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## **North Korea's Nuclear Weapons Program**

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## North Korea's Nuclear Weapons Program

### SUMMARY

North Korea's decisions to restart nuclear installations at Yongbyon that were shut down under the U.S.-North Korean Agreed Framework of 1994 and to withdraw from the Nuclear Non-Proliferation Treaty create an acute foreign policy problem for the United States. Restarting the Yongbyon facilities opens up a possible North Korean intent to stage a "nuclear breakout" of its nuclear program and openly produce nuclear weapons. North Korea's actions follow the reported disclosure in October 2002 that North Korea is operating a secret nuclear program based on uranium enrichment and the decision by the Korean Peninsula Energy Development Organization (KEDO) in November 2002 to suspend shipments of heavy oil to North Korea. North Korea claims that it has nuclear weapons and that it has completed reprocessing of 8,000 nuclear fuel rods. U.S. officials in 2004 stated that North Korea probably had reprocessed most or all of the fuel rods and may have produced 4-6 atomic bombs from them.

The main objective of the Bush Administration is to secure the dismantling of North Korea's plutonium and uranium-based nuclear programs. Its strategy has been: (1) terminating the Agreed Framework; (2) withholding any U.S. reciprocal measures until North Korea takes visible steps to dismantle its nuclear programs and makes concessions on other military issues; (3) assembling an inter-

national coalition to apply diplomatic and economic pressure on North Korea; and (4) planning for future economic sanctions and military interdiction of North Korea shipping and air traffic through a Proliferation Security Initiative. China, South Korea, and Russia have criticized the Bush Administration for not negotiating directly with North Korea, and they voice opposition to economic sanctions and to the use of force against Pyongyang. China, Russia, and even South Korea increasingly have expressed support for North Korea's position in six-party talks facilitated by China, but the talks have made little progress. North Korea's announcement of February 10, 2005, suspending its participation in the talks, appears aimed at creating a long-term diplomatic stalemate on the nuclear issue. The six party meeting of July-August 2005 contained more substantive negotiations but revealed a larger gap between the U.S. and North Korean positions than existed at the last six party meeting in June 2004.

The crisis is the culmination of eight years of implementation of the 1994 Agreed Framework, which provides for the shutdown of North Korea's nuclear facilities in return for the annual delivery to North Korea of 500,000 tons of heavy oil and the construction in North Korea of two light water nuclear reactors.

## MOST RECENT DEVELOPMENTS

After two sessions of six party talks beginning in July 2005, the six governments issued their first statement on the North Korean nuclear issue on September 19, 2005, a six party statement of principles. In the statement, North Korea committed to “abandoning all nuclear weapons and existing nuclear programs,” and returning to the Nuclear Non-Proliferation Treaty and allowing safeguards inspections by the International Atomic Energy Agency (IAEA) “at an early date.” However, North Korea also received a major concession from the Bush Administration in a clause in which the six parties agreed to discuss “at an appropriate time” North Korea’s demand to receive light water nuclear reactors (LWRs). The statement did not address the core issue in dispute between the United States and North Korea: the timing of dismantlement of North Korea’s nuclear programs. The Bush Administration held before and after the statement that the process of dismantlement must be an early stage in a settlement process. North Korea insisted that dismantlement would be implemented only after North Korea physically receives LWRs — a process that would take ten years or more. In November 2005, North Korea instituted a second boycott of the talks (the first boycott lasted from August 2004 to July 2005), justifying it with the demand that the Bush Administration rescind financial sanctions against a bank in Macao that the Administration claimed was laundering counterfeit U.S. 100 dollar bills produced in North Korea. The Administration asserted that the counterfeiting-sanctions issue was separate from the nuclear issue and should not interfere with the Six-Party Talks.

## BACKGROUND AND ANALYSIS

### **The Second Bush Administration and the Six-Party Talks**

**Context and Results of the July-August and September 2005 Six Party Talks.** The context for the six party meeting of July-August and September 2005 appears to be the Bush Administration’s proposal at the six party meeting of June 2004 and North Korea’s response to it. The Administration’s proposal was the first comprehensive proposal the Administration had made at the talks. It called for a short-term dismantlement of North Korea’s plutonium and uranium enrichment programs following a three-month “preparatory period. During the preparatory period, North Korea would declare its nuclear facilities and materials, suspend their operation, allow effective international inspections including a return of the International Atomic Energy Agency (IAEA), and negotiate the steps to be taken in dismantlement. In return South Korea and Japan would supply North Korea with heavy oil. North Korea would receive a “provisional multilateral security assurance” against a U.S. attack. The United States and North Korea would begin talks over U.S. economic sanctions and North Korea’s inclusion on the U.S. list of terrorist-supporting countries. The participants in the talks also would begin a study of North Korea’s energy situation. After North Korea completed dismantlement (which Bush Administration officials say would take 2-3 years), it would receive a permanent security guarantee, and permanent solutions to its energy problems would be undertaken. On July 24, 2004, North Korea’s Foreign Ministry denounced the U.S. June 23 proposal as a “sham proposal.” North Korea then refused to attend another six party meeting (which had been tentatively set for September 2004) until

the United States ended its “hostile policy” and “nuclear threat” toward North Korea, and it linked dismantlement of its plutonium nuclear program to the satisfaction of these demands. It announced on February 10, 2005, that it was suspending participation in the talks. On March 31, it announced a radically new “regional disarmament” agenda for the talks, demanding that the United States substantially reduce its military presence in and around Korea and accept a “peace system” to replace the 1953 Korean armistice. It issued increasingly frequent and specific statements claiming that it possesses nuclear weapons.<sup>1</sup>

