

# Managing the Spread of Nuclear Threats

*Mark Fitzpatrick*

Director, Non-Proliferation and Disarmament Programme  
International Institute for Strategic Studies, London

## Introduction

Dividing the world into two categories, those nations that are party to the nuclear Non-Proliferation Treaty (NPT) and those that are not, produces a tally of 189 vs. four<sup>1</sup>. The NPT is the most widely accepted arms control treaty in history. It is also the most successful, having kept the number of states with nuclear weapons limited to a single digit. As a measure of that success, only one of the nine<sup>9</sup> currently nuclear-armed states, North Korea, developed weapons outside the restrictions of the NPT. Universalization remains a cherished goal of the treaty. Yet, bringing new countries into the treaty serves little purpose if they then willfully violate it, as too many nations have been inclined to do.

In the past decade, at least seven countries have broken the NPT-required safeguards rules in non-trivial ways. Iraq and Libya did so with clear intent to develop nuclear weapons. Egypt and South Korea violated the reporting requirements without apparent malevolent intent. Syria began unreported construction of a plutonium-production reactor that had no apparent civilian purpose. One way or another, all of the preceding non-compliance problems have been resolved. The greatest threats to the global nonproliferation regime are posed by the two outstanding cases: North Korea, which developed nuclear weapons while ostensibly an adherent to the NPT in the 1990s; and Iran, which is developing nuclear weapons capabili-

ties that it argues are within the limits of its NPT obligations. Let us examine each in turn.

## North Korea – The Hardest Case

The greatest challenge to the non-proliferation system comes from North Korea. It signed the NPT in 1985 but was never in good standing with the treaty and pulled out of it in 2003. It is the only nation to have employed the Article X withdrawal clause, although whether it did so legally is still unresolved. As an NPT member, North Korea in 1993 was declared to be in non-compliance with its safeguards obligations for refusing a request by the International Atomic Energy Agency (IAEA) for a special inspection of camouflaged nuclear waste facilities that perhaps could have confirmed Pyongyang's suspected underreporting of plutonium production. To date, the plutonium production mystery has never been solved and North Korea's noncompliance has never triggered any real penalty.

Under the 1994 Agreed Framework with the U.S. that averted war over the crisis, North Korea froze its plutonium program for eight years but meanwhile began a uranium enrichment program that opened a second path to nuclear weapons. U.S. discovery of procurement efforts for the enrichment program and a consequent confrontation with North Korea over the issue led to the collapse of the accord, the expulsion of inspectors and resumption of the plutonium program.

In 2005, North Korea declared itself nuclear-armed and, to prove the point, tested nuclear devices in October 2006 and May 2009. Whether this makes Pyongyang a nuclear power is contested. It is uncertain whether North Korea can produce an atomic warhead small enough to fit in the nose cone of its ballistic missiles, particularly the *Nodongs*, whose 900-km (540-mile) range covers not only South Korea but also western Japan. If North Korea obtained a weapon design trafficked by the Pakistan-based A.Q. Khan nuclear black market network—and whether it did is unknown—warhead miniaturization would be a done deal. Protecting a ballistic-missile-mounted warhead against heat and buffeting during atmospheric reentry is another matter. The North's missile tests to date, including two failed tests of longer-range *Taepodong* missiles, probably do not provide sufficient confidence in this regard. Nuclear-armed North Korean aircraft presumably could not penetrate adversary airspace without being shot down, but nuclear weapons delivery by a suicide-mission submarine or ship is not unthinkable.

Today North Korea is estimated to possess enough plutonium for four to 11 implosion-type bombs. The range is wide because the amount of plutonium is unconfirmed and the amount that North Korea would need for each weapon is unknown. Pyongyang insists it must be recognized as a nuclear-armed state and says it will not give up these weapons as long as it faces a nuclear threat; that is, until the U.S. abolishes its own nuclear arsenal and/or its policy of extended deterrence.

Meanwhile North Korea remains a concern because of its proclivity for onward proliferation. The evidence is almost conclusive that North Korea was the source of the gasified uranium that Khan sold to Libya in 2000-2001. About that same time, North Korea began helping Syria build a plutonium-production reactor that Israel bombed in September 2007 before it could be fuelled. More recently, Burmese defec-

tors claim North Korea is colluding with Burma on nuclear weapons development, though the evidence presented to date is not persuasive. Most worrisome of all is the potential for North Korea-Iran nuclear cooperation, though the allegations here are based almost solely on conjecture. There is good reason to worry, but not yet to bring charges.

