

Verified Dismantlement of The DPRK's Nuclear Weapons Program¹

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The nuclear weapons program of the Democratic People's Republic of Korea (DPRK) remains at the center of US and international security concerns. The perception, if not the reality, that the DPRK has a growing number of nuclear weapons poses an increasing challenge to the US government and governments in the region.

The current size and status of the DPRK's nuclear weapons program is unknown. DPRK officials have often stated in the last several months that the DPRK has nuclear weapons, but it has refused to say how many nuclear weapons it has or whether it could deliver them by ballistic missile, the most threatening delivery system to Japan and the United States. DPRK officials have also stated that its nuclear weapons capabilities are growing, stating that the DPRK is increasing the quantity and improving the quality of its nuclear arsenal. But they refuse to explain what this statement means in practice. Despite these uncertainties, the DPRK is increasingly believed to have at least a few nuclear weapons and the plutonium to make several more. Debate continues on whether these weapons can be launched successfully on ballistic missiles such as the Nodong missile.

Unclassified information and some publicly available US intelligence assessments estimate that the DPRK could have separated enough plutonium for 3-9 nuclear weapons. It may have recently discharged enough plutonium in irradiated fuel from its 5 megawatt-electric reactor for 2-3 more nuclear weapons. It could separate this plutonium during 2005. These assessments, however, remain highly uncertain. Each year, the DPRK can produce enough new plutonium for about one more nuclear weapon in its 5 megawatt-electric reactor at the Yongbyon nuclear center. The DPRK's reported uranium enrichment program may eventually give it the capability to make enough highly enriched uranium for several nuclear weapons per year.

A priority of the United States is convincing the DPRK to dismantle its nuclear program in a verifiable, irreversible manner. It has joined with China, Japan, Russia, and South Korea in working toward a verified denuclearization of the Korean peninsula, a goal the

¹ This testimony is drawn from a forthcoming study commissioned by the US Institute of Peace authored by Albright and Corey Hinderstein. For more information, see also <http://www.isis-online.org/dprkverification.html>, <http://www.isis-online.org/publications/dprk/cooperative.htm>, and http://www.isis-online.org/publications/dprk/dprk_cooperative_dismantlement.html.

DPRK also states it shares. These six nations have launched a series of negotiations, called the Six-Party Talks, aimed at resolving the crisis over the DPRK's nuclear program.

The six parties have reportedly agreed to meet in late-July for the first time in more than a year. At their June 2004 meeting, the DPRK and the United States each made proposals that are unacceptable to the other. Initial discussions indicate that arriving at an agreement to verifiably dismantle the DPRK's program will be complicated. The scope of the agreement, the timing of various steps, and the benefits that accrue to the DPRK will require complicated negotiations.

The first challenge facing the negotiators is agreeing on a set of steps to dismantle irreversibly the DPRK's nuclear weapons program. The United States has proposed a front-loaded process whereby the DPRK declares and turns over its plutonium, enriched uranium, and any nuclear weapons. After taking these initial steps, the DPRK would receive a set of economic, political, and security benefits and submit to intrusive inspections and monitoring. The US approach is motivated by the manner in which Libya recently dismantled its secret nuclear weapons effort and invited the International Atomic Energy Agency (IAEA) to verify its dismantlement and compliance with the Nuclear Non-Proliferation Treaty (NPT).

The DPRK has proposed first establishing a "freeze" over its plutonium program accompanied by a range of benefits. It denies having a uranium enrichment program. Later, the DPRK would dismantle its nuclear weapons program in conjunction with a verification arrangement.

Whatever negotiated approach is taken to dismantle the DPRK's nuclear program, adequate verification of its conditions will be critical. Verification must be done in a manner that provides high confidence that the DPRK has dismantled its nuclear program completely, has not retained undeclared nuclear activities, and has come into compliance with the NPT. As a result, any verification arrangement will need to be robust.