North Korea’s strategy and since July 2004 appears to have four objectives: (1) kill the Bush Administration’s proposal of June 2004, as a basis for negotiations on the nuclear issue; (2) establish a long-term diplomatic stalemate on the nuclear issue that will last at least through the second Bush Administration; (3) gain extended time to continue development of nuclear weapons programs; and (4) condition other governments to accept North Korea as a nuclear weapons state. Pyongyang followed four basic tactics in pursuing these objectives. First, with its “hostile policy” and “nuclear threat” demands and then with its regional disarmament agenda, North Korea progressively enlarged the gap between its proposals and agenda and the Bush Administration’s June 2004 proposal. Second, boycotting six party meetings for significant periods of time would help to insure a protracted diplomatic stalemate and continue to pressure the other six party participating governments to take benevolent positions toward North Korea’s agenda when meetings occurred. Third, by proclaiming itself a nuclear weapons states, North Korea probably seeks to gradually draw other states into at least a defacto recognition of North Korea’s claimed status as a diplomatic stalemate continues. Fourth, in April 2005, North Korea shut down its five electrical megawatt nuclear reactor after two years of operation and announced that it had removed 8,000 fuel rods from the reactor for conversion into weapons-grade plutonium. North Korea then started up the reactor in July 2005. In June 2005, North Korea reportedly resumed construction of larger 50 megawatt and 200 megawatt reactors that had been shut down in 1994 under the U.S.-North Korean Agreed Framework.

The key question regarding North Korea’s motives in agreeing to the July-August and September 2005 talks was whether Pyongyang had decided to modify or abandon these objectives or whether it viewed participating in the meeting as another tactic to pursue them, especially the goal of a long-term diplomatic stalemate. The July 25-August 7 meeting was decidedly different from the previous meetings. It was by far the longest of the meetings. U.S. officials engaged North Korean counterparts bilaterally nine times for a total of nearly nine hours. The Bush Administration adopted a new approach toward the June 2004 proposal, offering details and indicating flexibility. Assistant Secretary of State Christopher Hill reaffirmed the proposal; but in response to North Korean complaints that the proposal front-loaded North Korean obligations, he stated that the sequencing of U.S. and North Korean obligations in the proposal could be the subject of negotiations. Hill reiterated the U.S. demand that North Korea acknowledge a secret highly enriched uranium (HEU) nuclear program; but he reportedly laid before the North Koreans evidence of North Korea’s acquisitions of components for an HEU infrastructure and stated that there could be progress on other issues prior to a settlement of the HEU issue. The Bush Administration also

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<sup>1</sup> For assessments of diplomacy on the North Korean nuclear issue, see Sejong Institute (Seoul). *The Second Bush Administration and the Korean Peninsula*. Papers presented at the 2<sup>nd</sup> Korea-U.S. Security Forum, March 30-April 2, 2005.

endorsed strongly South Korea's offer of 2,000 megawatts of electricity to North Korea annually if Pyongyang dismantled its nuclear programs. (South Korea says it could start supplying electricity within three years of an agreement.) Hill also reportedly offered North Korea an exchange of liaison offices, a proposal that North Korea had agreed to in 1994 but then rejected in 1997. However, Hill did not offer North Korea full diplomatic relations in exchange for a settlement of the nuclear issue, as urged by South Korea and China. The Bush Administration continued to hold that full normalization of relations was linked to a settlement of other issues between the United States and North Korea. During the talks, Hill actively issued public statements promoting U.S. positions and critiquing North Korean positions; this apparently was an effort to counter North Korean propaganda, which had been effective through much of the earlier six party talks.

North Korean negotiators displayed a more moderate demeanor at the meetings than they had at previous meetings. They eschewed issuing the kind of threats that they had issued at past meetings (a nuclear test, proliferation of nuclear materials). However, North Korea hardened its substantive negotiating agenda at the meetings, particularly widening the gap further between its agenda and the Bush Administration's proposal. North Korea maintained the agenda it had set out at previous meetings. It reiterated its reward for freeze proposal in telling South Korean officials that South Korea's offer of electricity could be linked only to a freeze of North Korea's plutonium program rather than dismantlement. In reiterating its demand that it retain a "peaceful nuclear program," it put special emphasis on receiving light water nuclear reactors (LWRs). Moreover, North Korean negotiators reportedly asserted that dismantlement could be negotiated and implemented only after North Korea had light water reactors; in short, a deferral of dismantlement into the distant future. Pyongyang reiterated regarding dismantlement and receiving LWRs after the issuance of the six party statement. North Korea also reiterated its demand that the United States remove it from the U.S. list of terrorist-supporting states and end U.S. economic sanctions (i.e., U.S. withdrawal of opposition to North Korea receiving financial assistance from international financial institutions). North Korean negotiators continued to deny the U.S. charge that Pyongyang has a secret HEU program. North Korean chief negotiator, Kim Kye-gwan, reportedly said that the issue could be discussed further; but he added after the meeting's adjournment that the issue could be discussed if the United States presented "credible information or evidence" — an apparent negative reference to the evidence that Assistant Secretary Hill had laid out to him. The six party statement did not address the HEU program, and Christopher Hill later stated that a key U.S. aim at the next six party meeting would be to secure a North Korea admission of this program.

In addition to the old agenda with the new emphasis on light water reactors, North Korea also raised the "regional disarmament" agenda that it had announced on March 31, 2005. North Korean negotiators declared that North Korea would "abandon our nuclear weapons and nuclear program" when the United States agreed to "normalization" of relations and "nuclear threats from the United States are removed." They asserted that the United States must dismantle U.S. nuclear weapons in South Korea (the United States claims there are no nuclear weapons in South Korea), cease bringing nuclear weapons into South Korea, end the U.S. "nuclear umbrella" in the U.S. defense commitment to South Korea, and agree to negotiate a "peace mechanism" with North Korea to replace the 1953 Korean armistice agreement. The North Koreans also reportedly raised U.S. forces in Japan as part of the "U.S. nuclear threat." It appears that North Korea did not lay out the entirety of this agenda at the meetings. North Korean official commentary before and after the meeting also called

for restrictions on U.S. “nuclear strike forces” and joint U.S.-South Korean military exercises on the Korean peninsula, and a withdrawal of U.S. forces from South Korea under a peace mechanism. The commentary emphasized that major U.S. military concessions related to Pyongyang’s agenda is a requirement for settlement of the nuclear issue. In agreeing in the six party statement to a separate negotiations of a peace agreement, North Korea may have decided to shift its focus from the United States to South Korea, believing that South Korea now may be prepared to make greater concessions concerning U.S. troops in South Korea than the Bush Administration would.

