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How light water reactors figure into negotiations with North Korea

North Korea badly needs energy assistance and has long wanted it in the form of light water reactors, creating a potential bargaining chip in the next round of discussions with Pyongyang.

BY JEFF GOLDSTEIN

IN THE FACE OF NORTH KOREA'S INTENSIVE AND PROVOCATIVE campaign to force the world in general, and the United States in particular, to accept Pyongyang as a nuclear power, the Obama administration has continued to insist that its goal remains to achieve "complete and verifiable denuclearization of the Korean peninsula." It is no longer clear if Pyongyang is willing to return to the negotiating table on the basis of the same formula as in the past: simultaneous steps toward North Korea's denuclearization and normalization of political and economic relations between Pyongyang, Seoul, Tokyo, and Washington. Thus, at this point, U.S. policy makers must focus on convincing Pyongyang that provocations will not get it what it wants—namely a U.S. guarantee not to pursue regime change while the transition from Kim Jong Il's rule is starting to play out.

At the same time, the new U.S. administration must be clear about what it is willing to offer North Korea in exchange for it relinquishing its fissile materials—including those that have already been weaponized—and accepting the intrusive verification measures necessary to assure the outside world that Pyongyang has in fact given up its entire nuclear stockpile. Even before North Korea's recent nuclear and missile tests, the difficulty of this task was underscored by the fact that Pyongyang had yet to carry through on its promise to provide a full accounting of its past nuclear activities.

In deciding what carrots to offer Pyongyang, the Obama administration must decide how it will carry out a major commitment made by the previous U.S. administration at the fourth round of the Six-Party Talks in September 2005—to provide energy assistance to fuel-starved North Korea. The joint statement issued after

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those talks made North Korea's preference clear: "[North Korea] stated that it has the right to peaceful uses of nuclear energy. The other parties expressed their respect and agreed to discuss, at an appropriate time, the subject of the provision of a light water reactor to [North Korea]." To drive the point home, the day after the statement was issued, the North Korean Ministry of Foreign Affairs issued a statement of its own: "The basis of finding a solution to the nuclear issue between [North Korea] and the [United States] is to wipe out the distrust historically created between the two countries and a physical groundwork for building bilateral confidence is none other than the U.S. provision of light water reactors to [North Korea]. We strongly demanded that the [United States] remove the very cause that compelled [North Korea] to withdraw from the [Nuclear Non-Proliferation Treaty] by providing light water reactors to it."

In determining whether or not to offer light water reactors (LWRs) to North Korea, as the Clinton administration did in the 1994 Agreed Framework, U.S. policy makers will need to address numerous questions—first and foremost, does providing LWRs still make sense from a nonproliferation viewpoint. Because although LWRs are proliferation resistant, they are not proliferation proof.

Critics of the Agreed Framework have argued that, in terms of proliferation concerns, it would have been better to offer Pyongyang conventional, fossil fuel-based power plants. They note that such plants also would be advantageous to North Korea since they could produce electricity more economically than LWRs and take less time to build. Conventional plants also would give North Korea more flexibility in procuring fuel supplies—oil and coal are available from a wider range of suppliers than the enriched uranium fuel for LWRs. Moreover, conventional plants would not require the massive and expensive upgrade to North Korea's decrepit electricity grid that would be necessary to accommodate a large, 1,000-megawatt LWR of the type pledged by Washington in the Agreed Framework.

And yet, in spite of the undoubted economic superiority of conventional power plants, both in the mid-1990s and in 2005, Pyongyang insisted that the United States provide it with LWRs. Clearly, North Korea considers LWRs more than just a source of much-needed electricity generating capacity. Rather, the demand appears to be part of a long-term strategy aimed at assuring regime survival by engaging Washington and trying to draw it into a more positive relationship. As noted earlier, the North Korean Foreign Ministry stated in November 2005 that Pyongyang sees LWRs as the "physical groundwork" for "building confidence between the two countries." Or, as a group of eminent international

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scholars concluded shortly after the 2005 joint statement was issued, “[North Korea] seeks a security relationship with the United States, and it will not let go until it achieves this goal. We believe that this is the reason for [North Korea’s] insistence on continuity with the past—that the United States must lead the provision of

the LWR, as in the Agreed Framework—an approach also blessed by [former leader] Kim Il Sung and therefore highly legitimate inside the [North Korean] polity.”¹ It is also likely that by becoming a member of the nuclear club largely through its own efforts, North Korea has a significant amount of pride invested in continuing its nuclear program in one form or another. And pride always has been a significant motivating factor in Pyongyang’s calculations.

