DPRK Reactor Supply Agreement, Articles I(3) and X(3-4).



operation of the KEDO-constructed LWRs are the IAEA Convention on Nuclear Safety (INFCIRC/449), dated July 5, 1994, and the US Nuclear Regulatory Commission Standard Review Plan (NUREG-0800) Revision-3, dated July 1983. The IAEA safety standard requires nations with nuclear reactors to: (1) “establish and maintain a legislative and regulatory framework to govern the safety of nuclear installations,” and (2) “establish or designate a regulatory body to enforce the established national safety standards.”<sup>12</sup>

The Nuclear Regulatory Commission safety standard, however, goes beyond IAEA measures—it is both descriptive and prescriptive. For example, it mandates that in order to be operated safely a nuclear power plant must be connected to two offsite power systems (also referred to as preferred power systems). Specifically, Nuclear Regulation-0800, Chapter 8.2, states the following in regard to the criteria for safety-related electric power systems for nuclear power plants:<sup>13</sup>

The primary objective . . . of the preferred power system, is to determine that this system satisfies the acceptance criteria . . . and will perform its design functions during plant normal operation, anticipated operational occurrences, and accident conditions. . . .

[T]he offsite power system[s] [must have the] capacity and capability to permit functioning of structures, systems, and components important to [the nuclear power plant’s] safety. . . . The preferred power system consists of two physically independent circuits routed from the electrical grid system by transmission lines to the onsite power distribution system. The . . . grid stability [must show] that loss of the largest generating capacity being supplied to the grid . . . will not cause grid instability. . . .

[T]he independence of the two circuits is [so] that both electrical and physical separation exists to minimize the chance of simultaneous failures. . . .

A power grid, as referred to above, should contain multiple power

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12 International Atomic Energy Agency, *Convention on Nuclear Safety: Information Circular/449* (Vienna, 2000), p. 4.

13 United States Nuclear Regulatory Commission, *Standard Review Plan: Nuclear Regulation (NUREG) 0800* (Washington DC: Office of Nuclear Reactor Regulation, 1983), pp. 1, 4, 9.

stations with no single reactor's generating more than 10–20% of an electric grid's power. Otherwise the whole system may be threatened due to unexpected power outages.<sup>14</sup> Currently, North Korea's total generating capacity is only 1.7 GW,<sup>15</sup> less than the total amount of power that both LWRs combined will provide to the power grid. According to Dr. Von Hippel of the Nautilus Institute, North Korea's power grid is too small, regardless of its condition, to safely operate the KEDO reactors without first connecting it to the power grid of a neighboring country.<sup>16</sup> There are also technical issues associated with the operation of nuclear reactors under conditions where frequency fluctuations requiring reactor shutdown often occur.<sup>17</sup> Furthermore, a nuclear reactor is usually operated as a base-load plant and cannot be quickly powered up or down to follow peak demand cycles.

North Korea has neither the money nor accessible resources to build an adequate power grid in which to operate a LWR, KEDO lacks the funds, and the US has stated it will not assist North Korea in this endeavor.

The final obstacle, and the one that appears to have been most dependent upon the aforementioned planning assumptions, is the capability of a LWR to manufacture weapons-grade plutonium (Pu-239). According to an analysis conducted by the Lawrence Livermore National Laboratory, the LWR, in its first fifteen months of normal operation, will produce more than 300 kilograms of weapons-grade plutonium, enough to build sixty implosion warheads.<sup>18</sup> Likewise Dr. John Holdren of Harvard University, in 1989, reported that in one year a 1 gigawatt (1,000-megawatt) LWR could produce between 200 and 250

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14 David Von Hippel and Peter Hayes, *DPRK Energy Sector: Current Status and Scenarios for 2000 and 2005* (1997), p. 13, available at <http://www.nautilus.org>.

15 *Dong-a Daily News*, September 29, 2000.

16 David Von Hippel, et al., *Modernizing the US-DPRK AF: The Energy Imperative* (2001), p. 3, available at <http://www.nautilus.org>.

17 When a reactor must be taken off-line quickly (as when the electrical frequency varies too greatly from design parameters), control rods must be inserted into the reactor core to "quench" the nuclear chain reaction. If the combination of several of these control rods are not inserted properly, and the more frequently reactors must be shut down, the more probable this event becomes; then the chain reaction could continue, with the possible results being an overheating of the reactor core.