The Bush Administration supported China’s effort to draft a statement of principles to present at the end of the meetings as a basis for future negotiations. China reportedly worked up four drafts without success but achieved the six party statement with the fifth draft that included the clause regarding LWRs. China reportedly pressured the Bush Administration hard to accept the fifth draft. South Korean officials expressed disagreement with the Bush Administration’s position that North Korea should not have a peaceful nuclear program as part of a settlement. The South Korean Foreign Ministry limited the appearance of disagreement by stipulating that North Korea first must rejoin the Nuclear Non-Proliferation Treaty, allow inspections by the IAEA, and dismantle nuclear weapons programs before it would gain the right to have peaceful nuclear facilities. South Korean officials also publicly rejected North Korea’s reward for freeze proposal and rejected the inclusion of a “peace mechanism” in a nuclear settlement. They also said that North Korea must accept a termination of the construction of the two light water reactors under the 1994 U.S.-North Korean Agreed Framework, which had been suspended in December 2002; but after the issuance of the six party statement, Seoul began to hedge on the status of the Agreed Framework reactors and the sequence of measures that would include discussion of LWRs.

## **Background to the Six-Party Talks**

The Bush Administration asserted on October 16, 2002, that North Korea had revealed to U.S. Assistant Secretary of State James Kelly in Pyongyang on October 5, 2002, that it had a secret nuclear weapons program based on highly enriched uranium (HEU). The program is based on the process of uranium enrichment, in contrast to North Korea’s pre-1995 nuclear program based on plutonium reprocessing. North Korea reportedly began a secret HEU program in the early 1990s with the assistance of Pakistan. North Korea provided Pakistan with intermediate-range ballistic missiles in the late 1990s, apparently as part of the deal.

The initial U.S. response was to secure a decision by the Korean Peninsula Energy Development Organization (KEDO) in November 2002 to end shipments of heavy oil to North Korea, which had been carried out under the U.S.-North Korean Agreed Framework of 1994. By their own admission, Bush Administration officials were surprised by the intensity of North Korea’s moves in late December 2002 to re-start plutonium-based nuclear facilities at Yongbyon and expel officials of the International Atomic Energy Agency (IAEA) placed there under the Agreed Framework to monitor the shutdown. North Korea restarted the five megawatt nuclear reactor shut down under the Agreed Framework. North Korea also announced that it would restart the plutonium reprocessing plant that operated up to 1994, and it later asserted that it had reprocessed 8,000 nuclear fuel rods, which had been in storage since 1994, into nuclear weapons-grade plutonium (U.S. intelligence reportedly has been unable to verify the exact state of reprocessing, but U.S. officials stated in late 2004 that

North Korea probably had reprocessed most or all of the 8,000 fuel rods and might have produced four to six atomic bombs). North Korea withdrew from the Nuclear Non-Proliferation Treaty (NPT) in January 2003. It justified its action by citing the U.S.-initiated cutoff of heavy oil shipments in December 2002 and by charging that the Bush Administration planned a “pre-emptive nuclear attack” on North Korea.

After October 2002, North Korea issued several threats, including a resumption of long-range missile tests, the proliferation of nuclear materials to other countries, and the testing of a nuclear weapon. Restarting the Yongbyon facilities opens up a possible North Korean intent or option to stage a “breakout” of its nuclear program by producing nuclear weapons through reprocessing the 8,000 fuel rods. According to estimates by nuclear experts and reportedly by U.S. intelligence agencies, if North Korea reprocessed the fuel rods, as it claims, it could produce four to six atomic bombs. Experts also have stated that North Korea could produce two or three additional nuclear weapons with the fuel rods apparently removed from the five megawatt reactor after the April 2005 shutdown. Such a nuclear breakout would diminish considerably any prospect of ending North Korea’s nuclear program diplomatically. Production of weapons-grade plutonium also would add substance to North Korea’s threat to export nuclear materials.

## The Six-Party Talks

**Bush Administration Policy.** The Administration’s policy since October 2002 is based on two views within the Administration. First, President Bush has voiced distrust of North Korea and its leader, Kim Jong-il. Second, there are divisions over policy within the Bush Administration. An influential coalition has consisted of Pentagon officials and advisers around Secretary of Defense Rumsfeld, officials of Vice President Cheney’s office, and proliferation experts in the State Department and White House led by former Undersecretary of State John Bolton. They reportedly oppose negotiations with North Korea, favor the issuance of demands for unilateral North Korean concessions on nuclear and other military issues, and advocate an overall U.S. strategy of isolating North Korea diplomatically and through economic sanctions and bringing about a collapse of the North Korean regime. A second coalition, mainly in the State Department, maintains that the Administration should attempt negotiations before adopting more coercive measures, and they reportedly doubt the effectiveness of a strategy to bring about a North Korean collapse.

Until the July-August 2005 six party meeting, the Administration’s policy had contained three elements: (1) a demand for an immediate North Korean commitment to dismantlement, (2) the avoidance of direct negotiations with North Korea until North Korea accepts dismantlement, and (3) the isolation of North Korea internationally. The Administration called on North Korea to commit to and take concrete measures to realize the “complete, verifiable, irreversible dismantlement” of its nuclear programs, both the plutonium program and the secret uranium enrichment program. This demand has become known as “CVID.” The Administration also asserted that North Korea must follow procedures similar to those being implemented by Libya, which has revealed details of its weapons of mass destruction and has turned over the weapons and related materials to the United States, other governments, and the International Atomic Energy Agency (IAEA). The Bush Administration eschewed substantive bilateral negotiations with North Korea. The

Administration stated that it would discuss ways to improve U.S.-North Korean relations only after North Korea accepts CVID and takes concrete measures to implement it.