When North Korea first raised the possibility of receiving LWRs from the United States in 1993, the appeal to Washington was clear. Spent fuel from natural uranium-fueled reactors (such as North Korea’s gas-graphite reactor) contains a high concentration of Plutonium (Pu) 239, the isotope of plutonium most desirable for producing nuclear weapons. An enriched uranium-fueled LWR, however, produces greater concentrations of the isotopes Pu 240 and Pu 241, which are less desirable for bomb-making. In addition, while North Korea’s gas-graphite reactor was fueled with domestically mined natural uranium, Pyongyang does not have the facilities to produce enriched uranium fuel for a LWR. Thus, by proposing to switch to a LWR program, North Korea seemed to be indicating a willingness to play by the international community’s rules. (Despite this, Pyongyang later may have explored the option of developing enrichment facilities.)

But the situation has changed significantly since the 1990s. Most importantly, Washington failed to prevent North Korea from becoming a nuclear weapons state. In addition, after 20 years of on-again, off-again construction, it seems clear that the two gas-graphite reactors North Korea began building in the late-1980s will never be completed. And pursuant to an agreement reached at the Six-Party Talks, Pyongyang has taken steps to disable its one operational reactor, spectacularly blowing up the cooling tower in June 2008. Although North Korea is threatening to rebuild the facility, U.S. experts believe it would take at least several months for Pyongyang to put the reactor back into operation. According to Siegfried Hecker, a former director of the Los Alamos National Laboratory, once operational, the reactor could produce about one Bomb’s worth of plu-

onium each year for at least several more years. Hecker did note, though, that the reactor and associated facilities were having technical problems before they were shut down: “The fluorination part of the fuel fabrication facility had corroded so badly that the building was abandoned. . . . [N]o new fuel has been fabricated since 1994.”² Over time, such problems could limit North Korea’s plutonium production capacity even if Pyongyang decides to refurbish and restart the reactor.

In trying to divine North Korea’s motives in insisting on receiving LWRs, U.S. officials also should recall that politics in North Korea, as in every other country, are as much or more about institutional interests as policy options. North Korea has a sizable and prestigious nuclear power establishment that has selfish reasons for wanting to preserve some type of nuclear power program. In addition, LWRs would leave North Korea with at least a theoretical capacity to create more plutonium for nuclear weapons, which might appeal to the country’s influential military leadership. Conversely, officials tasked with revitalizing Pyongyang’s moribund economy might prefer the quicker option of accepting conventional power plants, or perhaps some combination of conventional plants and a newer-generation, smaller-sized LWR.

Although decision making in North Korea is opaque, there is historical evidence that interest-group politics do matter, even on the LWR issue. During the final round of talks in 1994 that produced the Agreed Framework, the North Korean delegation, which was led by Foreign Ministry officials, agreed that Pyongyang would accept South Korean reactors as long as it did not have to publicly admit that they were from South Korea or deal directly with the South Koreans. Then, when negotiations began on the details of how to implement the Agreed Framework, North Korea sent a delegation headed by a senior official of its Committee on External Economic Relations, who spent the next six months insisting that Pyongyang would not accept South Korean reactors. The chief North Korean delegate, who had previously worked as the head of a major state trading corporation, brought his corporate successor along to the talks and demanded that the firm be given a role in the contractual arrangements related to the supply of the reactors. It was only after the Foreign Ministry again was put in charge of the negotiations that an agreement was reached, very much along the lines of the one outlined earlier in the Agreed Framework. We cannot know for sure why the North Korean leadership decided to switch tactics when it did, but the fact that these tactical shifts occurred at the same time as changes in the agency charged with leading negotiations with the United States suggests that bureaucratic infighting was at least partly to blame.

The logistics of providing LWRs today. If the Obama administration does consider providing North Korea with LWRs as part of a denuclearization deal, it will need to answer three closely interlocking questions: Which type of reactors should be chosen? How will they be paid for? And through what mechanism will they be provided?

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In 1993, the Clinton administration decided that although the United States would be willing to organize the supply of LWRs to North Korea, it would not be politically feasible to persuade Congress to appropriate funds to pay the project's estimated \$4 billion cost. This left only South Korea and Japan as potential financiers. They agreed to pay for construction, but only if the reactors were a South Korean model and if the prime contractor was the South Korean electrical utility Korea

Electric Power Corporation, or KEPCO. By insisting on providing the reactors, South Korea ensured that North Korea would have to abandon its policy of only dealing with the United States on nuclear matters; it guaranteed that the majority of the taxpayer money it was spending would stay at home; and it provided an international stage for KEPCO in the hope this might lead to other export orders in the future. By financing part of the project, Japan also won a seat at the table and the understanding that much of its financial contribution would pay for parts manufactured by Japanese subcontractors.

Today, answers to the same questions may not be as clear-cut. South Korean and Japanese relations with North Korea are poisonous, and it cannot be taken for granted that either will still be eager to pay for a LWR project. So unless the Obama administration wants to foot the bill (a highly unlikely outcome), it will need to consult with Seoul and Tokyo to determine exactly what concessions they need from Pyongyang to make renewed LWR financing politically viable in their domestic environments.