Finding the correct balance between intrusiveness and effectiveness could prove one of the toughest obstacles to negotiating an agreement. The DPRK may resist intrusive verification, given its secretive and militarized society. If the verification regime is not intrusive enough, however, the IAEA and the United States may judge it unacceptable. Because the 1994 US/DPRK Agreed Framework never reached the point where full-scale verification commenced, the negotiators will have limited practical experience of how to achieve this balance with the DPRK.

Cooperative Verified Dismantlement

In broad terms, cooperative verified dismantlement requires a state to voluntarily dismantle a nuclear program in cooperation with a verification organization. The process is termed "cooperative" to contrast it with the UN Security Council dismantlement resolutions applied to Iraq after the 1991 Persian Gulf War.

The goal of verified dismantlement is to obtain high confidence that the program no longer exists and reconstitution is difficult and likely to be detected relatively quickly or, at least, long before significant quantities of banned items are produced. In practice, the state conducts the actual dismantlement, and a verification organization verifies that the dismantlement has occurred.

Dismantlement may involve the destruction of key items in country or their transport overseas. The DPRK may agree to send certain key items overseas to provide additional confidence that the dismantlement is irreversible. In this case, the verification organization also needs to verify that the items are located in this other state or have been destroyed there. Plutonium and enriched uranium will likely be sent overseas; operating nuclear facilities would likely be dismantled in the DPRK.

Although the IAEA is usually selected as the organization to verify nuclear dismantlement, as occurred in the case of Libya and South Africa, other possibilities exist. Negotiations may result in the creation of another verification organization, or a mandate to bolster the IAEA's inspection rights and expertise in nuclear areas beyond that found in its safeguards department. In any case, an agreement would likely need to include a procedure whereby the verification organization would report to the parties of the agreement.

Who verifies the actual dismantlement of nuclear programs is thus a negotiable topic. Different models for the verification organization may also be needed to accomplish different tasks. There are many candidates for the verification organization, including:

- A specific organization created by the United States, other acknowledged nuclear weapon states (NWS), and other states in the region.
- "IAEA Plus," which would involve the IAEA safeguards department supplemented by experts or assistance from key member states. Variants of this model were used in Libya and South Africa.
- A bilateral or regional inspection agency.

In the case of verifiably dismantling any DPRK nuclear weapons and its associated nuclear weaponization program, nuclear weapon experts from the NWS will be expected to play a critical role. The verification organization will need to assess sensitive nuclear weapons information and equipment. These experts could be formed into a separate organization or assigned to the IAEA safeguards department. The latter step was followed in the case of South Africa after it declared in 1993 that it had built nuclear weapons. A variant of this approach was also used more recently in Libya.

No matter what organization verifies the dismantlement process, the IAEA safeguards department will be responsible for verifying that the DPRK is in compliance with the NPT. As a result, any effort to create a separate verification organization should be fully aware that the IAEA will also need to be involved in the verification process and will

independently make a determination whether the DPRK has come into compliance with the NPT and its safeguards agreement.

Dismantlement could occur either prior to the onset of verification activities or concurrent with verification. Concurrent dismantlement and verification is the preferred option because it can result in greater confidence. Accomplishing adequate verification after the dismantlement of a program is possible but more difficult and can take longer. Nonetheless, the IAEA was able to establish that South Africa had dismantled its entire nuclear weapons program, even though the verification started several years after the dismantlement took place.

Based on experiences in Libya and South Africa, the most important prerequisite for a verification process to work is that the state believes that verified dismantlement is in its vital interests. According to former members of the South African nuclear weapons program, without such a belief verified dismantlement is unlikely to succeed.

There are many specific prerequisites on the DPRK's side for the successful verification of the dismantlement of nuclear programs. Full transparency and cooperation will mean granting the verification organization a series of rights, including:

- Permitting broad access to sites and facilities;
- Providing detailed declarations;
- Allowing access to records, including program documents, procurement data, and possibly personnel records;
- Allowing interviews with program staff and officials; and
- Permitting environmental sampling at declared sites and elsewhere.

