

LA-UR-04-5828

Approved for public release;
distribution is unlimited.

Title: The North Korean Nuclear Dilemma

Author(s): Siegfried S. Hecker

Submitted to: Science Seminar,
Russian Federal Nuclear Center VNIIEF
Sarov, Russia
August 31, 2004



Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the University of California for the U.S. Department of Energy under contract W-7405-ENG-36. By acceptance of this article, the publisher recognizes that the U.S. Government retains a nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.

Form 836 (8/00)

The North Korean Nuclear Dilemma
Siegfried S. Hecker
Los Alamos National Laboratory
For presentation at Science Seminar
Russian Federal Nuclear Center VNIIEF
Sarov, Russia
August 31, 2004

The current nuclear crisis, the second one in ten years, erupted when North Korea expelled international nuclear inspectors in December 2002, then withdrew from the Nuclear Nonproliferation Treaty (NPT), and claimed to be building more nuclear weapons with the plutonium extracted from the spent fuel rods heretofore stored under international inspection. These actions were triggered by a disagreement over U.S. assertions that North Korea had violated the Agreed Framework (which froze the plutonium path to nuclear weapons to end the first crisis in 1994) by clandestinely developing uranium enrichment capabilities providing an alternative path to nuclear weapons.

With Stanford University Professor John Lewis and three other Americans, I was allowed to visit the Yongbyon Nuclear Center on Jan. 8, 2004. We toured the 5 MWe reactor, the 50 MWe reactor construction site, the spent fuel pool storage building, and the radiochemical laboratory. We concluded that North Korea has restarted its 5 MWe reactor (which produces roughly 6 kg of plutonium annually), it removed the 8000 spent fuel rods that were previously stored under IAEA safeguards from the spent fuel pool, and that it most likely extracted the 25 to 30 kg of plutonium contained in these fuel rods. Although North Korean officials showed us what they claimed was their plutonium metal product from this reprocessing campaign, we were not able to conclude definitively that it was in fact plutonium metal and that it came from the most recent reprocessing campaign. Nevertheless, our North Korean hosts demonstrated that they had the capability, the facility and requisite capacity, and the technical expertise to produce plutonium metal.

On the basis of our visit, we were not able to address the issue of whether or not North Korea had a “deterrent” as claimed – that is, we were not able to conclude that North Korea can build a nuclear device and that it can integrate nuclear devices into suitable delivery systems. However, based on the capabilities we saw, we must assume that North Korea has the capability to produce a crude nuclear device. On the matter of uranium enrichment programs, our host categorically denied that North Korea has a uranium enrichment program – he said, “we have no program, no equipment, and no technical expertise for uranium enrichment.” The denials were not convincing at the time and since then have proven to be quite hollow by the revelations of A.Q. Khan’s nuclear black market activities.

There is no easy solution to the nuclear crisis in North Korea. A military strike to eliminate the nuclear facilities was never very attractive and now has been overcome by

events. The principal threat is posed by a stockpile of nuclear weapons and weapons-grade plutonium. We have no way of finding where either may be hidden. A diplomatic solution remains the only path forward, but it has proven elusive. All sides have proclaimed a nuclear weapons-free Korean Peninsula as the end goal. The U.S. Government has chosen to negotiate with North Korea by means of the six-party talks. It has very clearly outlined its position of insisting on complete, verifiable, irreversible dismantlement of all North Korean nuclear programs. North Korea has offered several versions of “re-freezing” its plutonium program while still denying a uranium enrichment program. It has insisted on simultaneous and reciprocal steps to a final solution.

Regardless of which diplomatic path is chosen, the scientific challenges of eliminating the North Korean nuclear weapons programs (and its associated infrastructure) in a safe, secure, and verifiable manner are immense. The North Korean program is considerably more complex and developed than the fledgling Iraqi program of 1991 and Libyan program of 2004. It is more along the lines, but more complex than that of South Africa in the early 1990s. Actions taken or not taken by the North Koreans at their nuclear facilities during the course of the ongoing diplomatic discussions are key to whether or not the nuclear program can be eliminated safely and securely, and they will greatly influence the price tag for such operations. Moreover, they will determine whether or not one can verify complete elimination. Hence, cooperation of the North Koreans now and during the dismantlement and elimination stages is crucial. Technical discussions among specialists, perhaps within the framework of the working groups of the six-party talks, could be very productive in setting the stage for an effective, verifiable elimination of North Korea’s nuclear weapons program.