STS 152: Nuclear Weapons, Risk and Hope

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Handout #3, October 10, 2010

Reading for next class

Read this handout.

Read the web page that explains my connection to Prof. Rathbun. The Dalai Lama is giving the third Rathbun lecture this Thursday. Watch the JFK video (25 seconds long). The videos on that page of Sandra Day O'Connor's and George Shultz' Rathbun lectures are optional. The first is roughly an hour long and the second about an hour and a half.

Optional reading: Prof. Hecker's 2008 and 2010 papers quoted in this handout.

Overview of handouts

As noted in handout #1, nuclear risk has two components:

> How destructive are nuclear weapons?
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> How likely is it that they will be used?

The first handout focused on the first question. The second handout focused on two aspects of the second question:

> How likely is nuclear terrorism?
>
> How likely is nuclear proliferation?

This handout adds some thoughts on ways to reduce the likelihood of nuclear proliferation, while the next one will treat a third risk:

> How likely is nuclear war?

Can the U.S. reduce the likelihood of nuclear proliferation?

When most people think of nuclear proliferation, their minds focus on ways to pressure Iran, North Korea and other potential proliferators to stop their programs or, in the case of North Korea, to give up its nascent arsenal. Little attention is directed to ways that we in the United States could change to help prevent nuclear proliferation. The following personal story explains why I think we need to do more of the latter:

About 25 years ago, as my wife Dorothie and I were getting our relationship in order, we had a number of highly charged disagreements. (Straightening things out usually involves conflict.)

During one of these fights, after we'd disengaged temporarily, but while both of us were still deeply hurt, it was infuriating to me that she had treated me so badly, yet was mad at me. In my mind, I had done nothing wrong. Then I thought: "Would I rather that my perception reflected reality, in which case I was powerless and had to wait for Dorothie to come to her senses? Or would I rather that I bore some of the responsibility for this fight, in which case I had some power to help end it by correcting my part?" Clearly the latter! With that motivation, plus some training[1], I came to see my part in the fight. Doing that changed the dynamic and things got better rapidly.

That same kind of introspection is needed at a national level to avoid international – and especially nuclear – catastrophes. As with my marital spat, that doesn't mean that the United States is solely at fault – just that finding our role in creating the problem will give us more power in solving the problem.

With that preamble, let's now examine arguments that, even though the United States is opposed to nuclear proliferation, we have played a major, though unwitting role in encouraging such behavior. The two cases we will examine are Iran and North Korea. There is more detail on the North Korean situation solely because I have studied that in greater depth.

Iran[2]

We view our relationship with Iran through the prism of 1979 when, in violation of all international norms, Iranians stormed our embassy and took its personnel hostage. In contrast, the Iranian viewpoint revolves around 1953, when a CIA-backed coup overthrew the popular, democratically elected Mossadeq government and installed the Shah, beginning what many Iranians regard as a twenty-six year reign of terror under a police state. (Of course, when that regime disintegrated, it led to an even worse reign of terror under the ayatollahs.)

In spite of the antagonism and fear that Iran and Israel bear for one another, there is a surprising parallel between their world views which is described by Trita Parsi in his book, *Treacherous Alliance*:

> And like Israelis, Iranians are deeply suspicious of the outside world. While Jews have been persecuted and have survived a Holocaust, Iranians have fought colonization, annexation, decades of foreign intervention, and, last but not least, an eight-year war with

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[1] We had received this training through an organization called Creative Initiative Foundation, which was founded by Prof. Harry Rathbun and his wife Emilia. The Rathbun lecture series was established to carry on Prof. Rathbun's tradition at Stanford. My relationship to the Rathbuns is covered in more detail on my web site.

[2] Ms. Sarah Mantels, a student who took this seminar last year, contributed to this section.

> Saddam Hussein's Iraq, in which virtually the entire world – including the United States – sided with Iraq. When Saddam invaded Iran in 1980 … it took the Security Council more than two years to call for withdrawal of the invading forces. (Compare that to Saddam's 1990 assault on Kuwait, when a Security Council resolution passed within 12 hours of the invasion) … Another five years passed … before the UN addressed Saddam's use of chemical weapons against Iranian soldiers and civilians. (The United States and Western European countries either directly sold components for chemical weapons to Saddam or knew and quietly approved of such sales.) … The United States later cited the same crimes to justify its invasion of Iraq in 2003. For the Iranians, the lesson was clear: When in danger, Iran can rely on neither the Geneva Conventions nor the UN charter for protection. Just like Israel, Iran has concluded that it could rely only on itself.

