

NORTH KOREA'S WEAPONS PROGRAMMES

A NET ASSESSMENT

P R E S S S T A T E M E N T

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INTRODUCTION

Welcome to the launch of a special publication by the IISS: *North Korea's Weapons Programmes: A Net Assessment*, An IISS Strategic Dossier.

For nearly half a century the IISS has compiled *The Military Balance*, and during that time the Institute has gained experience in analysing information available in the public domain. The IISS is also well aware of the different political agenda that sources and informants of all kinds may have in providing us with information or in commenting on information that we propose to publish or that we have published. The Institute tries carefully to discount for possible bias and to be exacting in the nature of the evidence that it chooses to rely on.

Against that background, we produced our first IISS Strategic Dossier on *Iraq's Weapons of Mass Destruction* on 9 September 2002.

In that document, we attempted to bring together the best information available at the time, before inspectors were able to return to Iraq, on the history of Iraq's weapons programmes and the capacity that the regime had in a number of areas to regenerate capabilities, accelerate work, renew production, or to add to stocks already held.

We tried in that first Dossier to present evidence, explain what the indications were in the absence of direct evidence, and where there was no clear evidence or strong indications we explained whether we thought a particular activity, programme or holding could or could not be ruled out.

Following the resumption of inspections in Iraq, and then the war, it is clear that some of the assessments we made were subsequently proved correct, such as the development by Iraq of *al-Samoud* missiles that breached UN-set limits and our estimate that Iraq was at least several years away from being able to produce weapons useable nuclear material or long range ballistic missiles by itself. Other assessments, like the judgement that Iraq would probably deploy chemical artillery in the event of an attack, proved wrong. Some of our other judgements could still be proved right or wrong by the work of the Iraq Survey Group. Other assessments might never be tested against precise fact unless documents emerge or other findings come to light that can clearly explain what the position might have been in September 2002 and how that position might have been affected by measures taken by the regime of Saddam Hussein as the threat of war against him strengthened.

Overall, we believe that our Iraq Dossier stands up well when compared with other documents published at about the same time. Nevertheless, we intend to publish later in 2004 an independent assessment of that study. And we will also be devoting more research energies to analysing the particular intelligence challenges in the proliferation field.

In the meantime, there remains a need for independent organisations such as the IISS to make the best possible dispassionate efforts to analyse proliferation challenges that have been correctly defined as major security threats.

That sense of mission has brought us to apply our investigative and analytical efforts to the issue of North Korea's weapons programmes.

SOURCES AND ASSESSMENT CHALLENGES

For many reasons, the task of assessing North Korea's weapons programmes is even harder than that of judging those of Saddam Hussein's Iraq. There are four principal sources of information on which one can draw.

First, there are the official reports of governments seeking to penetrate North Korean secrecy like the US, South Korea and Russia. These public government reports will in any case be cautious because of the need to protect sources and methods. But even so, North Korea is a very hard target for intelligence collection. Reliable human sources are sparse, communication intercepts are fragmentary, and satellite and other remote sensing means provide limited information, subject to multiple interpretations. Most government assessments of North Korea are analytical judgements, based on evaluations and estimates of capabilities and motivations rather than conclusive evidence. In examining this material there is a need to separate worst case scenarios from assessments of the most probable scenario.

Second, there are reports based on direct observation of North Korean activities. For about a decade the International Atomic Energy Agency (IAEA) has inspected and monitored North Korea's main nuclear facilities. This provided a technological baseline for evaluating their capacities. Similarly, observation of North Korean missile tests, and interdiction of missile related exports can shed light on technical details of missiles being produced. But IAEA inspections have not extended to clandestine facilities such as those presumed to exist in relation to North Korea's uranium enrichment programme, or to facilities and activities linked to nuclear weapons development which are beyond the mandate of IAEA inspectors. And questions of overall North Korean missile

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production, deployment and armament cannot be answered by the direct observation or interception of trade that may have taken place.