In addition, the DPRK will need to allow inspectors access to military sites, a step it has resisted in the past. Procedures will need to be developed that permit the DPRK to protect sensitive, non-nuclear items without compromising the effectiveness of an inspection.

In general, the verification organization is expected to need more extensive rights than established under the IAEA Model Additional Protocol (INFCIRC/540). Because the process of verified dismantlement occurs over a finite period of time, these extraordinary rights could be established on a temporary basis.

The verification organization will require many different types of equipment to verify dismantlement that will go beyond the range of equipment typically used during safeguards. The "toolbox" of verification equipment should be negotiated ahead of time, as DPRK officials often view suspiciously equipment they don't understand or use themselves.

On the other hand, the verification organization must make several commitments to the DPRK. It must:

- Possess extensive knowledge about the type of program to be dismantled;
- Have the tools to ensure with a high degree of confidence that the program is dismantled, especially the ability to establish the completeness of any declaration; and
- Act in a professional and fair manner and protect sensitive information.

Ensuring the irreversibility of the dismantlement process is essential. To achieve irreversibility, the DPRK will need to destroy certain facilities, equipment, and documents, or ship certain items overseas. On-going monitoring of certain non-nuclear or dual-use activities may be necessary.

To make the process less costly and facilitate re-employment of personnel, the dismantlement process should involve the conversion of parts of the program to other viable purposes. Nuclear programs often involve equipment and skills that can be converted to non-proscribed activities. The goal should be to create economically viable alternatives or enable the gradual transfer of program personnel to other allowed activities. In the case of the DPRK, parties to the Six-Party Talks should explore opportunities for joint ventures. Cooperative Threat Reduction (CTR) programs in the former Soviet Union provide a useful model for many possible activities in the DPRK.

On-going monitoring of certain non-nuclear activities will likely be necessary once the dismantlement process is completed, particularly if some activities are converted to civilian purposes. In any case, any remaining nuclear materials will require on-going monitoring. The IAEA safeguards department is the best choice to conduct on-going monitoring of nuclear and non-nuclear activities or facilities.

Many countries are expected to have suspicions that the DPRK has not declared all its nuclear materials or facilities to the verification organization. A negative can never be proved; thus, a verification organization cannot prove that there are no undeclared materials or facilities. Instead, the verification organization will develop a set of procedures and actions that over time will allow it to develop confidence that undeclared activities do not exist in the DPRK. As part of this process, the verification organization will need to investigate many accusations and follow up its own leads about undeclared activities. The DPRK will need to accept such activities by the verification organization as part of dismantling its programs and coming into compliance with the NPT.

The creation of a dismantlement program in the DPRK will be part of a larger agreement involving the DPRK, the United States, and other states or international organizations. These negotiations will focus on creating the basic responsibilities, rules, and procedures for the dismantlement process for both the state and the verification organization.

Funding of the dismantlement and conversion processes should be established during these negotiations. Both the DPRK and the verification organization will require funds to accomplish their goals. In addition, any CTR-type activities will require funds.

The actual resources and number of personnel required by a specific verification organization will vary. The core effort is expected to require a few dozen specialists and a budget of several million dollars a year. Shipping materials and equipment out of the DPRK would involve additional costs. The process of dismantling the DPRK's nuclear weapons program could be achieved within a year or two, although the entire process of conversion and building confidence about the lack of undeclared activities could take several more years.

These core activities will need to be supplemented by support from IAEA member states. Critical support activities will include the analysis of an expected large number of environmental samples, the supply of inspection equipment, the provision of procurement information about the DPRK's overseas suppliers, and "third party" information about activities in the DPRK. Of particular importance will be the supply of procurement information learned through investigating the network led by Abdul Qadeer Khan and his associates.

Conversion costs could easily exceed tens of millions of dollars. This activity will require the participation of the verification organization to fulfill its mandate, but the specific conversion activities should be funded from another source.