18 Sokolski, *Neglected Steps*, p. 4.

kilograms of reactor-grade plutonium, enough for at least thirty to forty bombs.<sup>19</sup>

There are, however, according to the Council for Nuclear Fuel Cycle at the Institute for Energy Economics in Japan, certain factors that complicate creating nuclear bombs with reactor-grade plutonium, which are:<sup>20</sup>

The use of reactor-grade plutonium complicates [nuclear] bomb design for several reasons. First and most important, Pu-240 has a high rate of spontaneous fission, meaning that the plutonium in the device will continually produce many background neutrons. Second, the isotope Pu-238 decays relatively rapidly, thereby significantly increasing the rate of heat generation in the material. Third the isotope Americium (Am) 241 (which results from the 14-year half-life decay of Pu-241) emits highly penetrating gamma rays, increasing the radioactive exposure of any personnel handling the material.

Notwithstanding the challenges presented by these additional isotopes, the aforementioned institution and others, like the Committee on International Security and Arms Control of the National Academy of Sciences, and Dr. J. Carson Mark, former director of the Theoretical Division at Los Alamos National Laboratory from 1947 to 1972, have stated that it is not appreciably more difficult to design a weapon using reactor-grade plutonium vice weapons-grade plutonium.<sup>21</sup> In addressing the aforementioned challenges, the Committee on International Security and Arms Control of the National Academy of Sciences stated the following:<sup>22</sup>

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19 One bombs worth of reactor-grade plutonium is 7 to 10kg. John Holdren, "Civilian Nuclear Technologies and Nuclear Weapons Proliferation," *New Technologies and the Arms Race* (New York: St. Martin's Press, 1989), pp. 182–85.

20 Council for Nuclear Fuel Cycle, *Can Reactor Grade Plutonium Produce Nuclear Fission Weapons?* (Japan: Institute for Energy Economics, 2001), p. 6, available at <http://www.cnfc.or.jp/reports/rep0105e.html> (internet accessed on March 7, 2002).

21 "In practice, at all burn-up levels and at any time following discharge, the critical mass of reactor-grade plutonium metal is intermediate between that of Pu-239 and Pu-240, which is more reactive than weapons-grade uranium; reactor-grade plutonium can be brought to a supercritical—and hence, explosive-state by any assembly system that can handle U-235." Vogelaar, *The Future of KEDO*, p. 115.

[Although] Pu-240 will set off the reaction prematurely. . . . Calculations demonstrate, however, that even if pre-initiation occurs at the worst possible moment (when the material first becomes compressed enough to sustain a chain reaction), the explosive yield of even a relatively simple device similar to the Nagasaki bomb would be of the order of one or a few kilotons.<sup>23</sup> Regardless of how high the concentration of troublesome isotopes is, the yield would not be less. With a more sophisticated design, weapons could be built with reactor-grade plutonium that would be assured of having higher yields. . . .

The heat generated by Pu-238 and Pu-240 requires careful management of the heat in the device. Means to address this problem include providing channels to conduct the heat from the plutonium through the insulating explosive surrounding the core, or delaying assembly of the device until a few minutes before it is to be used. . . .

The radiation from Americium-241 means that more shielding and greater precautions to protect personnel might be necessary when building and handling nuclear explosives made from reactor-grade plutonium. But these difficulties are not prohibitive.

If such opinions are valid, coupled with North Korea's past resistance to various inspection regimes, it does not require much analysis to hypothesize a situation where, following the transfer of the LWRs, North Korea could expel the IAEA inspectors and then operate the LWRs for the distinct purpose of creating nuclear weapons. If such a scenario were to occur, adherence to the Agreed Framework would not only have brought harm to the long-term regional security of Northeast Asia, it also would have created a more volatile situation than the one that induced the crisis of 1994 and led to the signing of the Agreed Framework in the first place.

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22 Committee on International Security and Arms Control of the National Academy of Sciences, "Making a Bomb Using Plutonium from a Power Reactor," *Management and Disposition of Excess Weapons Plutonium* (National Academy Press, 1994), pp. 32–33, available at [http://www.ccnr.org/reactor\\_plute.html](http://www.ccnr.org/reactor_plute.html) (internet accessed on March 7, 2002).

23 The Nagasaki bomb was 22 kilotons and was exploded at a height of burst of 1,640 feet. The Hiroshima bomb was 12.5 kilotons and was dropped at a height of burst of 1,670 feet.