Third, there are leaks of government information and defector and refugee information. Government leaks must always be treated with caution, and are not always accurate. Many defectors and refugees have come forward with intriguing information, but while some of this is credible, much is implausible and a good deal cannot be confirmed. In this Dossier we have included tables in some of the chapters summarising the most important defectors that are publicly known and the information that they have provided. These are intended to illustrate the range and type of raw information provided by defectors but we treat this with considerable scepticism.

Fourth, there is information from the North Korean government itself. This information has to be measured against Pyongyang's interest in manipulating the outside world's perceptions of its capabilities. At times, this interest may dictate denial of capacities that actually exist. At other times, national interest may dictate exaggeration, or invention of capabilities that do not exist. Moreover, since North Korea is aware of the ways in which the outside world seeks to penetrate its secrets, it can disinform in a variety of subtle ways.

Despite these challenges, we have tried to present a balanced and cautious set of assessments on North Korea's nuclear programme, its chemical and biological programmes, its ballistic missile programme and the conventional military balance on the Korean peninsula. To set these in context we have also sought to recount a quarter century of diplomatic efforts to deal with North Korean nuclear and ballistic missile issues.

THE NUCLEAR PROGRAMME

The size and sophistication of North Korea's nuclear arsenal depends on estimates of the quantity of weapons useable nuclear material – separated plutonium (Pu) or highly enriched uranium (HEU) – that is available to North Korea and on its ability to build deliverable nuclear weapons with this material. Our assessment of North Korea's nuclear capabilities is based on three key assumptions. First, we assume that North Korea's sole source of fissile material in the past and at present is plutonium contained in the spent fuel from its two known research reactors – the Soviet-supplied IRT reactor and the graphite-moderated 5MW reactor. (In other words, our assessment does not include the possibility that North Korea acquired additional fissile material from foreign sources or from unknown indigenous facilities.) Second, we assume that the reprocessing of spent fuel to recover plutonium results in losses of 10–30% of the overall plutonium contained in the spent fuel. Third, we assume that North Korea's nuclear weapons are based on a simple implosion-type fission device, requiring 5–8kg of plutonium or 20–25kg of HEU per weapon, which North Korea is able to build without requiring a full nuclear test. Whether North Korea is currently able to build nuclear weapons small and light enough to be delivered by its No-dong missiles is unknown, but this is assumed to be an important strategic objective.

Based on these assumptions, we can calculate different scenarios for North Korea's past, present, and future nuclear capabilities. Prior to 1992, it is plausible that North Korea was able to separate enough plutonium from the spent fuel of the IRT reactor and the 5MW reactor for one or possibly two nuclear weapons. The actual amount of plutonium North Korea extracted prior to 1992 cannot be determined, but Pyongyang was determined to maintain its strategic ambiguity in the negotiations for the October 1994 Agreed Framework, which froze additional plutonium production, but accepted a delay in accounting for past plutonium production. Based on this estimate, North Korea's potential nuclear arsenal was limited to one or two nuclear weapons over the last decade, until the collapse of the Agreed Framework at the end of 2002, following the revelation that North Korea was seeking to circumvent the Agreed Framework by pursuing a clandestine uranium enrichment programme.

Since the end of the nuclear freeze in late 2002, North Korea's immediate ability to produce additional nuclear weapons depends on whether it reprocesses the nearly 8,000 spent fuel rods from the 5MW reactor, stored in North Korea since 1994. These rods contain about 25–30kg of plutonium, enough for 2–5 nuclear weapons, depending on reprocessing losses and the amount of plutonium per weapon. Pyongyang asserts that it has completed reprocessing the 8,000 fuel rods in April–June 2003, apparently taking advantage of the US focus on Iraq. At the same time, North Korea has suggested that it has not yet fabricated nuclear weapon components from the separated plutonium, but will do so if Washington continues to reject North Korea's proposal to restore a freeze on its plutonium production facilities in exchange for economic and political incentives. North Korea's claim that it has completed reprocessing the 8,000 rods and the status of any resulting raw plutonium cannot be independently verified.