Four Key Disarmament Tasks

An agreement to verifiably dismantle the DPRK's nuclear weapons program will need to identify the specific nuclear programs that require dismantlement. Negotiators would be expected to identify specific items subject to dismantlement and agree on a set of verification steps to ensure irreversible dismantlement of these specific items. Although negotiators would agree on many verification rights and procedures in general terms, they would also need to define the rights and procedures for specific nuclear programs.

The following are the three main nuclear programs expected to be subject to dismantlement in an agreement and the additional task of bringing the DPRK into compliance with the NPT.²

Task 1: The plutonium production program. This task focuses on plutonium production, separation, storage, and waste processing facilities. The principal aim will be to verifiably, irreversibly halt plutonium production and separation activities. The verification organization will need to verify DPRK statements about its plutonium production and separation activities. The DPRK will need to allow the removal of plutonium and irradiated fuel.

Task 2: The nuclear weaponization program. This task focuses on any nuclear weapons and the means to research, develop, test, and manufacture them. It involves the verified dismantlement of any nuclear weapons, and the irreversible, verifiable dismantlement of the set of facilities involved in researching, developing, testing, and

² For a more detailed discussion about each task, see forthcoming US Institute of Peace study or references given in task descriptions below.

manufacturing nuclear weapons. For more information on this specific task, see http://www.isis-online.org/publications/dprk/dprk_cooperative_dismantlement.html.

Task 3: The uranium enrichment program. This task focuses on the dismantlement of any uranium enrichment activities and the facilities to research, develop, test, and make enrichment equipment, such as gas centrifuges. For more information on this task, see <http://www.isis-online.org/publications/dprk/cooperative.htm>.

Task 4: Implementing the DPRK/IAEA safeguards agreement and bringing the DPRK into compliance with the NPT. The DPRK will need to rejoin the NPT and come into compliance with it, including implementing the Additional Protocol.

All these tasks will require the verification organization to conduct a range of activities to gain confidence in the absence of undeclared materials, equipment, and facilities. This process could be lengthy. Its outcome will depend mainly on the DPRK's transparency and cooperation with the verification organization.

Possible Dismantlement Approaches

The Six-Party Talks are far from agreeing upon a verified dismantlement approach. All parties to the talks have agreed that the ultimate goal is the denuclearization of the Korean peninsula, but only initial proposals have been presented at the talks.

The United States and the DPRK have each described the outlines of an agreement reflecting primarily their own interests. Neither proposal has been accepted by the other side. In addition, these proposals are mere sketches of a practical agreement with many details purposely left out.

Below is a description of an approach that attempts to bridge at least partially the differences in the US and DPRK proposals. This third proposal, called "progressive dismantlement," aims to allow a more informed discussion of the process of verified dismantlement.

"Progressive Dismantlement"

The US and DPRK proposals provide a basis to construct a model agreement that can serve as the basis of a discussion of possible verified dismantlement arrangements. Although this proposal draws upon discussions with officials involved in the Six-Party Talks, it is meant to be illustrative and not authoritative.

The proposal involves three phases, the implementation of which would gradually denuclearize the Korean peninsula and bring the DPRK into compliance with the NPT and North/South agreements to ban uranium enrichment and reprocessing facilities. Actions would move progressively from temporary disablement to irreversible dismantlement and removal of key items. Verification would occur throughout the process.

Phase One: Freeze, Declare, Disable, and Verify. The first phase would be focused on freezing nuclear activities in the DPRK for up to a year and developing comprehensive declarations of key nuclear programs, activities, and materials. No nuclear material or key items would be removed during this phase.

Priorities in this phase would be the plutonium program, any enrichment programs, and nuclear weaponization programs. The actions taken would include cessation of key activities, presentation by the DPRK of comprehensive declarations, securing and sealing facilities and key items, and effective monitoring of all nuclear programs. In addition, actions would be taken to temporarily disable key nuclear facilities or items, such as nuclear weapons.

Verification would be done by the IAEA or a special group created for this purpose and would include a range of tools, such as seals, cameras, and environmental sampling. The verification organization would evaluate DPRK declarations to ensure that they are correct and make at least preliminary determinations about their completeness. It should also work to build confidence that the DPRK is complying with the freeze. The DPRK would also gain confidence that the verification organization is acting consistently with the agreement.