The uranium enrichment facility that North Korea revealed to visiting American scholars last November is said to be for producing fuel for a prototype light-water reactor under construction. If reconfigured, however, it could produce highly-enriched uranium (HEU) sufficient for one or possibly two weapons a year. For reasons that remain unclear, North Korea seems to have switched its emphasis from plutonium to uranium enrichment. The plutonium program was suspended for a second time in 2007 in an agreement reached through the Six-Party Talks (both Koreas, China, Japan, Russia and the U.S.). That deal fell through in 2008 over disagreement on verification. But North Korea to date has not restored the plutonium-production reactor or the other facilities it partially disabled that year.

Diplomatic efforts to “denuclearize” North Korea have run out of steam. The hand of engagement offered to Pyongyang by President Obama upon his inauguration was met with a fist of defiance: a rocket test in violation of UN Security Council resolutions and the May 2009 nuclear test. North Korea's uncompromising posture was surely influenced by the hard-line policies adopted by South Korea's new, conservative government. When President Lee Myung-bak took over in early 2008 he ended his predecessors' “Sunshine policy” toward the North on grounds that it was all give and no take. No amount of aid was enough to persuade Pyongyang to rein in its nuclear program. The year 2010 then saw North Korea torpedo a South Korean naval vessel in May and shell an island in November, killing 48 in total, including two civilians.

Whatever the external factors, North Korea's stepped-up belligerence took place in the context of an unfolding power transition. The stroke that leader Kim Jong-il suffered in August 2008 forced him to accelerate preparations for dynastic succession to his 20-something youngest son, Kim Jong-un. Outsiders do not know whether, and to what extent, there is resentment among the ranks of the nomenclature over the sudden elevation of the inexperienced youngster to leading party positions and a vice marshal with no less than four stars. But firming up national unity by invoking a self-instigated foreign threat is a tried-and-true tactic of autocratic rule.

China sees resumption of the Six-Party Talks as the only way forward. A burgeoning internal debate over whether China's national security would be better off with or without the Kim regime on its border has been decisively settled in favor of the status quo. Beijing thus refuses to criticize Pyongyang's provocations and instead has upped aid and investment. It is setting in place the pieces for North Korea to become a *de facto* Chinese protectorate.

North Korea says it also seeks Six-Party Talks, though on terms that implicitly recognize its nuclear status. The Obama administration has no interest in making concessions for the sake of bringing Pyongyang to the table. As Defense Secretary Gates likes to say, the U.S. has bought that horse too many times before. Maintaining a posture of "strategic patience," Washington seeks evidence of a North Korean commitment of denuclearization and a prior readiness to resume meaningful North-South talks. On this, South Korea and Japan are solidly, and unusually, in step with the U.S. All conclude that North Korea is no longer willing—if it ever was—to trade its nuclear silver for any concessions they realistically can offer.

The trouble with strategic patience is that it does not reduce the nuclear threat and increases the likelihood of additional provocations. Policies of deterrence and containment, includ-

ing by strengthening interdiction capabilities through the Proliferation Security Initiative,<sup>3</sup> can help prevent North Korea from again exporting its nuclear secrets. Export controls, sanctions and financial pressure can also help prevent North Korea from acquiring foreign materials with which to expand its bomb-making potential. Such policies alone are probably not enough, however. They did not prevent the North from setting up a modern centrifuge plant that appears to be more advanced than Iran's. A way needs to be found to restore diplomacy to the mix of policy tools in dealing with this most difficult of regimes.

### **Iran: The Focus of Attention**

If North Korea is the most difficult case, why does Iran's nuclear program seem to attract so much more concern? One reason is that, unlike the North Korean case, non-proliferation vis-à-vis Iran has not yet failed. The other reason for giving Iran more attention is that if this effort, too, fails, the repercussions will be greater. An Iran with the bomb is more likely to spark an all-out war than was the case with Pyongyang's bomb. Both Israel and the U.S. insist they cannot accept a nuclear-armed Iran. And they are not the only countries with vital national security interests at stake. Saudi leaders talk freely about the need for following suit if Iran acquires nuclear weapons. This is not to say that a nuclear proliferation cascade is a foregone conclusion. It takes at least a decade to develop nuclear weapons and Iran's neighbors have other ways to defend themselves, and much to lose if they follow Iran's path. Still, Saudi Arabia, Egypt, Turkey and maybe others would want at least to keep the nuclear option open for themselves if Iran crosses the line of nuclear weapons production.