Our practice of threatening Iran, particularly with nuclear weapons, increases the motivation for that nation to develop its own nuclear capability. In 2006, during the Bush Administration, Seymour Hersh wrote in The New Yorker:

> A senior Pentagon adviser on the war on terror expressed a similar view. "This White House believes that the only way to solve the problem is to change the power structure in Iran, and that means war," he said. The danger, he said, was that "it also reinforces the belief inside Iran that the only way to defend the country is to have a nuclear capability." … One of the [American] military's initial option plans [for destroying Iran's nuclear program] … calls for the use of a bunker-buster tactical nuclear weapon, such as the B61-11, against underground nuclear sites.

Paradoxically, the father of the Iranian revolution, Ayatollah Ruhollah Khomeini, shut down the Shah's nuclear program as un-Islamic when he first came to power. *Newsweek* columnist Fareed Zakaria wrote in 2009:

> Everything you know about Iran is wrong, or at least more complicated than you think. Take the bomb. … President Mahmoud Ahmadinejad has quoted the regime's founding father, Ayatollah Ruhollah Khomeini, who asserted that such weapons were "un-Islamic." The country's Supreme Leader, Ayatollah Ali Khamenei, issued a fatwa in 2004 describing the use of nuclear weapons as immoral. In a subsequent sermon, he declared that "developing, producing or stockpiling nuclear weapons is forbidden under Islam." Last year Khamenei reiterated all these points after meeting with the head of the International Atomic Energy Agency, Mohamed ElBaradei. Now, of course, they could all be lying. But it seems odd for a regime that derives its legitimacy from its fidelity to Islam to declare constantly that these weapons are un-Islamic if it intends to develop them. It would be far shrewder to stop reminding people of Khomeini's statements and stop issuing new fatwas against nukes.
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> Following a civilian nuclear strategy has big benefits. … And if Tehran's aim is to expand its regional influence, it doesn't need a bomb to do so. Simply having a clear "breakout"

capacity[3] – the ability to weaponize within a few months – would allow it to operate with much greater latitude and impunity in the Middle East and Central Asia.

Only after Iraq used chemical weapons against Iran in the early 1980's and the world was silent, did Iran restart its nuclear weapons program. Henry Sokolski's article "The Bomb and Iran's Future" in the June 1994 issue of The Middle East Quarterly (Vol. I, No. 2), notes that in 1988 (after Iraq had used chemical weapons in its war with Iran), Ayatollah Akbar Hashemi Rafsanjani, then speaker of Iran's Parliament and commander-in-chief of its military, in a speech delivered to Iranian soldiers, said:

> With regard to chemical, bacteriological, and radiological weapons training, it was made very clear during the [Iran-Iraq] war that these weapons are very decisive. It was also made clear that the moral teachings of the world are not very effective when war reaches a serious stage and the world does not respect its own resolutions and closes its eyes to the violations and all the aggressions which are committed in the battlefield. … We should fully equip ourselves both in the offensive and defensive use of chemical, bacteriological, and radiological weapons. From now on, you should make use of the opportunity and perform this task.

To summarize, the main ways that the United States has unwittingly encouraged Iran's nuclear ambitions are:

- Aiding the 1953 coup that replaced the democratically elected and popular Mossadeq government with the Shah's police state.
- Aiding Iraq during its 1980's war with Iran, even though Iraq was the aggressor.
- Continuing to aid Iraq in that war even though it used chemical weapons against both Iran and its own Kurdish minority.
- Threatening Iran with both conventional and nuclear weapons. This was particularly pronounced during George W. Bush's presidency, but was reiterated implicitly in President Obama's 2010 Nuclear Posture Review.[4]

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[3] Uranium enrichment is particularly well suited to a breakout capacity. Once you have enough highly enriched uranium (HEU) to make a bomb, it is so easy that testing is not necessary. At least that was the path taken by the United States. The Manhattan Project scientists were so sure their HEU weapon would work that it was never tested before being used on Hiroshima. Nagasaki's more complex plutonium weapon required a test, and that was done in July 1945 at Alamogordo, New Mexico. This is why Iran's uranium enrichment program, although also applicable to its peaceful nuclear program and allowed under the Nuclear Nonproliferation Treaty, is of such great concern. It is one of the reasons why I believe that "atoms for peace," at least in its current form, is an oxymoron.

[4] Also see my August 2010 blog, "Two Takes on Attacking Iran."

