SCIENCE & GLOBAL SECURITY
2023, VOL. 31, NOS. 1–2, 48–53

Routledge
Taylor & Francis Group

BOOK REVIEW

Hinge Points: An Inside Look at North Korea's Nuclear Program by Siegfried S. Hecker and Elliot A. Serbin (Stanford University Press, 2023), 386 pages.

In his informative new book, Siegfried Hecker has done what very few Americans are better equipped to do: link the technical aspects of North Korea's nuclear and missile developments with their political purposes in North Korea's two-track strategy. Those political purposes were to ameliorate the threat North Korea perceived from the United States and to hedge against domination by China by negotiating a fundamental improvement in relations with the United States in return for major constraints on its own weapons programs—a purpose that few in Washington ever recognized.

In Hecker's judgment, "Washington's North Korea policies seldom incorporated sound technical analysis, either because such analysis was not sought out by policy makers or because it was contrary to Washington's policy assumptions and political priorities." Hecker is well positioned to render this judgment.

Technically knowledgeable, Hecker is a metallurgist with a remarkable career trajectory that spanned three decades at Los Alamos National Laboratory where he was director from 1986 to 1997. Hecker's directorship began during the period when the Soviet Union opened up and then disintegrated. Responding with vision, Hecker led the Department of Energy's three nuclear weapons laboratories into cooperative endeavors with their Soviet and then Russian counterparts. This cooperation started with joint lab calibrations of the seismic signals from each other's test sites to resolve accusations from hardliners in the Reagan Administration that the Soviets had been cheating on the Threshold Test Ban Treaty—accusations that were false. After the disintegration of the Soviet Union, continuing "lab-to-lab" cooperation helped Russia upgrade the security of its plutonium and highly enriched uranium stocks in its new more open internal environment.[1] Finally, Hecker initiated joint work at the Soviet test site in Kazakhstan to make less accessible the plutonium left there in the residues from Soviet hydronuclear and zero-yield tests, enough for tens of nuclear bombs.[2]

For access and North Korea policy analysis, Hecker benefited from relationships with experienced specialists, notably the late John Lewis, an Asia expert and coauthor of a pathbreaking history of China's nuclear program,[3] and former State Department Korea analyst Robert Carlin. After Hecker retired from Los Alamos and moved to Stanford's Center for International Security and Cooperation in 2005, he was invited to accompany a delegation Lewis had formed to meet with officials in North Korea's capital, Pyongyang. On that trip, Hecker learned that, with the authority of an ex-director of Los Alamos, he could play an important role in helping open up North Korea's nuclear program. Between 2004 and 2010, Hecker's participation helped secure invitations on four occasions for Lewis' delegations to visit Yongbyon, North Korea's first and foremost site for producing nuclear materials, and to hold frank discussions with senior North Korean diplomatic and military officials.

During the first visit to Yongbyon, in 2004, the delegation's hosts showed the group that North Korea had succeeded in separating significant quantities of plutonium from the fuel of a small reactor on the site. Plutonium was the fissionable material in the Nagasaki bomb. The message was obvious: Pyongyang had the wherewithal to make a bomb.

In the delegation's last visit to Yongbyon, in 2010, it was shown a complete and operational gas centrifuge uranium enrichment facility. They were told the facility was producing low-enriched uranium, but it was obvious that, at undetected enrichment facilities elsewhere, North Korea could make highly enriched uranium, the fissionable material in the Hiroshima bomb. Bombing North Korea's plutonium production reactor, which the Clinton Administration had almost done,[4] could therefore not end its nuclear buildup.

Beyond revealing their nuclear weapons advances, the Kim dynasty was communicating something else, that it wanted to negotiate with the United States, and showing off what it could do if Washington refused to engage.

That stance was rarely appreciated in Washington, a source of frustration to Hecker:

> The conventional wisdom that I encountered again and again was that good faith American efforts to halt the North's nuclear program were circumvented by the North's repeated violations of diplomatic agreements. Over the years, I found this perspective to be neither true nor helpful. It lets Washington off the hook too easily for its own failures and does not tell us why we are in the current predicament.