Furthermore, as in the early 1990s, the issue of reactor type will be heavily tied to the issue of financing. Shortly after the 2005 joint statement, when the Bush administration was insisting on completing the shutdown of the LWR project, Peter Hayes and his colleagues at the Nautilus Institute suggested that the solution might be to provide modern Russian LWR technology with South Korean and Japanese firms doing much of the work. Since then, oil price fluctuations have increased interest around the world in a new generation of nuclear technology, including smaller plants that might be more suited to North Korea's ramshackle electrical grid. On the

other hand, a significant amount of investment already has been made toward providing Pyongyang with South Korean reactors. Therefore, it might make more economic sense to resurrect that project. This approach also might be easier politically, as KEPCO would likely be a strong ally lobbying Seoul to support the resumption of the existing LWR project. One thing is clear: The type of reactor cannot be decided separately from the question of who will finance the project.

Next, there is the issue of the mechanism for providing whatever reactor model is chosen. In 1994, the United States organized an international consortium to finance and construct a LWR in North Korea. This consortium, the Korean Peninsula Energy Development Organization (KEDO), negotiated a reactor supply agreement with Pyongyang—a turnkey contract with KEPCO serving as primary contractor—and oversaw site preparation and initial construction of two reactors on the east coast of North Korea. KEDO officially terminated the LWR project in May 2006, but both the construction site and the reactor equipment that already has been fabricated have been mothballed and could be used again. Resurrecting KEDO would have an advantage because the organization already has negotiated technical agreements with North Korea that are required for completion of the LWR project. This work would have to be redone from scratch if a new reactor supply mechanism is created. On the other hand, using KEDO might not be useful unless the new project is based on the same reactors as the 1990s-era project, both because the KEDO charter requires it to provide only South Korean Ulchin-3 and Ulchin-4 model reactors and because the main KEDO-North Korean agreements, particularly the supply agreement, were based on the provision of those reactors.

The final issue the Obama administration will need to address is how to sequence North Korea's steps toward verifiable denuclearization with progress in the delivery of the LWR. Since it is a long-term project, the construction of LWRs is admirably suited for a slow process of confidence building. Under the Agreed Framework, as landmarks in the delivery of the LWR project were reached, North Korea would resume ad hoc, routine, and special IAEA inspections, ship out spent fuel from its reactor, and dismantle its gas-graphite nuclear facilities.

This time around, if the United States and its allies want North Korea to take far-reaching steps early on in the process, they will need to offer Pyongyang significant benefits—a peace treaty, the opening of diplomatic relations, economic emoluments—of a more immediate nature than the provision of a LWR. But since North Korea will not give up its plutonium stockpile in the short-term, any negotiated agreement for Pyongyang's denuclearization almost

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certainly will involve a prolonged series of simultaneous steps. If a LWR project is part of the package the United States and its allies put on the table, the question of sequencing will be even more complicated than it was in 1994. In the Agreed Framework, the United States and North Korea agreed, “When a significant portion of the

LWR project is completed, but before delivery of key nuclear components, [North Korea] will come into full compliance with its safeguards agreement with the IAEA, including taking all steps that may be deemed necessary by the IAEA, following consultations with the agency with regard to verifying the accuracy and completeness of [North Korea's] initial report on all nuclear material in [North Korea].” But since then, the United States has signed a nuclear cooperation agreement with India under which New Delhi is able to purchase

nuclear technology from U.S. companies even while a significant portion of its nuclear facilities remain outside IAEA safeguards. Although the two cases are different, Pyongyang is certain to cite the U.S.-India nuclear deal as a precedent in any future negotiations in support of the argument that it should receive key nuclear components before coming into full compliance with its IAEA safeguards agreement.

Among the other difficult items that will have to be included in any sequence of mutual steps are the conclusion of an agreement on peaceful nuclear cooperation (a “123 agreement”) and arrangements to insure a foreign-built, North Korean-operated nuclear reactor for liability in case of an operating accident. Luckily, neither of these steps would need to be taken until relatively late in the process of constructing LWRs.

The potential for LWRs to help solve the latest impasse in talks with North Korea. Since North Korea has produced a substantial amount of plutonium and has carried out nuclear tests, the stakes are even higher today than they were in 1994. As a result, the provision of a LWR will not be the centerpiece of an agreement, as was the case with the Agreed Framework. The Agreed Framework did include broad language about improving political and economic relations, but this time around, Pyongyang will certainly demand far more concrete concessions from the United States and its allies in those areas. Nevertheless, a LWR project might be a useful—perhaps even an essential—component of a negotiated resolution that achieves the goal of verifiable denuclearization of the Korean peninsula. ■

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NOTES

1. Peter Hayes, David von Hippel, Jungmin Kang, Tadahiro Katsuta, Tatsujiro Suzuki, Richard Tanter, and Scott Bruce, "Light Water Reactors at the Six Party Talks: The Barrier that Makes the Water Flow," Nautilus Institute, September 2005, p. 7, available at www.nautilus.org/fora/security/0578LWR.html.

2. Siegfried S. Hecker, "Denuclearizing North Korea," *Bulletin of the Atomic Scientists*, May/June 2008, pp. 44-49.

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