None of the above should be construed as meaning that I do not fear a nuclear-armed Iran. On the contrary, I see such a development as extremely dangerous. But we need to start formulating our foreign policy based on reality, not myths. The most popular – and the most dangerous – myths are those that demonize adversaries and glorify ourselves.

So, what can be done about Iran's nuclear ambitions? Given all the past mistakes, we do not have any really good options at this point in time. We need to learn from our mistakes so we do not repeat them, and hope we can make it through an interim period until Iranian-American relations improve to the point that real solutions become possible. And we need to be doing all we can, within the constraints of national and international security, to make such improvements.

North Korea

A better understanding of North Korea starts at least as far back as August 1945, when the war in the Pacific ended. As explained, in a report sponsored by the United States Army[5], the very existence of South Korea was somewhat of a gift from Stalin:

> On August 8, 1945, during the final days of World War II, the Soviet Union declared war against Japan and launched an invasion of Manchuria and Korea. By then, Japan had been depleted by the drawn-out war against the United States and its Allies and Japanese forces were in no position to stave off the Soviets. … Although the United States president, Franklin D. Roosevelt, and Marshal Josef V. Stalin of the Soviet Union had agreed to establish an international trusteeship for Korea at the Yalta Conference of February 1945, no decision had been made on the exact formula for governing the nation in the aftermath of Allied victory. The landing of Soviet forces, however, compelled the United States government to improvise a formula for Korea. Unless an agreement were reached, the Soviets could very well occupy the entire peninsula and place Korea under their control. Thus, on August 15, 1945, President Harry S. Truman proposed to Stalin the division of Korea at the thirty-eighth parallel. The next day Stalin agreed. Evidently Stalin did not wish to confront the United States by occupying the entire peninsula. He may also have hoped that the United States, in return, would permit the Soviet Union to occupy the northern half of the northernmost major Japanese island, Hokkaido.

Next, a statement by Secretary of State Dean Acheson just prior to the Korean War, provides a different perspective from the usual – that North Korea's attack came out of the blue. His January

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[5] Andrea Matles Savada and William Shaw, Editors, *South Korea: A Country Study*, Washington: GPO for the Library of Congress, 1990. I am indebted to Prof. Barton Bernstein for pointing out this fact, of which I had previously been unaware.

12, 1950, speech at the National Press Club, has led some to say that he gave North Korea a green light[6] to invade the South in an attempt to reunify the country:

> So far as the military security of other areas in the Pacific [including Korea] is concerned, it must be clear that no person can guarantee these areas against military attack. But it must also be clear that such a guarantee is hardly sensible or necessary within the realm of practical relationship. Should such an attack occur, one hesitates to say where such an armed attack could come from, the initial reliance must be on the people attacked to resist it and then upon the commitments of the entire civilized world under the Charter of the United Nations, which so far has not proved a weak reed to lean on by any people who are determined to protect their independence against outside aggression.

The Korean War followed Acheson's speech by six months, during which the United States repeatedly entertained using nuclear weapons.

Fast-forwarding to the current decade, a leading expert on Korea, Prof. Bruce Cumings of the University of Chicago, wrote in 2003:

> In June 1994, Bill Clinton came close to launching a 'pre-emptive strike' against North Korea's nuclear reactors at Yongbyon, about sixty miles north of Pyongyang. Then, at the last minute, Jimmy Carter got North Korea to agree to a complete freeze on activity at the Yongbyon complex, and a Framework Agreement was signed in October 1994. The Republican Right railed against this for the next six years, until George W. Bush brought a host of the Agreement's critics into his Administration, and they set about dismantling it, thus fulfilling their own prophecy and initiating another dangerous confrontation with Pyongyang.
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> The complacent US public seems unperturbed by Bush's failure so far to find a single WMD in Iraq … There has been even less public scrutiny of Intelligence claims about the capabilities of the Democratic People's Republic of Korea. For more than a decade, the CIA has maintained that Korea probably has one or two atomic bombs but no more than that, because the Koreans could not have reprocessed more than 11 or 12 kilograms of plutonium – the maximum amount they could have obtained from their reactor in 1989. …
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> Every year since [1993] the CIA Director has told Congress that 'the chances are better than 50:50' that North Korea has one or two bombs (not devices), and newspapers have routinely reported this assumption as fact. Yet in 1996, nuclear experts at the Livermore and Hanford laboratories reduced their estimate of how much fuel North Korea possessed

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[6] A similar accusation has been made with respect to the first Gulf War. A week before Saddam Hussein invaded Kuwait, the American Ambassador to Iraq, April Glaspie, appears to have told him: "We have no opinion on your Arab-Arab conflicts, such as your dispute with Kuwait. Secretary Baker has directed me to emphasize the instruction, first given to Iraq in the 1960s, that the Kuwait issue is not associated with America."