Administration officials have spoken often since early 2003 about the objective of “isolating” North Korea. There have been two components of the Administration’s isolation goal. One is to isolate North Korea from any diplomatic support from other governments over the nuclear issue and create a bloc of governments demanding that North Korea accept CVID. The second component is the creation of a broad coalition of governments willing to impose economic sanctions on North Korea if North Korea rejects CVID. In May 2003, President Bush proposed a Proliferation Security Initiative (PSI) aimed at interdicting exports of weapons of mass destruction and illegal drugs by proliferator countries. The Administration reportedly has drafted plans for economic sanctions, including cutting off financial flows to North Korea from Japan and other sources, interdicting North Korean shipments of missiles and other weapons to the Middle East and South Asia, and cutting the flow of illicit goods from North Korea (drugs, counterfeit currency, etc.). The aim of the PSI would be to constrict sharply North Korean foreign exchange earnings, which are a major source of sustenance to the North Korean political elite and the North Korean military. Advocates of the PSI believe that such financial pressure could produce internal pressures within the regime that would result in either a North Korean capitulation to U.S. demands or the collapse of the Pyongyang regime. The Administration is pressuring several countries to cease purchases of North Korean missiles.

The Administration views the six-party talks as giving it a vehicle to secure support from China, South Korea, Japan, and Russia — North Korea’s immediate neighbors — for the U.S. demand that North Korea agree to total dismantlement of its nuclear programs. U.S. officials have spoken of creating a five versus one situation in the six-party talks, thus isolating North Korea. This in turn would lay the groundwork for the participation of China, South Korea, Japan, and Russia in sanctions against North Korea if North Korea rejected CVID — sanctions through the United Nations Security Council and/or the Proliferation Security Initiative. Throughout the talks, Administration officials expressed a view that North Korea would isolate itself through its provocative actions in reopening its plutonium nuclear program and its threats to proliferate nuclear materials and test nuclear weapons and missiles. The *Far Eastern Economic Review* of September 11, 2003, cited two U.S. officials as asserting that “it’s worse now for North Korea than it has been — this isolation” and that “we’re letting them dig their own grave.” U.S. officials were “convinced that Pyongyang’s [provocative] statements [at the August six-party meeting] were pushing its opponents closer together.” After North Korea’s announcements of February 2005, Secretary of State Condoleezza Rice contended that North Korea was “isolating” itself further.

The Administration has placed special emphasis on China’s role in the six-party talks. U.S. officials praise China’s role in hosting the meetings in Beijing. They state that China should exert diplomatic pressure on North Korea to accept CVID. The importance of China is pointed up by the mutual defense treaty China has with North Korea and China’s role in supplying North Korea with an estimated 90 % of its oil and 40% of its food.

However, from the start of multilateral talks, the other participants have voiced criticisms of the Administration’s positions. China, Russia, and South Korea have criticized the Administration for not negotiating directly with North Korea, and they have urged the Administration to propose detailed settlement proposals on the nuclear issue. They have

asserted that the Administration should spell out the reciprocal measures it would take if North Korea agreed to dismantle its nuclear programs. China, Russia, and South Korea issued no positive pronouncements toward the U.S. June 23, 2004, proposal. The Chinese and South Korean foreign ministers told Secretary of State Colin Powell in October 2004 that the Administration needed to formulate new, “creative” proposals. Russia, China, and South Korea also have voiced support for several of North Korea’s key positions in the six-party talks, including Pyongyang’s “reward for freeze” proposal and its denials that it has a secret HEU program. They also have expressed opposition to economic sanctions, and only Japan has joined the PSI. Russia, South Korea, and China did not criticize North Korea’s boycott of the six-party talks after July 2004, and their reactions to the North Korean announcements of February 2005 avoided direct criticism of North Korea. However, as cited earlier, the Administration appeared to gain some public support from South Korea and China in the aftermath of the July-August 2005 meeting.

**North Korea’s Counter-Strategy.** In the summer of 2003, in the wake of the perceived U.S. military victory in Iraq and negative international reactions to North Korea’s restarting of the plutonium program and threats, the North Korean leadership appeared worried that they faced international isolation and much heavier U.S. pressure. From that point, there emerged a multifaceted North Korean diplomatic strategy backed by a concerted propaganda campaign aimed primarily at strengthening Pyongyang’s position in the six-party talks and weakening the U.S. position. A lead component of North Korea’s strategy was to threaten that it would abandon the six-party talks, thus playing on the psychological fears of the other parties. North Korea also apparently employed this threat to demand that China, the host of the talks, provide it with financial subsidies and increased shipments of food and oil as “payment” for North Korean agreement to attend future sessions of the six parties in Beijing. North Korea also began to claim that it has nuclear weapons, reportedly first in private at the April 2003 Beijing talks and then publicly after the August 2003 Beijing meeting. Pyongyang publicly referred to possessing a “nuclear deterrent” but became more explicit in claiming nuclear “weapons” from September 2004 onwards.

But with these repeated threats, North Korea made a series of proposals: first, a formal U.S.-North Korean non-aggression pact, later modified to a formal U.S. guarantee that the United States would not attack North Korea; second, a long-term “freeze” of North Korea’s plutonium program; and third, retention by North Korea of a “peaceful” nuclear program. North Korean proposals also have called for extensive concessions by the United States and Japan, including removal of North Korea from the U.S. list of terrorist-supporting states, supply of electricity, several billion dollars in “compensation” from Japan, restoration of shipments of heavy oil and construction of the two light water nuclear reactors under the 1994 Agreed Framework, and an end to U.S. economic sanctions and U.S. interference in North Korea’s economic relations with other countries.

While purposefully keeping its proposals vague regarding content and its own obligations, North Korea engaged in a concerted propaganda campaign to promote its proposals. Propaganda, aimed especially at South Korea, Russia, and China asserted that a U.S. guarantee of non-aggression is necessary to prevent the Bush Administration from carrying out a plot to stage an “Iraq-like” unilateral attack. Pyongyang’s propaganda organs contended that a “freeze” of plutonium facilities is a logical “first stage” in a settlement process. The propaganda organs employed enticing captions, such as “simultaneous

actions,” “action versus action,” “simultaneous package deal,” “bold concessions,” and “non-interference in our economic development.”