The DPRK would declare and present to the verification organization all its plutonium. It would do the same with any nuclear weapons and components.

The verification organization would account for all these items during this phase. Negotiations would need to decide whether the fissile material in the nuclear weapons should be presented to the verification organization in the shape of weapon components or in other forms.

In addition, the DPRK would declare its entire complex of facilities and activities to produce and separate plutonium and to research, develop, test, manufacture, and deploy nuclear weapons. Members of the verification organization would visit all these facilities.

This phase would also include declarations on any uranium enrichment activities or establish that such activities did not take place. Any enriched uranium would be presented to the verification organization. Questions about the DPRK's uranium enrichment activities would need to be addressed during this phase, although final resolution could occur after plutonium issues are settled.

Rewards would occur at the start of this phase and later upon presentation of a complete declaration. The principal reward would be the provision of heavy fuel oil or other energy supplies. The amount provided could be linked to specific steps taken by the DPRK. In addition, the DPRK could receive provisional security assurances from the United States and its partners.

Phase Two: Verified Dismantlement and Removal of Key Items This phase would last about one or two years and would focus on the verified, irreversible dismantlement of the DPRK's nuclear weapons program. Key items and materials would be removed from the DPRK during this phase. The verification organization would conduct rigorous activities to ensure that dismantlement is complete and verified. It would also accelerate the process of ensuring the absence of undeclared materials, equipment, and facilities.

DPRK would receive additional security guarantees, economic assistance, compensation, diplomatic recognition, and its removal from the State Sponsors of Terrorism list. This phase would also include a range of initiatives modeled on cooperative threat reduction actions taken in other states.

The DPRK would be expected to keep certain civil nuclear energy programs. Civil nuclear energy assistance in the areas of medical isotopes and other radioactive sources for non-nuclear industries and agriculture could be expanded in this phase.

Plutonium, either in separated or unseparated form, would be removed from the DPRK. Plutonium production and separation facilities would be irreversibly dismantled or disabled. The verification organization would conduct a thorough accounting of all plutonium in the DPRK.

Key nuclear weapon components would be removed from the DPRK and the weaponization complex would be dismantled or disabled. Verification would need to show that the DPRK had declared all its weaponization activities and nuclear weapons.

Any enrichment facilities or activities would be dismantled irreversibly and any uranium hexafluoride and enriched uranium removed from the country. Centrifuge components, drawings, and single-use equipment would be destroyed or removed from the DPRK. Uranium conversion facilities would be dismantled.

Certain facilities, equipment, or activities may be shifted to non-banned uses, but single purpose nuclear facilities would generally be dismantled or permanently disabled.

Phase Three: Long Term Monitoring and NPT Compliance During this phase, which would be indefinite and could overlap phase two, the DPRK would come into compliance with the NPT and establish long term monitoring programs of its remaining nuclear energy programs and other programs that utilize equipment or personnel from dismantled programs.

The principal verification organization during this phase would be the IAEA. The DPRK would have already ratified the Additional Protocol and take other steps to increase the effectiveness of IAEA inspections. For example, it could announce a policy to grant the IAEA unrestricted access to sites in the DPRK.

The resumption of the LWR project could occur in this phase. Additional economic assistance could also occur.

The Challenge of Ensuring the Absence of Undeclared Nuclear Material and Facilities

An important element in any negotiated verification regime in the DPRK will be creating measures whereby the verification organization develops confidence, or credible assurances, of the absence of undeclared nuclear material or activities. This process is by its very nature time consuming. As a result, the verification organization will devote considerable time and resources to developing this confidence. Exactly how long the verification organization needs will depend on the DPRK's cooperation and willingness to take steps to enhance its transparency.

In Libya and South Africa, for example, the governments committed to allowing IAEA access anywhere and providing additional information in documents and interviews with a wide range of officials, scientists, and technicians. These commitments went beyond those required by the NPT and were critical in enabling the IAEA and the international community to develop confidence in the absence of undeclared materials and facilities in these states. As a result, the DPRK should be encouraged to make a range of commitments that further its transparency.