Because of the potential for any nuclear reactor to be misused as a source for producing fissile material, US law prohibits the transfer of nuclear components to unreliable agents. Specifically, the US Atomic Energy Act of 1954, amended in 1978, prohibits transfer of nuclear material if a non-nuclear-weapons state has (1) detonated a nuclear device, (2) terminated or abrogated IAEA safeguard inspections, (3) violated the NPT, or (4) tried to make nuclear material for weapons purposes.<sup>24</sup> North Korea has violated three of the four conditions stipulated by this statute. Though the US president, with Congressional consent, can waive the provisions of this law,<sup>25</sup> it is difficult to imagine either of them doing so, given the fact that the transfer of LWRs to a “hostile” country is paramount to providing it an increased capability to produce nuclear weapons.

### ***Normalization of US-DPRK Relations***

Article Two of the Agreed Framework, states that the US and North Korea “will move towards full normalization of political and economic relations.” Though small strides have been made, much work has yet to be done in this area. Currently, neither diplomatic relations nor liaison offices have been established between the two countries. This is clearly one of the most necessary steps in the entire agreement, yet it continues to be the most neglected.

Since the planning assumption that envisioned the North Korean government’s becoming more open and reasonable has yet to be validated, continuing to try to implement the Agreed Framework may not

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24 Nuclear Nonproliferation Act, US Code, 1978, Vol. 1, Sections 129, 138.

25 “[If] the president determines that cessation of such exports would be seriously prejudicial to the achievement of the United States nonproliferation objectives or otherwise jeopardize the common defense and security: Provided, that prior to the effective date of any such determination, the President’s determination, together with a report containing the reasons for his determination, shall be submitted to the Congress and referred to the Committee on Foreign Affairs of the House of Representatives and the Committee on Foreign Relations of the Senate for a period of sixty days of continuous session, but any such determination shall not become effective if during such sixty-day period the Congress adopts a concurrent resolution stating in substance that it does not favor the determination” (1954 Atomic Energy Act, Chapter 11, Section 129).

be the best approach. But if this agreement is to succeed, actions need to be taken to create the security environment that the assumptions were originally predicated upon. Perhaps, through positive engagement with North Korea, a positive security environment can be created on the Korean peninsula.

A major initiative to engage North Korea was begun following the inauguration of South Korean President Kim Dae-jung in 1998. This was his so-called Sunshine Policy of reaching out to North Korea. The fruits of this policy have been harvested in inter-Korean trade, cultural events, and bilateral visits and talks. The apogee of President Kim's Sunshine Policy occurred during a head-of-state three-day summit, which took place in Pyongyang from 13 to 15 June 2000. This historic event was the impetus for many other significant developments to include the on going construction of a trans-peninsula transportation corridor.<sup>26</sup> In addition to the June 2000 Summit, there have also been many high-level bilateral meetings, to include the inter-Korean Defense Ministerial talks in September of 2000. In 2001, the ROK provided North Korea with over \$120 million in aid,<sup>27</sup> and during this same period inter-Korean trade reached \$402.9 million.<sup>28</sup>

The good will created by President Kim's Sunshine Policy made possible a visit to Pyongyang by Secretary of State Albright in October 2000. There she met with Chairman Kim Jong-il in the highest level meeting yet held between the US and North Korea. An intended follow-on visit by President Clinton was canceled when the Democratic Party lost the presidential election in November 2000. Following the inauguration of President George W. Bush in January 2001, US-North Korea relations have deteriorated to the near 1994 crisis levels. In late 2001 President Bush repeatedly called upon North Korea to eliminate its weapons of mass destruction capabilities. On 29 January 2002, during his State of the Union Address, President Bush identified North Korea, Iraq, and Iran as state sponsors of terror, categorized them as an "axis of evil," and then circuitously threatened preemptive military action against them.<sup>29</sup>

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26 The South Korean portion of the project is complete but the North Korean portion has not started.

27 *Joong Ang Ilbo*, July 5, 2001.

28 *Chosun Ilbo*, January 9, 2002.

29 George W. Bush, *The President's State of the Union Address* (Washington, DC: The

I will not wait on events, while dangers gather. The United States of America will not permit the world's most dangerous regimes to threaten us with the world's most destructive weapons. . . . We can't stop short. If we stop now—leaving terror camps intact and terror states unchecked—our sense of security would be false and temporary. History has called America and our allies to action, and it is both our responsibility and our privilege to fight freedom's fight.