This was evident from the start. In 1994, at a time when North Korea had no nuclear weapons, with the assistance of a visit by former president Jimmy Carter, Kim Il Sung, the grandfather of current North Korean leader, Kim Jong Un, had concluded an initial deal with the United States, an "Agreed Framework," under which North Korea, with IAEA and U.S. on-site verification, had shut down its gas-cooled plutonium production reactor and the chemical reprocessing facility built to separate plutonium from that reactor's irradiated fuel. North Korea also halted construction on two much larger production reactors that, if completed, could have increased its plutonium production rate 50-fold.[5] Despite the ups and downs of North Korea's subsequent nuclear diplomacy with the United States, construction on those reactors was never resumed. In exchange, Washington pledged to "move toward full political and economic normalization" and U.S. allies, South Korea, and Japan, committed to building two large, water-cooled reactors on North Korea's east coast, to be completed once Pyongyang came into full compliance with the Nonproliferation Treaty.

In one of several "hinge points" in this saga, however, the successor G.W. Bush Administration. took over and pulled out of the deal because of accumulating intelligence that North Korea was covertly developing a uranium enrichment program. In response, North Korea told IAEA and U.S. personnel to go home and, free of monitoring, North Korea resumed plutonium production and stepped up its enrichment efforts. In Hecker's assessment, by not doing a risk/benefit analysis, the Bush administration "had failed to anticipate the technical consequences and ensuing nuclear security risks of its political decision to walk away from a diplomatic agreement that had halted activities at the nuclear complex for eight years." That laid the basis for the first of Hecker's visits to Yongbyon where he was shown what lay in store for Washington if it disengaged.

The Bush Administration subsequently reconsidered and asked China to host "Six-Party" talks with China, Japan, Russia, and South Korea lined up with the United States at the negotiating table confronting North Korea with a demand for "complete, verifiable and irreversible dismantlement" of North Korea's nuclear programs. The lack of progress occasioned Hecker's first visit to Yongbyon, during which he was shown its "product," a jar containing a small amount of plutonium in metallic form.

The Six-Party talks eventually produced a joint declaration that revived elements of the 1994 Agreed Framework. Bush Administration hardliners managed to unravel that accord, however, by insisting that North Korea be denied a civilian nuclear power program because such a program could provide a cover for a latent nuclear weapon program. Hecker argues once again that a risk/benefit analysis would have demonstrated the value of the renewed restraints on North Korea's nuclear arming.

In 2006, North Korea conducted its first nuclear test, which fizzled, and began to test longer-range ballistic missiles. This led to much tougher sanctions that did little, however, to curb North Korea's weapons advances. Once again, when the Bush Administration returned to talks, they achieved progress, including the shutdown and temporary disabling of the Yongbyon reactor and reprocessing plant, and renewed inspections. A declaration by the North of its nuclear assets proved controversial, however. So did disclosure, after an Israeli air strike, that a Syrian plutonium-production reactor had been nearing completion with North Korean assistance. At the end of the Bush Administration, the deal collapsed once again, this time over the U.S. demand for physical verification of North Korea's declaration of its past nuclear material production.[6]

The Obama Administration took over in 2009 but quickly decided that negotiating with the North Korea was, in President Obama's words, to participate in a "cycle of provocation, extortion and reward." Instead, the Obama Administration adopted a posture of "strategic patience," relying on sanctions and diplomatic pressure and hoping for the best, while it invested its nonproliferation energies elsewhere.

Soon after Obama's inauguration, Hecker was again in North Korea, where he concluded that Pyongyang had "set a trap" for the fledgling administration: "a scenario in which North Korea would conduct a satellite launch, which would force the administration to argue for strong UN sanctions." That in turn would "give Pyongyang justification to conduct the second nuclear test," expel the inspectors, and restart plutonium production in Yongbyon. The North delayed the satellite launch until April to give the Obama Administration time to reconsider its stance and then sprang the trap.