> to less than the amount needed for a single bomb[7]: the North, they concluded, could only have seven or eight kilograms of fuel, whereas 'it takes ten kilograms of weapons-grade plutonium to fabricate a first bomb,' and eight or nine kilograms for subsequent ones. … In other words, the CIA's educated guess, endlessly repeated in the media, appears to have been mistaken. A less obvious consequence of this mistake has been its role in strengthening the North's position in negotiations with the US.

In July 2006, in TIME Magazine/time.com, Prof. William Perry (formerly Secretary of Defense under Bill Clinton) advocated a pre-emptive American attack on North Korea's missile program:

> Although the July 4 [2006] test of the Taepo Dong 2 missile—which is intended to carry nuclear warheads to U.S. territory—appears to have failed, North Korea … has crossed a line in the sand clearly drawn by the U.S. and its partners. We anticipated that North Korea would ignore the U.S.'s warnings. That's why, in an opinion piece published in the *Washington Post* on June 22, we urged the Bush Administration to strike the Taepo Dong 2 on its launchpad before the test could be conducted. … Critics of our article, including members of the Bush Administration, say that a pre-emptive strike is too risky. But if the U.S. is ever going to defend a line in the sand with North Korea, that is the least provocative way to do it, and next time it will only be riskier. Such a strike could be seen by the North Korean leadership for what it is: a limited act of defense of the U.S. homeland against a gathering threat, and not an overall attack on North Korea. For the U.S., the risk of inaction will prove far greater. The Pyongyang regime will view its stockpile of missiles and nuclear material as tipping the regional balance in its favor and providing a shield behind which it can pursue its interests with impunity.

A related threat was made in September 2009 when North Korea stated that it planned to launch a satellite, but it was feared it was really testing a missile:[8]

> In unusually blunt remarks, Admiral Timothy Keating, commander of the US Pacific Command based in Hawaii, said that interceptor ships were ready "on a moment's notice. Should it look like it's something other than a satellite launch, we will be fully prepared to respond as the president directs," he said in a recent interview with ABC News.

Even when North Korea has cooperated, it has felt unrewarded. Prof. Siegfried Hecker, former Director of Los Alamos, has been a major player in attempts to resolve the disputes between our nation and North Korea, and has made six trips there during this decade. His paper "Denuclearizing North Korea," in the May-June 2008[9] issue of the *Bulletin of the Atomic*

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[7] Prof. Hecker's estimate, detailed later in this section, is in rough agreement with Cumings'.

[8] According to U.S. envoy to North Korea Stephen Bosworth, a missile test would be a violation of a U.N. resolution. Not surprisingly, the North views such resolutions very differently from us.

[9] This was after North Korea's first nuclear test (October 2006), but before its more successful, second test (May 2009). The first test is estimated to have had a yield of under a kiloton, while the second is believed to be in the 5 kiloton range – almost as destructive as those used at Hiroshima and Nagasaki.

Scientists indicated great hope for stopping that nation's nuclear weapons from advancing, *if* the United States would take certain actions, which it did not:

> … During the past four years, I've visited North Korea's Yongbyon nuclear complex three times with nongovernmental teams of scientists and observers. My visits to the complex and my meetings with North Korean officials have convinced me that the elimination of North Korea's plutonium production capacity is within reach. …
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> From 1994 to December 2002, International Atomic Energy Agency (IAEA) inspectors monitored the freeze of production facilities, while Yongbyon technical specialists were allowed to conduct periodic maintenance of the facilities. After the United States accused North Korea of operating a clandestine uranium enrichment program in October 2002, Pyongyang expelled the IAEA inspectors, withdrew from the Nuclear Non-Proliferation Treaty (NPT), and restarted its nuclear facilities.
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> Based on my February visit, I judge the disablement actions to be serious and in good faith. I believe that Pyongyang has made the decision to permanently shut down plutonium production if the other parties do their part. However, they have retained a hedge to be able to restart the facilities if the agreement falls through. …
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> The Six-Party process has put within reach the possibility of permanently shutting down the entire Yongbyon plutonium production complex; it is highly unlikely that North Korea has clandestine plutonium production facilities. Eliminating Yongbyon's plutonium production is the highest technical priority for the parties negotiating with North Korea because doing so would dramatically reduce the risk posed by the North Korean nuclear program. To do so, these countries should put the burden on North Korea to finish disabling the Yongbyon complex and to begin dismantling it. During my February visit, North Korean Ministry of Foreign Affairs officials said that they have slowed the discharge of fuel from the reactor (one of the last disablement actions) because the other five parties had not lived up to their October 3, 2007 commitments. Specifically, as of February 14, 2008, only 200,000 tons of the promised 500,000 tons of heavy fuel oil had been delivered, and South Korea and China had provided very little of the promised 500,000 tons of heavy fuel oil equivalent. In addition, the United States had not removed North Korea from the states sponsoring terrorism list and had not terminated application of the Trading with the Enemy Act—two other conditions of the October agreement.