At present, North Korea's ability to produce fresh plutonium is limited to the 5MW reactor, which was restarted in February 2002. Under generous assumptions, this reactor can produce enough plutonium in spent fuel for about one nuclear weapon annually. Thus, assuming that North Korea separated enough plutonium for 1 or possibly 2 nuclear weapons prior to 1992, and that it has obtained enough plutonium for 2–5 weapons from existing spent

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fuel in storage, and that it can produce and separate one additional weapon's worth of plutonium in the 5MW reactor, North Korea's nuclear arsenal could be around 4–8 nuclear weapons over the next year. Unless new facilities to produce fissile materials are completed, this nuclear arsenal would grow at the rate of one weapon a year, representing the annual output from the 5MW reactor.

Over the next several years, North Korea's ability to dramatically increase its nuclear arsenal depends on how quickly it can complete the 50MW reactor, which was under construction at the time of the 1994 Agreed Framework, and a production-scale centrifuge enrichment plant, which North Korea has apparently begun to build in the last few years. In theory, the 50MW reactor could produce about 55kg of plutonium in spent fuel annually, enough for 5–10 nuclear weapons, depending on assumptions of reprocessing losses and the amount of plutonium required per weapon. The production capability of the enrichment plant is more difficult to assess because little is known about the status of the facility, but available evidence from official US reports and interdicted procurement efforts suggests an intended output of around 75kg of HEU annually, enough for about three simple implosion-type fission weapons.

It is impossible to predict with any precision when the 50MW reactor and a production-scale enrichment plant might be completed. In a worst case, if the facilities are completed within the next one or two years, North Korea's output of nuclear weapons could significantly increase around mid-decade to about 8–13 weapons every year. A more cautious assessment – taking into consideration possible technical difficulties and delays, including interdiction efforts – is that these facilities will not be completed until the second half of the decade.

In either case, this analysis suggested there is still some time for diplomatic efforts to halt and eliminate North Korea's nuclear arsenal while it remains limited to a handful of nuclear weapons. As time elapses, however, a diplomatic solution could become more difficult, as Pyongyang acquires additional strategic bargaining chips and as increased uncertainties about North Korean capabilities complicate verification of any diplomatic agreement. Moreover, the more North Korea's capabilities grow, the greater the danger that deterrence on the Korean Peninsula will erode, that other states in the region will elect to pursue their own nuclear options, and that North Korea might risk the sale of nuclear materials or weapons to other states or terrorist groups.

CHEMICAL AND BIOLOGICAL WEAPONS (CBW)

Estimates of North Korea's chemical and biological weapons programmes are extremely uncertain. On balance, we assess that North Korea has probably produced and stockpiled a variety of chemical weapons agents and munitions, including artillery shells, aerial bombs, rockets, and missiles, but we cannot hazard an estimate of the amount and type of agents and munitions. Presumably, chemical weapons would be attractive to Pyongyang as both a military instrument for battlefield use and as a strategic asset to threaten civilian casualties, and the perceived utility of chemical weapons may have increased over the past decade as North Korea's conventional capabilities declined and after its nuclear capabilities were limited by the Agreed Framework. Prudently, American and allied officials assume that North Korea is prepared to use chemical weapons against military and civilian targets in a general conflict. Information on biological weapons is even scarcer. There is general agreement that North Korea has conducted research and development on biological agents, but it is not known whether it has decided to produce and weaponise biological agents.

BALLISTIC MISSILES

Conservatively, we estimate that North Korea has deployed about 120 short-range *Hwasong-5/6* (*Scud-B/-C*) missiles, which can reach targets throughout South Korea, and about 40 medium-range *No-dong* missiles, which can reach targets throughout Japan. Including missiles in storage and reserve, however, North Korea's overall ballistic missile inventory probably totals several hundred missiles, and additional missiles could be deployed if deemed necessary by Pyongyang. From Pyongyang's perspective, its ballistic missile force presumably serves both a military and political function. Armed with high-explosive or CBW warheads, missiles could perform as long-range artillery to disrupt military communications and logistics and interdict reinforcements. Politically, missiles provide North Korea a credible means to attack South Korean and Japanese cities, intended to reinforce deterrence and discourage Seoul and Tokyo from pursuing policies that increase the risk of conflict. In wartime, the actual effectiveness of North Korean missiles to strike military and civilian targets would be reduced by poor accuracy, vulnerability to pre-emption, attrition of missile launchers and crews, and missile defences, but some missiles are likely to reach their targets.