Hecker returned to Yongbyon in November 2010 where, to his astonishment, he and his colleagues were given a guided tour of a fully operating enrichment plant with some 2000 centrifuges arrayed in six cascades. Despite his urgings, it would take months before negotiations resumed in earnest but, by the time of the death of Kim Jong Il (father and predecessor of the current leader, Kim Jong Un) in December 2011, a deal was pending that, in return for some $240 million in nutritional aid, North Korea would halt plutonium and uranium production at Yongbyon, readmit inspectors, and suspend its nuclear and ballistic missile testing. The accord was not formalized in a document but was announced separately by the two sides on Leap Day 2012. When Kim Jong Un went ahead with an attempted satellite launch that failed, however, the Obama Administration blew up the deal. That decision was another hinge point and, in Hecker's assessment, "yet another example of how U.S. policy and technical assessments were decoupled."

Hecker provides a scathing summary of what he feels was a missed opportunity by an administration that was willing and able to negotiate successfully with another so-called "rogue" state, Iran:

> President Obama came into office with North Korea having conducted one nuclear test, perhaps having amassed sufficient plutonium for five or so primitive nuclear

> weapons, yet with no capability to deliver these on missiles. He was leaving with North Korea having added four more nuclear tests, sufficient plutonium and highly enriched uranium for roughly twenty-five nuclear weapons, and impressive demonstrations of missile capabilities through dozens of successful missile tests.

Obama's successor, President Trump, did negotiate with North Korea, in his own mercurial manner. Hecker, Serbin, and Carlin tried to support this effort by studying the record of North Korea's weapons development and negotiating behavior to divine what limitations on its programs might be achievable. They recommended as high-priority initial objectives: "no nuclear tests; no intermediate- or long-range missile tests; no more production of plutonium and highly enriched uranium; and no export of nuclear weapons, materials or technologies."

In fact, in anticipation of his first meeting with Trump in Singapore, Kim Jong Un did suspend North Korea's nuclear and long-range ballistic missile tests. Trump reciprocated by suspending the large joint annual U.S.-South Korea military exercises that the North Korean security establishment saw as potentially masking preparations for an invasion, but resumed the exercises a few months later.

The Singapore meeting could have been a good start, but Trump was out of his depth and, as in the Bush Administration, infighting between those who, like negotiator Steve Biegun, wanted to take advantage of the opening that had been created, and the hardliners led by National Security Advisor John Bolton, drained the energy out of the effort. Offers in Kim Jong Un's letters to Trump of further actions, such as a shutdown of the key parts of the North Korea's nuclear weapons program at Yongbyon, went unheeded at the 2019 Hanoi summit when the Trump Administration rejected a reciprocal step-by-step approach and reverted to demanding complete denuclearization including verified elimination of all of North Korea's nuclear activities and long-range missiles before the United States would undertake any actions such as moving to declare an end the Korean War, curtailing war drills, or significantly easing sanctions.

Hecker says almost nothing about the Biden Administration's policy toward North Korea and there is, in fact, little to say. Thus far, the Biden Administration, like the Obama Administration, seems to see little potential benefit from negotiations with North Korea and has invested its foreign policy energy elsewhere, notably in bolstering Ukraine in its fight against Russia's invasion.

Hecker concludes,

> Three administrations had a singular focus on denuclearization – to drive the nuclear risk to zero, rather than realistically managing risk… The result has been exactly the opposite of what Washington wanted. The North has been handed opportunities to expand its program relatively unfettered. [Washington] pushed Pyongyang toward China instead of pulling it toward South Korea [and] the United States has not made North Korea a top-tier security priority.