Early in 2010, I asked him if his view had changed in light of North Korea's second nuclear test on May 25, 2009. He told me he was working on a paper that would answer that question, and it is now available. I've extracted what I view as the most relevant parts of that paper:

> Security concerns have been the central driver of the North Korean ruling regime since the birth of the nation after World War II. … The devastating Korean War, resolved only by an armistice, and the U.S. threat to use nuclear weapons likely moved Kim Il-sung to pursue nuclear weapons early on. … The late 1960s were turbulent times in Pyongyang's relations with the West. South Korea's military was bolstered by U.S. troops and U.S. nuclear weapons on its soil. Pyongyang watched the Cuban missile crisis unfold in a manner that

shed doubt on Soviet commitments to its allies. It witnessed the Sino-Soviet split and the Chinese Cultural Revolution. Each of these developments reinforced the notion that Pyongyang could only rely on itself for the North's security. Although Pyongyang fielded an immense conventional army and its deadly artillery along the Demilitarized Zone (dmz) was poised to destroy Seoul, nuclear weapons would help to balance the U.S. nuclear presence in the South. …

By the early 1990s, Pyongyang's security environment deteriorated dramatically. … Pyongyang was devastated by these changes and began seriously to explore accommodation with the West, especially with the United States. Carlin and Lewis believe that Kim Il-sung made the strategic decision to engage the United States and even accept U.S. military presence in the South as a hedge against potentially hostile Chinese or Russian influence. …

However, reconciliation between Washington and Pyongyang proved difficult, as Washington saw the Agreed Framework primarily as a nonproliferation agreement. … the Agreed Framework was opposed immediately by many in Congress who believed that it rewarded bad behavior. Congress failed to appropriate funds for key provisions of the pact, causing the United States to fall behind in its commitments almost from the beginning. … The Agreed Framework, which began as a process of interaction and cooperation, quickly turned into accusations of non-compliance by both parties. …

the diplomatic crisis resulting from its 1998 rocket launch over Japan was resolved by the Perry Process … The follow-up meeting between Secretary of State Madeleine Albright and Kim Jong-il that was held in Pyongyang a couple of weeks later appeared to put the nuclear crisis on a path to final resolution.

With the change in administrations in Washington, hope for a settlement was quickly dashed. Whereas Pyongyang was waiting for a U.S. response to the Perry Process, it ran into the Bush administration's adamant opposition to the terms of the Agreed Framework and to political accommodation. Pyongyang practiced restraint with the incoming Bush administration until North Korea was accused of a covert uranium enrichment program and saw the Agreed Framework come to an end. During the confrontation over enrichment in October 2002, First Vice Minister of Foreign Affairs Kang Sok-ju told his American counterpart, “We are a part of the axis of evil....If we disarm ourselves because of U.S. pressure, then we will become like Yugoslavia or Afghanistan's Taliban, to be beaten to death.” Pyongyang withdrew from the npt [Nuclear Nonproliferation Treaty] and restarted its dormant Yongbyon facilities to produce fuel for a plutonium bomb.

Pyongyang's security fears were further heightened by the invasion of Iraq. Pyongyang now believed the bomb would assure its survival, so it no longer hid its nuclear weapons aspirations. …

What can we learn from how and why North Korea built the bomb? North Korea is unlikely to give up its nuclear arsenal anytime soon because it has become crucial to how