If the success of the Agreed Framework is predicated upon a relationship of trust between Washington and Pyongyang, the worsening of relations between the US and North Korea does not bode well for the Agreed Framework's achieving its goals. Perhaps opening capital-city liaison offices could renew the process of building trust in the relationship, a process already conceived of in the Agreed Framework. Movement toward establishing diplomatic relations, and the dual objective of Article Two, the normalization of economic relations with North Korea, a major policy objective of Pyongyang, might also help make the Agreed Framework work. Since January 20, 1988, the US designation of North Korea as a state supporter of terrorism has effectively disqualified North Korea from receiving monetary aid from international financial institutions such as the Asian Development Bank, the World Bank and International Monetary Fund. Additionally, for fifty years, presidents of the US, upholding the Trading with the Enemy Act, have enforced economic sanctions against North Korea. This situation, coupled with such internal problems as irrational central planning, flooding and drought, has perpetuated North Korea's low gross domestic product, which in 2000 was estimated to be \$22 billion.<sup>30</sup>

In 2000, North Korea's per capita gross domestic product was \$1,000, a drop since 1989.<sup>31</sup> This drop in the economy was precipitated in part by the collapse of the Warsaw Pact and the Soviet Union between 1989 and 1991. Sixty percent of North Korea's trade in 1989 was with Warsaw Pact countries. Much of that trade was in bartered goods, and the collapse necessitated the use of hard currency after 1991. Heavy flooding in 1995

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White House, 2002), available at <http://www.whitehouse.gov>.

30 CIA, *The World Factbook—Korea, North* (Washington DC), available at <http://www.cia.gov/cia/publications/factbook/geos/kn.html>.

31 Ibid.

and 1996 and a drought in 1997, followed by lesser floods and droughts up through this year, have all exacerbated the economic decline. Clearly, North Korea's economy is in trouble.

As a militaristic society and in spite of its economic hardships, North Korea perpetuates a defense budget that consumed, in 1999, 6.2 percent of its gross domestic product, or \$1.36 billion.<sup>32</sup> To reverse this type of spending is going to take a long-term exposure to a better way, such as a free-market economy, and perhaps some coaxing and cooperation from outside nations, particularly the US, South Korea, Japan, and China.

Some exposure to a better way is beginning to occur on various fronts. As mentioned, high-level US–North Korea and South–North Korea bilateral talks have occurred. Since January 2000 sixteen nations have established diplomatic relations with North Korea.<sup>33</sup> Additionally, KEDO has become a forum for exposing North Korea to accepted norms of international business practices, while concurrently providing opportunities for thousands of North and South Koreans to work, socialize and to build trust in their relations. Hence, regardless of the outcome of the Agreed Framework, these experiences will most certainly serve as positive influences for change.

### The Agreed Framework Evaluated

Strategic planners, in evaluating policy options, often use the three criteria of feasibility, acceptability, and suitability. They makeup what is commonly referred to as a FAS test. These terms are defined in Joint Publication 1-02, the *Department of Defense Dictionary of Military and Associated Terms*, as follows:

Feasibility—The determination of whether the assigned tasks could be accomplished by using available resources.

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32 Ministry of National Defense, *Defense White Paper*; ROK (Seoul, 2000), p. 48.

33 Nations establishing diplomatic relations were Italy (January 2000), Australia (May 2000), UK (December 2000), Netherlands and Turkey (January 15, 2001), Belgium (January 23, 2001), Canada (February 6), Spain (February 7), Germany (March 1), Luxembourg (March 5), Greece (March 8), Brazil (March 9), New Zealand (March 26), Kuwait (April 6), EU (May 14), Bahrain (May 23). Source, [www.korea-np.co.jp/pk/173rd\\_issue/2001122609.htm](http://www.korea-np.co.jp/pk/173rd_issue/2001122609.htm).



Acceptability—The determination whether the contemplated course of action is worth the cost in manpower, material, and time involved; is consistent with the law of war; and militarily and politically supportable.

Suitability—The determination that the course of action will reasonably accomplish the identified objectives, missions, or tasks if carried out successfully.

Taken together, these criteria provide the framework used in this paper to determine the viability of this policy option for achieving the verifiable end of North Korea's nuclear weapons program.