Iran professes, of course, that its nuclear program is only for peaceful purposes. This stated policy is underscored by a religious ruling. Professions of innocence are belied, however, by systematic violations of IAEA safeguards—14

kinds of reporting violations over the course of 18 years, as documented by the IAEA in 2003—and ongoing obstruction of IAEA investigations. Notwithstanding the civilian-energy purpose of projects such as the Bushehr power reactor, the totality of the evidence indicates beyond reasonable doubt that Iran also seeks a capability to produce nuclear weapons. The endeavor is not a crash effort akin to Pakistan’s nuclear bomb project, which reached the nuclear weapons threshold eleven years after A.Q. Khan stole enrichment technology from the Netherlands. If Iran wanted to produce the fissile material for a nuclear weapon as soon as possible, it could have moved more quickly than the 25 years it has been at it so far. Overall, Iran’s leaders have tried to keep their weapons intentions ambiguous. Yet the “purely peaceful” justification is not credible.

Like North Korea, Iran has pursued two paths to a nuclear weapons capability. In its case, the plutonium path is further away. A heavy-water research reactor under construction at Arak is ostensibly for civilian purposes but is similar in size to reactors used by India, Israel and Pakistan to produce plutonium for weapons. Here again, the issue is one of potential. To separate plutonium from the reactor’s spent fuel would require a reprocessing capability, which Iran does not now have. Luckily, the proliferation threat from Arak is well behind schedule, because Iran has not been able to produce or to procure the large metal components for the reactor.

The Bushehr nuclear power reactor, which is finally due to go on-line soon, is also a potential source of weapons-usable plutonium. Its annual discharge of spent fuel will, in theory, contain enough plutonium for a few dozen nuclear weapons. However, the “reactor-grade” plutonium produced as a by-product of electricity generation is not well suited for weapons. Although Iran could operate the Bushehr reactor in a way that would produce “weapons-grade” plutonium, doing this would tip off inspectors.

Iran would also have to build and conceal a reprocessing plant for spent fuel for this kind of reactor, which is technically challenging, and prevent Russia from following through with its obligation to take back the spent fuel.

The most pressing proliferation concern stems from Iran’s development of uranium enrichment technology. The enrichment program based at Natanz has been delayed by technical troubles stemming from the faulty design of the first-generation centrifuge employed and industrial sabotage, including targeting by the Stuxnet computer malware.<sup>4</sup> Iran’s ability to operate many more than about 4-5,000 centrifuges at Natanz is limited by its access to key raw materials and equipment. Despite claims of self-sufficiency, the enrichment program is still dependent on foreign supplies of certain materials and components. Iran may be able to overcome these constraints over time, but strict application of export controls and intelligence scrutiny of global black markets will hamper its ability to rapidly expand uranium production.

Notwithstanding the technical troubles at Natanz and centrifuge-production limitations, Iran has already produced about 4,000kg of low-enriched uranium (LEU), which if further enriched to weapons grade—and it is a big “if”—would probably be enough for two nuclear weapons. If Iran were to use the Natanz facility for this purpose, it would take a little over 1.5 years to produce the first bomb’s worth of highly-enriched uranium (HEU). In theory, a quicker path, called a batch enrichment process, could produce the first weapon’s worth of HEU in six months. However, this method has never been done in practice. Whichever method was used, at least six more months would be required to convert the gasified HEU into metal and fashion it into a weapon. The minimum timeline, then, for the first weapon, is over two years under the usual method and one year for the batch method.