The status of North Korean efforts to develop longer-range, multiple stage missiles, including missiles capable of delivering a nuclear warhead against the US, is more difficult to assess. In August 1998, the launch of a three-stage *Taepo-dong-1* rocket achieved stage separation, but failed to place a small satellite into orbit. As a ballistic missile, the *Taepo-dong-1* could not deliver a 'nuclear weapon-sized' payload beyond medium ranges, but North

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Korea is thought to be working on a larger *Taepo-dong-2* missile potentially capable of delivering a 'nuclear weapon-sized' payload to intercontinental ranges, which would include US cities. The status of the *Taepo-dong-2* programme is unknown. According to official US estimates, it 'may' be ready for testing, but North Korea has refrained from additional flight tests of long-range missiles since it agreed to a moratorium on such tests in September 1999.

North Korea has long been the world's leading exporter of missiles and related components and technology to a range of customers, including Egypt, Iran, Syria, Libya, the UAE, Yemen, and Pakistan. Since the late 1990s, however, opportunities for additional sales may be declining. Some customers, such as Iran, have nearly achieved an independent production capability, reducing their need for North Korean assistance. Other customers, such as Egypt, Pakistan, Yemen, the UAE, Pakistan, and most recently Libya have made political commitments to limit or end their missile-related relationship with North Korea. Periodically, Pyongyang has also exercised some caution in making missile sales – most recently in refusing to export missiles to Iraq on the eve of the Iraq War – and the multinational Proliferation Security Initiative (PSI) may impose greater constraints and obstacles to additional missile sales.

CONVENTIONAL FORCES

Over the years, the conventional military balance on the peninsula has shifted against North Korea. As US and South Korean forces have modernised and strengthened their military capabilities, and North Korea's forces have suffered from economic deprivation, obsolete equipment, poor maintenance, and inadequate training, North Korea's ability to invade South Korea successfully from forward-deployed forces near the DMZ has diminished. At the same time, North Korea's conventional forces are sufficiently strong to make an offensive allied invasion to overthrow the North Korean regime extremely unattractive. With its massed artillery near the DMZ, North Korea retains the ability to inflict heavy casualties and collateral damage on allied forces and civilians. Korea may not be able to seize Seoul, but it can devastate it. In theory, US forces could carry out limited pre-emptive attacks to destroy known North Korean nuclear facilities and missile emplacements, although such an attack almost certainly would not destroy all secret facilities and hidden weapons and it would risk provoking a North Korean retaliation that could trigger a catastrophic war. The possibility that North Korea has acquired nuclear, chemical, and biological weapons makes the prospect of a general war even more difficult to contemplate.

DIPLOMATIC CHALLENGES

Because of these military realities, diplomacy has always been the preferred tool for seeking to prevent or to disarm North Korean nuclear and missile capabilities. Present efforts are all concentrated on the so-called Six Party Talks including the US, Russia, China, Japan and the two Koreas.

The Six Party Talks might produce a new bargain to replace the Agreed Framework, requiring North Korea to disarm 'verifiably, completely, and irreversibly' in exchange for security assurances and political and economic benefits.

The talks might also collapse. Washington could declare an end to diplomatic efforts and seek to impose international economic and political sanctions against North Korea, with the support of China, Russia, South Korea and Japan. North Korea could carry out threats to conduct a missile test or even a nuclear test in an effort to increase pressure on the US to make concessions.

The talks could also continue for some time, with no obvious breakthrough or breakdown. Neither Washington nor Pyongyang might make fundamental compromises, each believing the other to be constrained from forcing the issue.

The problem is that the more protracted the diplomatic uncertainties, the greater the opportunity for uncertainties to build on the nature and extent of North Korea's weapons programmes. That, alone, would be destabilising.