### ***Feasibility Test***

For the Agreed Framework to be feasible, the US, its KEDO partners, and North Korea would have to be both willing and able to allocate all required funds necessary to meet each nation's respective obligations. For KEDO, this includes the cost of building the LWRs, delivering HFO, and safely disposing of the 8,000 spent fuel rods from North Korea's five-megawatt GMR. North Korea must repair its power grid so that the LWRs will be able to operate safely, and dismantle its GMRs and their associated facilities.

In 1995, KEDO accepted the financial cost of the Agreed Framework. However, because of the delays in executing the Agreed Framework, the original LWR cost estimates of \$4 to \$4.5 billion are likely to increase significantly. In 1995, Nicksch suggested that as a result of inflation, cost overruns and North Korean requests for a one billion dollar grant to repair its power grid, total project costs could double.<sup>34</sup> Already since the signing of the Agreed Framework the US has spent \$331 million for KEDO. With the exception of \$25.7 million that was spent on canning the fuel rods, nearly all of the money has been used to pay for HFO shipments to North Korea.<sup>35</sup> Assuming the first LWR is completed in 2009 and the US expenditures to KEDO remain constant with its 2002 payment of \$95 million, the cost to the US over the next seven years will

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34 Nicksch, *The Agreed Framework*, p. 2.

35 USDOS Congressional Budget 1995–2002.

be \$665 million. Given the large federal budget, it is feasible that the US will be able to meet its financial obligation under the Agreed Framework.

Seoul, however, has yet to decide how to raise \$3.22 billion, its share of the \$4.5 billion LWR project.<sup>36</sup> In 1999, the government issued bonds worth \$131 million to fund the preparatory construction, and had planned to raise another \$222 million during 2000, though the National Assembly disapproved that plan. If the cost of the LWR project doubles and the percentage of cost sharing remains the same, the South Korean government will have to raise \$6.44 billion, a prohibitively expensive cost that is unlikely to be accepted by either South Korean taxpayers or by international capital markets.

North Korea's inane economic system, lack of foreign exchange, and diminutive federal budget impinge on its ability to repair its decrepit power grid, or to build the two independent offsite power circuits that are required by contract for the emergency operation of LWR safety equipment. Consequently, North Korea may not be able to achieve nuclear safety standards of the US and the IAEA, a necessary requirement for the final delivery of the LWRs. Consequently, if North Korea is either unable or unwilling to finance a power grid refurbishment project, it is also unlikely that it would be willing to finance the dismantling of its GMRs and related facilities.

If the cost of the LWR project doubles, it will be infeasible to accomplish the Agreed Framework. Even if one assumes that the cost of the project will not increase substantially, as long as North Korea is held responsible for financing the refurbishment of its power grid, it is plausible to expect that financially it either will not or cannot meet its obligations; therefore, the Agreed Framework is financially infeasible.

### ***Acceptability Test***

The US and North Korea have shown varying degrees of commitment to the Agreed Framework over the past eight years. North Korea has frozen its GMRs and related facilities, and permitted its spent fuel rods to be canned. The US and KEDO have begun work on the LWR project and have delivered annual shipments of HFO. However, these

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<sup>36</sup> *Korea Herald*, June 9, 1998.

are only preliminary actions and are insufficient to achieve the denuclearization of North Korea. Pyongyang's actions are reversible and the US-KEDO actions appear to be delaying tactics. Distrust between the two parties appears to be the roadblock that stalls further progress; notwithstanding, North Korea has extracted residual benefits because of the Agreed Framework that have netted it millions of dollars in international aid and trade. It is uncertain how long these residual benefits alone will continue to pacify North Korea, thereby keeping it from reinitiating its nuclear weapons program.

The Agreed Framework is unacceptable for three reasons: (1) political and economic engagement is currently undesirable; (2) LWRs produce fissile material that can be used to create nuclear weapons; and (3) LWRs cannot safely operate on North Korea's decrepit power grid.