To achieve this confidence, the DPRK will be requested to provide broader declarations that include more detailed information than typically provided under IAEA safeguards agreements. The verification organization will ask the state for permission to examine a variety of records and conduct its own interviews of key DPRK program personnel. The verification organization may ask for foreign procurement information from the DPRK and other states. The verification organization will ask to visit sites and take environmental samples at these sites. The verification organization will have follow-up questions and requests.

In addition, the verification organization may seek access to a range of sites not listed in a DPRK declaration. The main reason for the verification organization to make such a request would be that it needs to resolve a question relating to the correctness or completeness of the DPRK's declared information or resolve an inconsistency relating to that information. The basis for the question could be results from environmental sampling, open source or third party information, foreign procurement data, or inconsistencies in declarations or statements.

The DPRK has sensitive military sites that the verification organization may need to inspect. As a result, the DPRK will need to agree during the Six-Party talks or other negotiations that the verification organization will have access to military or other sensitive sites.

In the negotiation of the verification arrangements, the DPRK and the other parties to the agreement may want to develop procedures for "managing access" by the verification

organization in order to prevent the dissemination of proliferation sensitive information, meet safety and physical protection requirements, protect proprietary or commercially sensitive information, or protect national security secrets. The international community has extensive experience in designing managed access arrangements that can ensure the absence of undeclared activities while protecting state secrets. However, such arrangements cannot preclude the verification organization from gaining credible assurance of the absence of undeclared nuclear material and activities at a location.

To protect its secrets at a military site, for example, the DPRK may cover or otherwise hide sensitive non-nuclear-related equipment to prevent it being seen or otherwise characterized by the verification organization. The DPRK may want the presence of certain of its officials when the verification organization is at the site. These limitations on the inspections should not inordinately delay the granting of access to the verification organization, allowing the operators time to remove or destroy items.

To effectively accomplish its goal, the verification organization will also need to conduct certain activities at these sites. In particular, it will need to take environmental samples, use radiation detection and measurement equipment, and perhaps gain access to records and officials.

At some point, the verification organization and the parties to the dismantlement agreement will have to make a determination that they have enough confidence in their understanding of the DPRK's nuclear program to conclude that the DPRK has dismantled its nuclear weapons programs and is unlikely to have undeclared nuclear materials or facilities.

The verification organization will be primarily responsible for making this determination using a wide variety of information and experiences that would be expected to result from several years of intensive verification in the DPRK. Such a determination would require a finding that the DPRK's declarations are correct and complete, or at least a finding of no indications or evidence that such declarations are not complete. Such findings are bound to include some uncertainty, but any uncertainties should be shown as small enough to justify the determination.

The verification organization would be expected to draw upon the IAEA's experiences in other countries, particularly Libya and South Africa, in making such a determination. Having gone through two successful verified dismantlement experiences, the IAEA is capable of reaching a conclusion on verified dismantlement using proven tools and methods.

After the verification organization has made such a determination, the parties to the agreement will also need to ratify this determination. The agreement should include a mechanism for the parties to meet and discuss the conclusion of the verification organization, including such important matters as the absence of undeclared nuclear materials and facilities. If the verification organization is IAEA Plus, the IAEA Board of

Governors could also pass a resolution in support of such a determination. A UN Security Council resolution could add credibility.

The search for undeclared nuclear activities will not end with a conclusion by the verification organization about nuclear weapons dismantlement and coming into compliance with the NPT. The IAEA, as part of ensuring continued compliance with the NPT, will continue to investigate any evidence of undeclared materials or facilities on an on-going basis, making annual determinations about this issue as part of routine safeguards.