> the regime assures its security. Nuclear weapons also play a supportive role domestically and provide diplomatic leverage. Pyongyang views its security concerns as existential. …
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> As undesirable as it may sound, the best hope is a long-term strategy to contain the nuclear threat while tackling the North Korean problem comprehensively, but in discrete steps. Both Beijing and Seoul favor taking the long view. Time is not on Pyongyang's side. The greatest threat to the regime is not from the outside, but from within. … And it is essential to stop Pyongyang from doing additional damage around the world through nuclear cooperation and exports. …
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> The lessons of North Korea will not be lost on other potential proliferators, particularly Iran. Pyongyang broke new ground in defying international norms and took advantage of the international community's inability to respond effectively….
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> The Bush administration killed the Agreed Framework for domestic political reasons and because it suspected Pyongyang of cheating by covertly pursuing uranium enrichment. Doing so traded a potential threat that would have taken years to turn into bombs for one that took months, dramatically changing the diplomatic landscape in Pyongyang's favor. …
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> The United States plays an indispensable role in proliferation prevention, but it can't go it alone. It cannot afford to sit at the sidelines as it has done with Iran. We found that Pyongyang was willing to slow its drive for nuclear weapons only when it believed the fundamental relationship with the United States was improving, but not when the regime was threatened. …
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> The more divided we are at home, the more we yield advantage to the adversary. Political divisions in Washington in recent years resulted in our inability to negotiate the nuclear crisis effectively. American diplomats lament that it has been more difficult to negotiate in Washington than at the six-party table.

Perhaps the best summary of the above situation is contained in a question that Prof. Hecker answered when he was a guest lecturer in this seminar early in 2010. At the end of his talk, one of the students asked, "Are you convinced that if the Bush administration hadn't broken the agreements with North Korea in 2002 and accused them, then they wouldn't have a bomb now?" His reply follows:

> I think there's a good likelihood that what you just said is true. We still don't know that for sure because it's very hard to dig back into the early history of what they did with the reactor, when they operated that reactor, what they made. And the best analysis that we have is that prior to 1994, which is when they froze everything. [*MH Note: Between 1994 and 2002 they shut down their plutonium production under the Agreed Framework*.] In 1994, prior to that, they may have made two to ten kilograms of plutonium, as we look at the reactor, the operations. But we're not sure. It's also possible that actually they didn't even make two kilograms. And since we need about six for a bomb, it's quite possible that they never had a bomb. In 1993 to 1994, you go back, and the Director of Central Intelligence, actually one Bob Gates, said at that time that they believed that North Korea has the possibility of having one or two nuclear weapons. That was the intelligence

community's judgment in 1993, 1994. As we look back today, we say that's the upper end, and it's possible that they had nothing.[10]

In that same guest lecture, Prof. Hecker made several key points:

- While North Korea is ruled by a despotic regime with horrible human rights abuses, its record of adherence to nuclear agreements is relatively good.

- We have failed to meet many of our obligations under those same agreements.

- American accusations of illicit uranium enrichment have some basis, but are not materially important. If a nation can master the plutonium bomb, as North Korea has done, enriching uranium is of secondary importance.

- North Korea has been existentially threatened by the United States. They will not give up their crude nuclear deterrent under current conditions. But if we will return to the negotiating table and treat them with respect, Hecker believes it is possible to induce them to do no further nuclear testing. That is very important to our national security because their current nuclear weapons are crude and probably not missile-capable. More testing will be needed to achieve that goal, so stopping it is of the utmost importance. Unfortunately, American domestic politics makes such an approach impossible.

- Contrary to the popular view that negotiations with the North failed because it now has the bomb, diplomacy made significant achievements from our perspective, but much less so from North Korea's. Under the 1994 Agreed Framework, they stopped construction of two large nuclear reactors. Without the Agreed Framework, Hecker estimates that North Korea would now have enough plutonium for 100 bombs, instead of 4-8. As noted in the question and answer above, there is even a "good likelihood" that the North would have no bombs today if we had not taken the actions that we did in 2002.

One additional incident that deserves our attention is the sinking of the South Korean naval vessel the Cheonan in March 2010. While the prevailing view in the United States is that North Korea sunk that ship with a torpedo, serious flaws have been found in the investigation that came to that conclusion. For details see my blog posts on the subject dated May 29, June 5, June 7 and June 29. While the North may well be guilty as charged, there is a real possibility that is not the case. If so, imagine how that regime will react. Even if the North did sink the Cheonan, the incident occurred in disputed waters, near where South Korea sunk a Norther Korean vessel four months earlier. When war and peace hang in the balance, we need to be much more careful in accepting arguments, especially from parties to the dispute. See my May 29 blog post on the subject for a *mea culpa* in that regard!

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[10] Even enough plutonium for one or two bombs would be a minimal threat since two tests were needed for North Korea to achieve a reasonable yield. Additional tests will be needed before they can place a warhead on a missile.