Firstly, as of January 2002, both the US and North Korea appear unwilling to engage. However, this freeze in the relationship has only occurred since President Bush took office in January 2001. Former Secretary of State Albright's visit to Pyongyang in October 2000 was indicative of a mutual willingness to engage. However, Pyongyang's continued willingness to engage has been stymied by President Bush's hard-line approach, causing a strain in the relationship that is crippling future, short-term engagement opportunities. If the Agreed Framework is to succeed, the US must put aside any preconceived conditions for normalizing diplomatic and economic relations, and begin the normalization process now, an essential confidence-building measure. Though the Agreed Framework is designed to effect this normalization process, it has yet to accomplish it. Since the regime change that was anticipated has not occurred, the only viable alternative way to establish such a relationship is through engagement. With both sides apparently not willing to move forward quickly to achieve this goal, the acceptability of fully implementing the Agreed Framework is clearly in question.

Secondly, LWRs produce plutonium that can be used in making nuclear weapons; this issue is closely tied to the first issue. Because of the possibility to misuse LWRs, the transfer of this technology must be based upon a relationship of trust—which is built over time—through political and economic engagements. Because the US has always been concerned about the misuse of spent LWR fuel, it included in the *KEDO-DPRK Reactor Supply Agreement* the requirement for North Korea to “relinquish

any ownership rights over the LWR spent fuel and agree to the transfer of the spent fuel out of its territory as soon as technically possible after the fuel is discharged, through appropriate commercial contracts” (VIII(3)). The contract itself is insufficient to prevent North Korea from expelling IAEA inspectors and reprocessing spent LWR fuel to create nuclear weapons if it so desired. Hence, the US does not currently trust North Korea to possess nuclear reactors. Therefore, the US finds it unacceptable to progress further with building the LWRs until North Korea begins the process of achieving compliance with the IAEA full-scope safeguards agreement; even then it is unlikely that the US or KEDO would still be willing to build the LWRs.

Thirdly, LWRs cannot safely operate on North Korea’s power grid. This issue was a concern that KEDO addressed in the *KEDO-DPRK Reactor Supply Agreement*. As a stipulation to transferring LWRs to North Korea, the supply agreement states: “the DPRK shall assure that appropriate nuclear regulatory standards and procedures are in place to ensure the safe operation and maintenance of the LWR plants. . . .” [in accordance with a] “set of codes and standards equivalent to those of the IAEA and the US” (Articles X(3) and I(3)). However, since North Korea has not yet repaired its power grid so that it can achieve minimum LWR operating safety standards, the transfer of LWRs to North Korea is unacceptable. Likewise, it is financially unacceptable for KEDO to build the LWRs until a solution to this issue has been resolved.

Because of the regulatory stipulations that govern the transfer of key nuclear components to North Korea, the potential exists for discord to arise between the US and South Korea. As the LWR project is delayed, so is North Korea’s responsibility to repay KEDO the cost of this project.<sup>37</sup> Since North Korea’s power grid does not meet regulatory safety compliance, it is possible that this problem could eventually be the final issue that holds up completion of the LWR project. If the reactors are never brought on line, whatever money has been spent will be lost, and South Korea, saddled with 70 percent of the project cost, will lose the most. If perchance the US abandons the Agreed Framework it would likely lose

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37 Once the reactors are completed and handed over to North Korea the DPRK will repay KEDO the cost of the project, interest free, over a 20-year term (see Appendix 4, Article II).

some political capital, as well as financial capital. Lastly, KEPCO, South Korea's state owned energy company, sees this construction project as a step towards future contracts for building other reactors throughout the world. Therefore, the potential exists for South Korea to attempt to pressure the US into transferring the key nuclear components, regardless of North Korea's regulatory compliance, another issue that is potentially confrontational.

### ***Suitability Test***

The Agreed Framework is in its eighth year, a remarkable feat considering that no other US policy instrument has accomplished this much progress with Pyongyang. Even so, the initial planning assumptions of the Agreed Framework were wrong. Primarily, the assumption that the North Korean regime would be replaced by a more reasonable successor who would reform the government and improve the security environment of the Korean peninsula has not yet occurred.

The Agreed Framework has been delayed by no fewer than six to seven years, or nearly twice its intended duration. Certainly, if US policymakers placed stock in their initial assumption that a political implosion of North Korea was likely during this period, delaying the project made some sense. However, since an implosion no longer appears likely, the real threat is that the Agreed Framework will break down and not achieve the denuclearization of North Korea, or that project delays will provide North Korea the time to covertly develop nuclear weapons, more than if there had been no agreement. If this greater nuclear weapons development turns out to be the case, then the current short-term gain of regional security would have been achieved at the expense of longer-term global security.