Special Role of Cooperative Threat Reduction Programs

The DPRK is being asked to sacrifice most of its existing nuclear programs. These programs enjoy extensive resources, contain large infrastructures, and employ thousands of scientists, engineers, technicians, and other specialists. The states requesting this sacrifice have an interest in assisting the DPRK in reducing the negative consequences of this large transformation of its nuclear establishment. Such assistance could also provide the DPRK nuclear establishment with a powerful incentive to cooperate with nuclear disarmament and prevent the future leakage of dangerous knowledge from its program.

Cooperative threat reduction (CTR) programs have had a significant impact of the conversion of WMD programs to peaceful programs in Russia and the former-Soviet states. The United States is also pursuing CTR programs in Libya and Iraq. These US-led CTR programs have focused on dismantling weapons of mass destruction and their associated infrastructures, combining and securing stocks of weapons and related materials, re-directing professionals to non-weapons work, increasing transparency and building trust, and supporting cooperation that can prevent proliferation.

Some of these objectives, including dismantlement and increased transparency, would be included in a negotiated verifiable dismantlement program in the DPRK. However, it is important to develop other CTR activities in the DPRK during the dismantlement process, either as part of a negotiated agreement, such as a mandated benefit to the DPRK, or negotiated later on a bilateral basis.

One of the key issues for all the parties involved in the Six-Party Talks is the thousands of people who will need to find new jobs. The DPRK can be expected to resist an agreement that requires it to give up all the human resources devoted to its nuclear weapons program without assistance on re-employing them. Therefore, projects intended to transition the program personnel to viable non-banned projects would be a benefit to the DPRK as well as those concerned.

A key focus for transition work could be expansion of the DPRK's civilian nuclear energy applications in the medical, industrial, and agricultural fields, all areas with substantial but decayed capabilities. These civil nuclear energy projects could serve to employ many scientists and technicians, and be a significant benefit to the people of North Korea whose nuclear medical, industrial, and agricultural programs have fallen

behind the status of programs around the world. The DPRK has stated that it intends to continue with civil nuclear energy, and CTR projects could focus on legitimate nuclear fields that pose no military danger.

Although most CTR projects would be run by states in cooperation with the DPRK, the IAEA could play an important role in providing peaceful, allowed nuclear assistance through its technical cooperation program. As a result, a priority is the DPRK re-joining the IAEA, which it left in 1994.

Findings and recommendations

Verified nuclear dismantlement of the DPRK's nuclear weapons program involves a series of definable, interrelated activities. The process involves an agreement of which DPRK nuclear activities will be dismantled and the type of verification that will accompany dismantlement.

Verified dismantlement can be successful in the DPRK. It can be accomplished at a fair cost and in a reasonable amount of time. To work, it must be carried out by a verification organization that is technically competent, professional, and politically fair. The verification process will need the political support of all concerned parties. The DPRK must be cooperative and transparent to the verification organization and the other parties to any agreement. Such commitment will likely depend on the DPRK's belief that its vital interests are served by an agreement to verifiably dismantle its nuclear weapons program.

Other states involved in an agreement will need to settle on realistic verification arrangements. In particular, they should avoid unnecessarily intrusive verification requirements that would be seen by the DPRK as attempts to reveal secrets related to sensitive programs not subject to this agreement.

Calls to eliminate all vestiges of the DPRK's nuclear energy program are unrealistic. The DPRK is likely to insist on the continuation of many aspects of its civil nuclear energy programs, such as radioisotope use in nuclear medicine, isotope production for civil applications, and civil nuclear research. The continuation and expansion of such efforts may in fact contribute to effective dismantlement by providing jobs for displaced nuclear scientists and technicians. The fate of nuclear electricity generation programs, particularly the LWR project whereby KEDO builds two nuclear power reactors in the DPRK, is more controversial. Its resumption will be unlikely before the DPRK has dismantled its nuclear weapons program.

If the LWR project is resumed at some future date, IAEA inspections can provide adequate verification against potential misuse of these reactors, particularly if safeguards include real-time camera surveillance of the reactor and any spent fuel storage areas.

The necessary foundation for a verified dismantlement effort can be laid through detailed negotiations by informed parties that recognize the scope and stakes of such an effort.

