INTRODUCTION: SETTING THE SCENE

Have ye not known? Have ye not heard? Hath it not been told you from the beginning?
-Isaiah 40:21

THE HISTORICAL EXPERIENCE WITH NUCLEAR NONPROLIFERATION VERIfication is a mixture of success and failure. In one form or another, verification of the peaceful uses of atomic energy has been key to the proliferation of nuclear capabilities from the very early days of the Atomic Age. For example, under the U.S. "Atoms for Peace" program of the early 1950s, the United States required that the sale of a nuclear reactor be accompanied by assurances and verification measures to ensure that the reactor was not being used in the development of a nuclear weapons capability. Other supplier states followed similar practices.

Soon afterward, the International Atomic Energy Agency (IAEA), which was formed in 1957, began taking over some of the duties of verification that had previously been undertaken by vendor states. With the entry into force of the Nuclear Non-Proliferation Treaty (NPT) in 1970, it became mandatory for non-nuclear weapon states parties to the NPT to enter into safeguards agreements with the IAEA, even if the state had no nuclear facilities.[1]

The NPT remains the primary legal instrument of nuclear nonproliferation. Under the NPT, those five states—the United States, the Soviet Union (now Russia), the United Kingdom, France, and China—that exploded a nuclear device prior to January 1, 1967, are recognized as legal nuclear weapon states, while all other states that have joined the Treaty have done so as non-weapon states.

By some measures, the NPT regime has been reasonably successful. Predictions made in the early 1960s of dozens of states in possession of nuclear weapons by the 1980s did not come true. As of 2001, only four countries—Cuba, Israel, India, and Pakistan—remain outside the NPT.

All seemingly went well under the NPT regime until the early 1990s, when some cracks appeared in the protective wall of the IAEA safeguards system. First, it became known that Iraq was on the verge of clandestinely acquiring a nuclear capability. Iraq's secret nuclear weapons program showed the main flaws in the IAEA safeguards system, in that safeguards were unable to detect and uncover illicit activities in states that chose not to declare such activities.

The second challenge was posed by South Africa, which joined the NPT in 1991 as a non-weapon state. After joining the NPT, South Africa declared in 1993 that it had previously dismantled a small nuclear arsenal. South Africa's nuclear arsenal was not "illegal," because it existed prior to

South Africa's accession to the Treaty. However, the IAEA was now responsible for verifying that South Africa was truly a non-weapon state following its accession. This verification exercise necessarily exceeded the boundaries of traditional safeguards.

The third challenge to the NPT was posed by North Korea. North Korea was unable to satisfactorily explain the contradictions between its 1992 declaration to the IAEA and the inspector's findings during 1992–1994. Contrary to its obligations under its safeguards agreement with the IAEA, North Korea also refused to grant an IAEA request for a "special inspection" of undeclared facilities.

The IAEA responded to these challenges by reforming its safeguards system. In particular, the IAEA adopted new rules for collecting information, better inspection procedures, and improved sampling and analysis techniques to better enable it to detect the presence of undeclared nuclear activities within an inspected state. However, this system of "negative verification" is difficult and expensive to implement, and has yet to be implemented widely.

Negative verification was formalized in another key nonproliferation instrument: the Comprehensive Nuclear Test-Ban Treaty (CTBT). The CTBT, which was concluded in 1996, bans any nuclear explosion. Its verification includes a detection system and an on-site inspection mechanism (OSI) that is aimed at locating a suspect event, ascertaining whether it was a nuclear explosion, and identifying the culprit. This system is a negative verification system, since it does not intend to verify a declared existence, but rather seeks to provide assurances of either the absence or the reality of a nuclear explosion.

At the regional level, other groundbreaking nuclear nonproliferation arrangements formed. Notably, Argentina and Brazil decided to form a bilateral nuclear inspection system that greatly reduced fears that either state was clandestinely pursuing nuclear weapons. This bilateral inspection system allowed both countries to be fully integrated into the Latin American nuclear-weapons-free zone (NWFZ) and, by virtue of a special agreement negotiated with the IAEA, into the NPT safeguards regime.

Still, all is not well in the nuclear nonproliferation arena. Having been found in noncompliance with the NPT, Iraq was forced in 1991 by the UN Security Council to accept an intrusive inspection and monitoring regime that intended to eliminate Iraq's capability to acquire nuclear weapons. A specially designated IAEA "Action Team" was created to "destroy, remove, or render harmless" Iraq's existing nuclear weapons program. The Action Team also was to deploy on-going monitoring and verification (OMV) systems to ensure that Iraq's program could not be reconstituted without detection. However, by the end of 1998, Iraq was able to thwart the inspections and have the inspectors removed.

The Need for Reevaluation

Given these problems, the time has come to reexamine the international nuclear nonproliferation verification regime and apply the lessons of experience, with a view towards proposing improvements.

Under an ideal system, there should be no compromises in the technical operation of verification. There can be no concessions in the demand for technical integrity, accuracy, and verity in performing the verification activities, in the analysis of the data, in the reporting of the results, and in making the technical judgments.

From the technical perspective, nuclear nonproliferation verification must be seen as an absolute measure, answering to an absolute need, thereby demanding an absolute result. Not treating nuclear verification as a deterministic effort could be misleading and, in a worst-case scenario, disastrous. The stakes in the nuclear game are too high for that.

At present, there is no absolute guarantee of success in the effort to prevent countries from acquiring nuclear weapons. The main reason for this is that some countries are willing to ignore their international obligations and legal commitments. Such states will go to any length to develop nuclear weapons. In addition, there are those that will, mainly for financial but also for political and strategic reasons, provide much sought-after technology, materials, and know-how to any who want it.

Many of the ideas that are proposed in this book are workable, realistic, and necessary. Some ideas, such as the discriminatory application of verification resources, are controversial because they are contrary to present-day attitudes and, if implemented, could present some governments in an unfavorable light. However, taken together, these ideas will better enable the states parties to a treaty to make a more informed basis for judging the outcome of verification.

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[1] The full title of the NPT is the "Treaty on the Non-Proliferation of Nuclear Weapons."