The Agreed Framework is an unsuitable policy option for denuclearizing North Korea. In fact, rather than creating an environment that reduces North Korea's ability to produce nuclear weapons, the LWRs, a plutonium generating system, if transferred, will significantly increase its capability to produce such weapons. Nuclear reactors and their technology should only be transferred to trustworthy, reliable partners. Since the US does not trust North Korea to operate its graphite-moderated reactors for fear that it will divert plutonium for use in building nuclear

weapons, the transferring of LWRs is incomprehensible. The same controlling agency used to regulate the one would be used to regulate the other, the IAEA.

Given time and a committed effort by both parties, it is plausible, though unlikely in the near future, that the Agreed Framework could act as a conduit for building trust within US–North Korea relations. Confidence-building measures are the only way that any denuclearization agreement is going to achieve its end state. Some basic confidence-building measures that should be initiated include: (1) establishing regular communications between nations, such as opening capital-city liaison offices, (2) holding regular staff talks and conferences, (3) conducting regular senior diplomat and military officer counterpart visits, (4) normalizing economic trade relations, and (5) conducting meaningful humanitarian work inside North Korea. As these type of meaningful confidence-building measures take hold, mutual trust will begin to develop and the chasm of distrust that exists between the US and North Korea will begin to shrink. Until this occurs, it is unrealistic to expect that an action as complicated as denuclearizing North Korea could happen. Hence, the results of this analysis suggests that, given the current political direction of the US coupled with the aforementioned obstacles, the Agreed Framework is an unsuitable policy option for achieving the permanent or long-term denuclearization of North Korea.

## **Conclusion**

The denuclearization of North Korea, a formalized policy objective of the US since the signing of the 1994 Agreed Framework, remains the singularly most important objective of Washington regarding Pyongyang. However, because of inaccurate planning assumptions in developing the 1994 Agreed Framework, namely that Pyongyang was facing an imminent implosion, the advisability of providing LWRs to North Korea has come into question. In 1999 Washington, in reaction to a North Korea ballistic missile test, unilaterally attached to a provision in the Agreed Framework the demand for North Korea to eliminate its long-range ballistic missile programs. Then, in 2001, Washington, vexed by perpetual delays in the Agreed Framework, requested a meeting with Pyongyang

to discuss a host of security concerns that included the proliferation of nuclear, biological and chemical weapons, long-range missiles, and the reduction of its military force. That meeting has yet to occur, and President Bush's characterization of North Korea as a member of an axis of evil in January 2002 has done little to advance the cause of engagement or NPT objectives in North Korea.

The security problems caused by Pyongyang will certainly not just go away. Therefore, if the US is to achieve the permanent or long-term denuclearization of North Korea, it needs to follow an effective policy. What an effective policy should be has certainly been hotly debated; however, in light of the issues presented in this paper, the 1994 Agreed Framework is not the solution.

There are three main problems with the Agreed Framework. The first problem is that the transfer of LWRs to North Korea is supposed to reduce its ability to produce nuclear weapons, but in actuality the converse is true. North Korea relinquishes its GMRs, with a capability to produce enough fissile material to build thirty nuclear bombs annually,<sup>38</sup> for two LWRs that collectively produce enough fissile material to produce sixty to one hundred nuclear bombs annually—a 50 to 70 percent increase in capability. The trust required for North Korea to operate its GMRs without diverting plutonium to build nuclear warheads is the same trust that is required to operate LWRs. Since the US does not trust North Korea to operate its GMRs, it does not and should not trust North Korea to operate LWRs.

This matter of trust is the second problem with the Agreed Framework; in fact, it would be the central problem of any agreement with North Korea. Since the Bush administration assumed office in Washington, the aversion that the US has with engaging North Korea has become more pronounced. The Agreed Framework relies upon a relationship of mutual trust to be successful, but current trends indicate that there is little desire to pursue such efforts. Until relationships of trust are forged between the US and North Korea, no LWR transfer agreement will succeed.

Thirdly, so long as the LWRs are unable to operate safely on North

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38 Leon V. Sigal, "Disarming Strangers: Nuclear Diplomacy with North Korea," (New Jersey: Princeton University Press, 1998), p. 91.

Korea's power grid, it is unsafe, and consequently prohibited by law, to transfer LWRs to North Korea. The success of the Agreed Framework is predicated on the transfer of the LWRs to North Korea. Hence the Agreed Framework is unsuitable for achieving the denuclearization of North Korea.