Because verification will be central to any agreement and complicated to negotiate, the parties must focus on it early in the negotiation process. The exact rights of the verification organization are expected to be a major issue. A goal of the negotiations is to find an optimal, effective verification arrangement that satisfies all parties.

Verification will need to start early in the implementation phase of any agreement. Delays in implementing verification could interfere in achieving confidence that the DPRK is dismantling its programs according to its commitments. In addition, verification will play a key role in testing whether the DPRK is sincere in its commitments to dismantle.

A key test of any verification arrangement is how the DPRK reacts to requests from the verification organization. Will it interpret any requests narrowly or be hostile to these requests? Will it cooperate in addressing any concerns or requests of the verification organization?

Although many verification organizations have been discussed, the best alternative for the verification organization is IAEA Plus, which is the IAEA safeguards department supplemented by experts from member states. Other parties may want to take part directly in the verification process, as occurred in Libya, but giving the IAEA responsibility for verification poses the fewest problems and offers the most advantages.

The IAEA in any case will be responsible to determine that the DPRK comes into compliance with the NPT. Thus, efficiency alone argues to give the IAEA primary responsibility for the more straightforward tasks of verifying dismantlement of the DPRK's key nuclear weapons programs and long-term monitoring of dual-use items remaining after the dismantlement process. Making IAEA Plus responsible for verification will also help avoid competing and possibly conflicting verification efforts.

The IAEA would need expanded powers to carry out dismantlement responsibilities in the DPRK. To accomplish its tasks, the IAEA will need rights beyond traditional safeguards and the protocol. Although an agreement reached during the Six-Party Talks or other suitable negotiating forum would detail these additional powers, the IAEA may also need UN Security Council approval to carry out this new mandate.

If the IAEA is not given lead responsibility, the negotiators will need to carefully work out the transfer of authority from the verification organization to the IAEA for long term-monitoring and the determination whether the DPRK is in compliance with the NPT and its safeguards obligations.

During the verification process, rights of access will be critical. The DPRK should be encouraged to grant unrestricted access to sites as deemed necessary by the verification organization, with the understanding that the DPRK can take reasonable steps to protect vital secrets in programs not covered by a dismantlement agreement.

DPRK declarations will be extremely important to the verification process. If the experience of other cases is a guide, the DPRK may not provide adequate declarations initially. Nonetheless, the DPRK should be expected to supplement its declarations and provide supplementary information as the verification process progresses. Lack of an acceptable first declaration should not be seen as non-compliance but as part of the process. However, continued incomplete declarations would be an early indicator that the DPRK does not intend to comply.

A reasonable approach needs to be developed for deciding when to dismantle key items in place or send them overseas. Nuclear material such as plutonium and enriched uranium should be removed. But not everything can or needs to be removed. In addition, certain items could be useful in non-banned programs.

The verification organization will likely need several years to develop adequate confidence that the DPRK has fully dismantled its programs and does not have undeclared nuclear materials or facilities. Knowing when that point has been achieved could be one of the most difficult tasks facing the verification organization. Because of importance of this issue, however, the agreement should include a process for the parties to agree collectively that such a point has been reached.

A wide variety of CTR programs should be established during the dismantlement process. In addition to projects established by parties to the agreement, the IAEA technical cooperation program and other countries could participate.

Despite all the difficulties, an agreement to verifiably dismantle the DPRK's nuclear weapons program remains vital to US and international security. If the United States and its allies have the political will, they can achieve such an agreement. Although the entire verification process will likely take several years, the positive impact of dismantlement would be felt almost immediately. DPRK nuclear facilities would be disabled and monitored. Nuclear material would be declared, sealed, and verified. Any nuclear weapons would be disabled and monitored. These steps go way beyond the freeze under the Agreed Framework. Relatively early in the process, the DPRK would send out its most threatening nuclear material and start the process of verifiably dismantling its key nuclear weapons facilities. For the first time, a realistic process to denuclearize the DPRK would be underway. All members of the Six-Party Talks should set this goal as their highest priority.