Another element in North Korea’s counter-strategy has been a campaign to deny that it has a uranium enrichment (HEU) program. From the summer of 2003, North Korean propaganda organs escalated steadily denials of an HEU program and denials that North Korean officials admitted to an HEU program to Assistant Secretary of State James Kelly in October 2002. North Korean officials stressed this denial to visiting foreign delegations. North Korean propaganda organs compared U.S. claims of an HEU program to the perceived erroneous U.S. claims of weapons of mass destruction in Iraq, and they demanded that the United States provide evidence of its claim.

North Korea retained much of this strategy after the June 2004 six party meeting; but, as described previously, it initiated an actual boycott of the talks and enlarged its agenda as part of a strategy to “kill” the Bush Administration’s June 2004 proposal and create a long-term diplomatic stalemate on the nuclear issue.

## North Korea’s Nuclear Program

Most of North Korea’s plutonium-based nuclear installations are located at Yongbyon, 60 miles of the North Korean capital of Pyongyang. They are the facilities covered by the 1994 U.S.-North Korean Agreed Framework. The key installations are:<sup>2</sup>

- **An atomic reactor, with a capacity of about 5 electrical megawatts that began operating by 1987:** it is capable of expending enough reactor fuel to produce about 6 kilograms of plutonium annually — enough for the manufacture of a single atomic bomb annually. North Korea in 1989 shut down the reactor for about 70 days; U.S. intelligence agencies believe that North Korea removed fuel rods from the reactor at that time for reprocessing into plutonium suitable for nuclear weapons. In May 1994, North Korea shut down the reactor and removed about 8,000 fuel rods, which could be reprocessed into enough plutonium (25-30 kilograms) for 4-6 nuclear weapons. North Korea started operating the reactor again in February 2003, shut it down in April 2005, and said it had removed another 8,000 fuel rods. Experts believe that the reactor can produce enough material for six kilograms of weapons-grade plutonium annually, which would be close to enough plutonium for one atomic bomb per year.
- **Two larger (estimated 50 megawatts and 200 electrical megawatts) reactors under construction at Yongbyon and Taechon since 1984:** According to U.S. Ambassador Robert Gallucci, these plants, if completed, would be capable of producing enough spent fuel annually for 200 kilograms of plutonium, sufficient to manufacture nearly 30 atomic bombs per year. However, when North Korea re-opened the plutonium program in

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<sup>2</sup> Albright, David and O’Neill, Kevin. *Solving the North Korean Nuclear Puzzle*. Washington, D.C., Institute for Science and International Security Press, 2000. pp. 57-82.

early 2003, reports indicate that construction on the larger reactors was not resumed, but construction reportedly was resumed in June 2005.

- **A plutonium reprocessing plant about 600 feet long and several stories high:** The plant would separate weapons grade Plutonium-239 from spent nuclear fuel rods for insertion into the structure of atomic bombs or warheads. U.S. intelligence agencies reportedly detected North Korean preparations to restart the plutonium reprocessing plant in February and March 2003. According to press reports, the CIA estimated in late 2003 that North Korea had reprocessed some of the 8,000 fuel rods. In January 2004, North Korean officials showed a U.S. nuclear expert, Dr. Sigfried Hecker, samples of what they claimed were plutonium oxalate powder and plutonium metal. Dr. Hecker later said in testimony before the Senate Foreign Relations Committee (January 21, 2004) that, without testing, he could not confirm whether the sample was metallic plutonium “but all observations I was able to make are consistent with the sample being plutonium metal.”

Satellite photographs reportedly also show that the atomic reactors have no attached power lines, which they would have if used for electric power generation.

Persons interviewed for this study believe that North Korea developed the two reactors and the apparent reprocessing plant with its own resources and technology. It is believed that Kim Jong-il, the son and successor of President Kim Il-sung who died in July 1994, directs the program, and that the military and the Ministry of Public Security (North Korea’s version of the KGB) implement it. North Korea reportedly has about 3,000 scientists and research personnel devoted to the Yongbyon program. Many have studied nuclear technology (though not necessarily nuclear weapons production) in the Soviet Union and China and reportedly Pakistan. North Korea has uranium deposits, estimated at 26 million tons. North Korea is believed to have one uranium producing mine.

North Korea’s secret highly enriched uranium (HEU) program appears to date from at least 1996. Hwang Jang-yop, a Communist Party secretary who defected in 1997, has testified that North Korea and Pakistan agreed in the summer of 1996 to trade North Korean long-range missile technology for Pakistani HEU technology. Other information date North Korea-Pakistan cooperation to 1993. The Clinton Administration reportedly learned of it in 1998 or 1999, and a Department of Energy report of 1999 cited evidence of the program. In March 2000, President Clinton notified Congress that he was waiving certification that “North Korea is not seeking to develop or acquire the capability to enrich uranium.” The Japanese newspaper *Sankei Shimbun* reported on June 9, 2000, the contents of a “detailed report” from Chinese government sources on a secret North Korean uranium enrichment facility inside North Korea’s Mount Chonma. Reportedly, according to a CIA report to Congress, North Korea attempted in late 2001 to acquire “centrifuge-related materials in large quantities to support a uranium enrichment program.” The CIA estimated publicly in December 2002 that North Korea could produce two atomic bombs annually through HEU beginning in 2005; other intelligence estimates reportedly project a bomb producing capability between 2005 and 2007. Ambassador Robert Galucci, who negotiated the 1994 U.S.-North Korean Agreed Framework, and Mitchell Reiss, head of the State Department’s Policy Planning Bureau until 2004, have stated that a functioning North Korean HEU

infrastructure could produce enough HEU for “two or more nuclear weapons per year.” The *Washington Post* of April 28, 2004, quoted a U.S. intelligence official saying that a North Korean HEU infrastructure could produce as many as six atomic bombs annually. Administration officials have stated that they do not know the locations of North Korea’s uranium enrichment program or whether North Korea has assembled the infrastructure to produce uranium-based atomic bombs; but U.S. intelligence agencies reportedly have extensive information on North Korea’s accelerated overseas purchases of equipment and materials for the uranium enrichment program since early 1999.