Developing a means to deliver a nuclear weapon adds to the timeline. Like North

Korea, Iran has put great effort into developing a variety of intrinsically nuclear-capable ballistic missiles. Iran acquired the *Nodong* from North Korea, renamed it the *Shahab-3*, and then made its own variation, the *Ghadr-1*. Interesting, this missile, with its distinctive baby-bottle-shaped nose cone, showed up at a Pyongyang military parade last October. This suggests that missile cooperation between the two countries has become reciprocal. Iran's most capable missile, the solid-fuel propelled *Sajjil-2*, is still two to three years away from becoming operational. Its 2,200-km (1,320 mile) range would allow it to hit Israel and other targets even when fired from protected positions well inland.

Because Natanz is under IAEA regular inspections, use of the centrifuges there for HEU production would become known and thereby give the IAEA several weeks' warning, at the very least. Therefore, if Iran did decide to build a nuclear bomb, it would probably try to do so through a parallel secret set of facilities in order to bypass inspectors. To succeed, Iran would have to keep secret both the enrichment plant and the upstream feed-material chain: uranium mining, milling and conversion to gasified form. Iran's willingness to construct secret enrichment facilities, and not to report them to the IAEA until they are discovered, is thus extremely troubling. Notwithstanding Iran's lack of success so far in keeping facilities secret, detection of clandestine enrichment facilities is uncertain. Iran's 2006 suspension of its adherence to the Additional Protocol, which granted IAEA inspectors access to more sites, increased the uncertainty about clandestine production. Iran's declaration in December 2009 that it intends to build a total of ten other enrichment plants, while surely an exaggeration given Iran's inability even to fully outfit Natanz, added to the international unease caused by the 2009 revelation of a previously secret enrichment plant at Fordow.

If Iran truly had nothing to hide, there would seem to be little purpose in insisting on

positions that do nothing but hide its nuclear activities. Iran broke off implementation of the safeguards Additional Protocol, repeatedly bars experienced IAEA inspectors, and is the only proponent of an obsolete version of a safeguards provision on early notification of new facilities. These actions seriously impede the IAEA's ability to detect nuclear-weapons indicators.

Nevertheless, the claim of peaceful intent, and the religious prohibition that underlies stated policy, could be a useful basis for a negotiated solution to the problem. Iranians attuned to the reality of global politics recognize that nuclear weapons would make Iran a target of international hostility, spur further proliferation in the region and extend America's policy of nuclear deterrence to their neighborhood. Although the temptation for Iran's leaders to eventually translate nuclear potential into reality could be difficult to resist once the option is available to them, many argue that Iran will be content to have a nuclear-weapons option without actually producing nuclear weapons.

Whether or not Iran's adversaries will allow it to become a virtual nuclear-capable nation is uncertain, especially as it establishes more "facts on the ground" by increasing its stockpile of LEU and developing more powerful centrifuges. If Iran is able to produce large numbers of more advanced centrifuges, the break-out options will become more alarming. At present, however, the likelihood that any dash by Iran for a bomb would be detected before it assembled a single weapon—much less the small arsenal that would be needed to make break-out worth the risk—allows time for a negotiated solution, should Iran's leaders decide to seek one.

Unfortunately, those leaders show no sign of wanting a negotiated solution, unless it means acceptance of Iran's nuclear program. Iran has stated a willingness to accept some further transparency, although not more than what is required of other countries. Even Iranian acceptance of the additional inspector access

provided for in the Additional Protocol, which is not mandatory, would not provide sufficient confidence that Iran's intentions are purely peaceful. Concerned countries would want to see more transparency—a kind of “go-anywhere, anytime” inspection authority sometimes called an “Additional Protocol plus.” Concerned states would also want to see limits put on Iran's enrichment program and a forswearing of reprocessing technologies that would allow Iran to separate weapons-usable plutonium from its reactor spent fuel. Negotiating such limits does not seem possible at a time when Iran, such as at the Istanbul meeting in January, does not even want to talk about a revised form of nuclear fuel swap that would require it to send the bulk

of its enriched uranium out of the country. Deterrence and containment policies are thus the best of a bad set of policy choices.

- 1 The four are: India, Israel, Pakistan and North Korea.
  - 2 The nine are: United States, Russia, United Kingdom, France, China, India, Israel, Pakistan and North Korea.
  - 3 The PSI was launched by the Bush Administration in 2004 to strengthen cooperation among states to stop illicit WMD shipments.
  - 4 This was purportedly developed and unleashed by Israel and the U.S. against Iran's centrifuges in 2009-2010.
-