One mystery that arises in both Hecker's and other accounts is North Korea's singular focus on obtaining light-water reactor (LWR) power technology. The Clinton Administration's 1994 Agreed Framework deal to halt North Korea's plutonium program was in exchange for the provision of two light-water power reactors.[7] These reactors were badly matched with North Korea's fragmented power grid, which would not have been able to accommodate such large power plants. Small-scale distributed power plants would have been a much better match. In the North Korean view expressed to Hecker, however, the light-water power reactors symbolized a U.S. commitment to a

long-term relationship in which the United States and its allies would have had to supply fuel and services to support the continued operation of the reactors.[8] Ultimately, North Korea's nuclear establishment would struggle to build and operate a small LWR power reactor at Yongbyon even though it could much more easily have produced both power and plutonium by building larger versions of the Yongbyon gas-graphite reactor.

A major error made by both the Bush and the Obama Administrations was their efforts to get China to put pressure on North Korea to eliminate its nuclear programs. China certainly would prefer North Korea not have nuclear weapons and has more leverage over North Korea than the United States does, but many experts on North Korea believe that, if North Korea's nuclear-weapon programs were ever again on the negotiating table, it would be in exchange for security, and political accommodation with the United States that North Korea could use to offset pressures from its powerful neighbor.[9]

Hinge Points is, of course, not just a story about the fecklessness of U.S. diplomacy toward North Korea. The Kim dynasty by its actions at home and abroad has time and again weakened the already fragile support for negotiations in Washington and Seoul. Yet, as with the Soviet Union or China in the Cold War or many states today, the Biden Administration needs to be reminded that it does not have to approve of leaders and states to negotiate in earnest with them.

Notes and References

1. See the two-volume book, *Doomed to Cooperate: How American and Russian Scientists Joined Forces to Avert Some of the Greatest post-Cold War Nuclear Dangers*, edited by S. Hecker. (Los Alamos, New Mexico: Bathtub Row Press, 2016) https://www.losalamoshistory.org/store/p265/Doomed_to_Cooperate.html.
2. Eben Harrell and David E. Hoffman, *Plutonium Mountain: Inside the 17-Year Mission to Secure a Dangerous Legacy of Soviet Nuclear Testing* (Cambridge, MA: Harvard Kennedy School, Belfer Center, 2013) https://pulitzercenter.org/sites/default/files/08-17-13/plutonium_mountain-web.pdf.
3. Clifton B. Parker, "John Lewis, Stanford Political Scientist and Groundbreaking Asian Politics Expert, Dies at 86," *Stanford News*, September 7, 2017, https://news.stanford.edu/2017/09/07/stanford-political-scientist-john-lewis-dies-86/.
4. Amanda Erikson, "The Last Time the U.S. Was 'on the Brink of War' With North Korea," *Washington Post,* August 9, 2017.
5. Kelsey Davenport, "The U.S.-North Korean Agreed Framework at a Glance, Fact Sheets and Briefs," *Arms Control Association*, February 2022, https://www.armscontrol.org/factsheets/agreedframework.
6. Kelsey Davenport, "The Six-Party Talks at a Glance, Fact Sheets and Briefs," *Arms Control Association*, January 2022, https://www.armscontrol.org/factsheets/6partytalks.
7. Light water is ordinary water labeled to distinguish it from the "heavy" water used in a class of reactors developed by Canada.
8. Christopher Lawrence, "Normalization by Other Means—Technological Infrastructure and Political Commitment in the North Korean Nuclear Crisis," *International Security* 45 (2020): 9–50.
9. Joseph Yun and Frank Aum, "A Practical Approach to North Korea for the Next US President," *Bulletin of the Atomic Scientists*, October 2, 2020.

ORCID

Frank N. von Hippel http://orcid.org/0000-0002-7934-9584

Leon V. Sigal
Northeast Asia Cooperative Security Project, New York City, NY, USA
sigalleonv@gmail.com

Frank N. von Hippel
Program on Science and Global Security, Princeton University, Princeton, NJ, USA

Received 16 January 2023; Accepted 14 February 2023

This article has been republished with minor changes. These changes do not impact the academic content of the article.

https://doi.org/10.1080/08929882.2023.2184563