## **International Assistance**

Knowledgeable individuals believe that the Soviet Union did not assist directly in the development of Yongbyon in the 1980s. The U.S.S.R. provided North Korea with a small research reactor in the 1960s, which also is at Yongbyon. However, North Korean nuclear scientists continued to receive training in the U.S.S.R. up to the demise of the Soviet Union in December 1991. East German and Russian nuclear and missile scientists reportedly were in North Korea throughout the 1990s. Since 1999, reports have appeared that U.S. intelligence agencies had information that Chinese enterprises were supplying important components and raw materials for North Korea’s missile program.

## **North Korea’s Delivery Systems**

North Korea succeeded by 1998 in developing a “Nodong” missile with a range estimated at up to 900 miles, capable of covering South Korea and most of Japan. North Korea reportedly deployed nearly 100 Nodong missiles by 2003. On August 31, 1998, North Korea test fired a three-stage rocket, apparently the prototype of the Taepo Dong-1 missile; the third stage apparently was an attempt to launch a satellite. U.S. intelligence estimates reportedly concluded that such a missile would have the range to reach Alaska, Guam, and the Northern Marianas Commonwealth. Media reports in early 2000 cited U.S. intelligence findings that without further flight tests, North Korea could deploy an intercontinental ballistic missile that would be capable of striking Alaska, Hawaii, and the U.S. west coast. Japan’s *Sankei Shimbun* newspaper reported on August 6, 2003, that North Korea and Iran were negotiating a deal for the export of the long-range Taepo Dong-2 missile to Iran and the joint development of nuclear warheads. U.S. officials reportedly told Japanese counterparts in July 2003 that North Korea was close to developing nuclear warheads for its missiles. They claimed in September 2003 that North Korea had developed a more accurate, longer-range intermediate ballistic missile that could reach Okinawa and Guam (site of major U.S. military bases) and that there was evidence that North Korea had produced the Taepo Dong-2, which could reach Alaska, Hawaii, and the U.S. west coast. Reports in mid-1994 indicated that North Korea was close to completing underground missile bases for the advanced intermediate-range missiles.

These projections led the Clinton Administration to press North Korea for new talks over North Korea’s missile program. In talks held in 1999 and 2000, North Korea demanded \$1 billion annually in exchange for a promise not to export missiles. U.S. negotiators rejected North Korea’s demand for \$1 billion but offered a lifting of U.S. economic sanctions. This laid the ground for the Berlin agreement of September 1999, in which North Korea agreed to defer further missile tests in return for the lifting of major U.S. economic sanctions. President Clinton formalized the lifting of key economic sanctions against North

Korea in June 2000. North Korea continued the moratorium, but it appears to have used Pakistan and Iran as surrogates in testing intermediate-range missiles based on North Korean technology. (See CRS Report RS21473, *North Korean Ballistic Missile Threat to the United States*, by Andrew Feickert.)

## State of Nuclear Weapons Development

A CIA statement of August 18, 2003, estimated “that North Korea has produced one or two simple fission-type nuclear weapons and has validated the designs without conducting yield-producing nuclear tests.” The initial estimate of one or two nuclear weapons is derived primarily from North Korea’s approximately 70-day shutdown of the five megawatt reactor in 1989, which would have given it the opportunity to remove nuclear fuel rods, from which plutonium is reprocessed. The U.S. Central Intelligence Agency (CIA) and the Defense Intelligence Agency (DIA) reportedly estimated in late 1993 that North Korea extracted enough fuel rods for about 12 kilograms of plutonium — sufficient for one or two atomic bombs. The CIA and DIA apparently based their estimate on the 1989 shutdown of the five megawatt reactor.<sup>3</sup>

South Korean and Japanese intelligence estimates reportedly were higher: 16-24 kilograms (Japan) and 7-22 kilograms (South Korea). These estimates reportedly are based on the view that North Korea could have acquired a higher volume of plutonium from the 1989 reactor shutdown and the view of a higher possibility that North Korea removed fuel rods during the 1990 and 1991 reactor slowdowns. Russian Defense Ministry analyses of late 1993 reportedly came to a similar estimate of about 20 kilograms of plutonium, enough for two or three atomic bombs. If, as it claims, North Korea reprocessed the 8,000 nuclear fuel rods in 2003 that it had moved from storage at the beginning of that year, North Korea gained an additional 25-30 kilograms of plutonium, according to Dr. Sigfried Hecker in his testimony before the Senate Foreign Relations Committee on January 21, 2004. Dr. Hecker, former director of the Los Alamos laboratories, had visited North Korea’s Yongbyon nuclear complex in early January 2004. U.S. officials and nuclear experts have stated that this amount of plutonium would give North Korea the potential to produce between four and six atomic bombs. These estimates appear to be based on projections that a country like North Korea would need 6-8 kilograms of plutonium to produce one atomic bomb. The IAEA has had a standard that a non-nuclear state would need about eight kilograms of plutonium to produce an atomic bomb.

Russian intelligence agencies also reportedly have learned of significant technological advances by North Korea toward nuclear weapons production. On March 10, 1992, the Russian newspaper *Argumenty I Fakty* (Arguments and Facts) published the text of a 1990 Soviet KGB report to the Soviet Central Committee on North Korea’s nuclear program. It was published again by *Izvestiya* on June 24, 1994. The KGB report asserted that “According to available data, development of the first nuclear device has been completed at the DPRK nuclear research center in Yongbyon.” The North Korean government, the report stated, had decided not to test the device in order to avoid international detection.

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<sup>3</sup> Ibid., p. 111-166. Kim Kyoung-soo. *North Korea’s Weapons of Mass Destruction: Problems and Prospects*. Elizabeth, New Jersey, and Seoul, Hollym, 2004. p. 27-50.

Additionally, a number of reports and evidence point to at least a middle-range likelihood that North Korea may have smuggled plutonium from Russia. In June 1994, the head of Russia's Counterintelligence Service (successor to the KGB) said at a press conference that North Korea's attempts to smuggle "components of nuclear arms production" from Russia caused his agency "special anxiety." U.S. executive branch officials have expressed concern in background briefings over the possibility that North Korea has smuggled plutonium from Russia. One U.S. official, quoted in the *Washington Times*, July 5, 1994, asserted that "There is the possibility that things having gotten over the [Russia-North Korea] border without anybody being aware of it." The most specific claim came in the German news magazine *Stern* in March 1993, which cited Russian Counterintelligence Service reports that North Korea had smuggled 56 kilograms of plutonium (enough for 7-9 atomic bombs) from Russia.

According to press reports in late 2002, the CIA concluded that North Korea accelerated its uranium enrichment program in the 1999, 2000, and 2001. According to *U.S. News and World Report*, September 1, 2003, the CIA estimated that North Korea could produce a uranium-based atomic weapon by the second half of 2004.

## **Diplomatic Background to the Agreed Framework and Amending Agreements**

North Korea signed the Nuclear Non-Proliferation Treaty (NPT) in 1985. In a denuclearization agreement signed in December 1991, North Korea and South Korea pledged not to possess nuclear weapons, not to possess plutonium reprocessing or uranium enrichment facilities, and to negotiate a mutual nuclear inspection system. In January 1992, North Korea signed a safeguards agreement with the International Atomic Energy Agency (IAEA), which requires North Korea to report all nuclear programs to the IAEA and gives the IAEA the right to conduct a range of inspections of North Korean nuclear installations and programs. In 1992, North Korea rebuffed South Korea regarding implementation of the denuclearization agreement, but it did allow the IAEA to conduct six inspections during the period June 1992-February 1993.

In late 1992, the IAEA found evidence that North Korea had reprocessed more plutonium than the 80 grams it had disclosed to the agency. In February 1993, the IAEA invoked a provision in the safeguards agreement and called for a "special inspection" of two concealed but apparent nuclear waste sites at Yongbyon. The IAEA believed that a special inspection would uncover information on the amount of plutonium which North Korea had produced since 1989. North Korea rejected the IAEA request and announced on March 12, 1993, an intention to withdraw from the NPT.

The NPT withdrawal threat led to low- and higher-level diplomatic talks between North Korea and the Clinton Administration. In May 1994, North Korea refused to allow the IAEA to inspect the 8,000 fuel rods that it had removed from the five-megawatt reactor. In June 1994, North Korea's President Kim Il-sung reactivated a longstanding invitation to former U.S. President Jimmy Carter to visit Pyongyang. Kim offered Carter a freeze of North Korea's nuclear facilities and operations. Kim took this initiative after China reportedly informed him that it would not veto a first round of economic sanctions, which the Clinton

Administration had proposed to members of the U.N. Security Council. According to former Defense Secretary William Perry, the Pentagon also developed a contingency plan to bomb the Yongbyon nuclear facilities if North Korea began to reprocess the 8,000 fuel rods into weapons-grade plutonium. The Clinton Administration reacted to Kim's proposal by dropping its sanctions proposal and entering into a new round of high-level negotiations with North Korea. This negotiation led to the Agreed Framework of October 21, 1994.<sup>4</sup>

## **The Agreed Framework: Provisions, Implementation, Costs, Future Issues**

The heart of the Agreed Framework was a U.S. commitment to provide North Korea with a package of nuclear, energy, economic, and diplomatic benefits; in return North Korea would halt the operations and infrastructure development of its nuclear program.<sup>5</sup> The Agreed Framework committed North Korea to "freeze its graphite-moderated reactors and related facilities" with the freeze monitored by the IAEA. Ambassador Robert Gallucci, who negotiated for the United States, stated that "related facilities" include the plutonium reprocessing plant and 8,000 stored fuel rods. Clinton Administration officials reportedly said that a secret "confidential minute" to the Agreed Framework prohibits North Korea from construction of new nuclear facilities elsewhere in North Korea.

Gallucci and other officials emphasized that the key policy objective of the Clinton Administration was to secure a freeze of North Korea's nuclear program in order to prevent North Korea from producing large quantities of nuclear weapons grade plutonium through the operations of the 50 and 200 megawatt reactors and the plutonium reprocessing plant at Yongbyon. Gallucci referred to the prospect of North Korea producing enough plutonium annually for nearly 30 nuclear weapons if the 50 and 200 megawatt reactors went into operation.

### **Benefits to North Korea**

**Light Water Nuclear Reactors.** North Korea was to receive two light water reactors (LWRs) with a generating capacity of approximately 2,000 megawatts. The Agreed Framework set a "target date" of 2003. The United States was obligated to organize an international consortium arrangement for the acquisition and financing of the reactors. The Clinton Administration and the governments of South Korea, Japan, and other countries established in March 1995 the Korean Peninsula Energy Development Organization (KEDO) to coordinate the provision of the LWRs. After the groundbreaking at the reactor site in August 1997, KEDO officials changed the estimated completion date from 2003 to 2007; other experts predicted a much later date. The laying of the foundation for the LWRs occurred in August 2002 just before the Kelly mission to North Korea and the Bush Administration's subsequent suspension of construction.

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<sup>4</sup> Wit, Joel S., Poneman, Daniel B., and Gallucci, Robert L. *The First North Korean Nuclear Crisis: Going Critical*. Washington, D.C., Brookings Institution Press, 2004. p. 192-330.

<sup>5</sup> *Ibid.*, p. 421-423.

**Oil at No Cost.** The Agreed Framework committed the United States to provide North Korea 500,000 metric tons of heavy oil to North Korea annually until the first of the two light water reactors became operational. The oil shipments continued until KEDO's decision in November 2002 to cancel future shipments..

**Diplomatic Representation.** The United States and North Korea announced in the Agreed Framework an intention to open liaison offices in each other's capitals and establish full diplomatic relations if the two governments make progress "on issues of concern to each side." However, North Korea displayed reluctance to finalize arrangements, and talks over liaison offices ended in 1997. Ambassador Gallucci asserted that a full normalization of diplomatic relations would depend on a successful resolution of non-nuclear military issues, especially the heavy deployment of North Korean conventional military forces along the demilitarized zone separating North and South Korea and North Korea's program to develop and sell longer-range missiles to other governments. In October 1999, William Perry, the Administration's Special Adviser on North Korea, cited normalization of diplomatic relations as one of the benefits which the United States could offer North Korea for new agreements on nuclear and missile issues.

**Lifting the U.S. Economic Embargo.** The Agreed Framework specifies that within three months from October 21, 1994, the two sides would reduce barriers to trade and investment, including restrictions on telecommunications services and financial transactions. This required the Clinton Administration to relax the U.S. economic embargo on North Korea, which the Truman Administration and Congress put in place during the Korean War. On January 20, 1995, the Administration announced initial, limited measures. North Korea complained loudly that these measures failed to meet the commitment stated in the Agreed Framework. In U.S.-North Korean talks in September 1999, the United States agreed to end a broader range of economic sanctions in exchange for a North Korean moratorium on future missile testing. President Clinton ordered the end of most economic sanctions in June 2000. Since then, North Korea has not met with any American firms to talk about trade and/or investment opportunities and has rejected an offer from the American Chamber of Commerce in Seoul to send a business delegation to Pyongyang.

**U.S. Nuclear Security Guarantee.** Article III of the Agreed Framework states that "Both sides will work together for peace and security on a nuclear-free Korean peninsula." Under that heading, it states, "The U.S. will provide formal assurances to the DPRK against the threat or use of nuclear weapons by the U.S." While the language is not totally clear on the timing of the U.S. delivery of a formal nuclear security guarantee, it seems to imply that this would come when North Korea had dismantled its nuclear program or at least had advanced dismantlement to a considerable degree.

## **North Korean Obligations Beyond the Freeze of the Nuclear Program**

North Korea's immediate obligation was to freeze its existing nuclear installations. The Agreed Framework alluded to certain other obligations for Pyongyang. Ambassador Gallucci and other Clinton Administration officials were more specific in describing these. They disclosed the existence of a secret minute that the Administration and North Korea concluded in conjunction with completion of the Agreed Framework. North Korea, however, has not acknowledged such a secret minute.

**Inspections and Broader Nuclear Obligations.** The Agreed Framework stated, “The DPRK will remain a party to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and will allow implementation of its [1992] safeguards agreement under the Treaty.” Gallucci stated in congressional testimony that the Agreed Framework did not restrict the right of the IAEA to invoke special inspections if it discovered any new North Korean nuclear activities. Gallucci said that the Agreed Framework only restricted the IAEA with respect to the two suspected nuclear waste sites and the nuclear installations and the stored fuel rods at Yongbyon and Taechon. He stressed that any new North Korean nuclear program would fall immediately under the IAEA-North Korea safeguards agreement and that North Korea must place it under IAEA safeguards. Failure to do so, he said, would constitute a violation of the Agreed Framework. Thus, North Korea’s secret HEU program violated this clause of the Agreed Framework.

In the Agreed Framework, North Korea pledged to “consistently take steps to implement the [1991] North-South Joint Declaration on the Denuclearization of the Korean Peninsula.” North Korea thus extended its obligations to South Korea in the North-South denuclearization agreement to the United States. This clause of the Agreed Framework also is relevant to North Korea’s secret HEU program, since the North-South denuclearization agreement specifically prohibits uranium enrichment.

**Disposition of Fuel Rods from the Five Megawatt Reactor.** The Agreed Framework provided for the storage of the rods in North Korea under IAEA monitoring and a North Korean promise not to reprocess plutonium from the rods. It also provided for subsequent talks on the “ultimate disposition” of the rods.

**Dismantlement of Nuclear Installations.** The Agreed Framework states that “Dismantlement of the DPRK’s graphite-moderated reactors and related facilities will be completed when the LWR project is completed.” North Korea’s proposal at the 2003 Beijing talks in effect would continue the linkage between dismantlement and completion of the light water reactors. The Bush Administration wants dismantlement much earlier in a settlement process.

## Role of Congress

Congress voiced skepticism regarding the Agreed Framework, but its appropriations gave the Administration flexibility in implementing U.S. obligations, including heavy oil shipments. Congress included in the Omnibus Appropriations bill for FY1999 (H.R. 4328) the requirement that the President certify progress in negotiations with North Korea over the nuclear, missile, and other issues before the Administration could allocate money to KEDO operations. President Clinton issued two such certifications in 1999 and 2000; in 2000, he said that he could not certify that North Korea was not engaged in uranium enrichment.

On October 20, 1994, President Clinton sent a letter to North Korean leader Kim Jong-il, stating that he “will use the full powers of my office” to carry out U.S. obligations related to light water reactors and alternative energy [oil]. President Clinton added that if contemplated arrangements for light water reactors and alternative energy were not completed, he would use the powers of his office to provide light water reactors and

alternative energy from the United States “subject to the approval of the U.S. Congress.” The Bush Administration did not request funding for KEDO in FY2004 and FY2005.

## FOR ADDITIONAL READING

CRS Issue Brief IB98045, *Korea: U.S.-South Korean Relations — Issues for Congress*, by Larry A. Niksch.

CRS Report RL31555, *China and Proliferation of Weapons of Mass Destruction and Missiles: Policy Issues*, by Shirley A. Kan.

CRS Report RS21473, *North Korean Ballistic Missile Threat to the United States*, by Andrew Feickert.

CRS Report RL31696, *North Korea: Economic Sanctions*, by Dianne E. Rennack.

CRS Report RL31785, *Foreign Assistance to North Korea*, by Mark E. Manyin.