IPNDV

INTERNATIONAL PARTNERSHIP FOR
Nuclear Disarmament Verification

Some Thoughts on Verification Objectives, Declarations, and Their Implications from the Perspective of an Inspected State

December 2022

Introduction

This paper discusses verification objectives of an inspected state (Host) in a notional nuclear disarmament agreement under which several nuclear -armed states commit to reduce, dismantle, and eliminate part of their nuclear arsenal and verification is carried out by a multilateral body comprising Inspectors from nuclear- and non–nuclear-armed countries. It then considers how those Host objectives shape a state's perspective regarding what should be the verification provisions of any such agreement and the implementation of such provisions, especially inspections. Building on a short description of different types of declarations and their role in nuclear disarmament verification, this paper subsequently considers Host perspectives on what the content of such declarations should be and how they should be implemented.

The paper draws on analysis conducted by the International Partnership for Nuclear Disarmament Verification (IPNDV).[1] It also reflects some of the insights gained from a series of table-top exercises carried out by the IPNDV. To illustrate its points, this paper uses the IPNDV Basic Scenario[2] that has helped structure the IPNDV's work.

IPNDV Basic Scenario

- A nuclear-armed state, Ipindovia, is one of several States parties to the Nuclear Weapons Reduction Treaty (NWRT)
- The NWRT obligates Ipindovia and other States party to the treaty to reduce their arsenal of nuclear warheads from 1,000 to a maximum of 500
- Ipindovia is obligated to dismantle those nuclear warheads
- Dismantlement and absence of warheads over the 500-warhead limit is to be verified by a multilateral body consisting of both nuclear- and non–nuclear-armed states
- The NWRT includes a set of specific inspection processes, procedures, techniques, and technologies (PPTT) to be used for verification of the dismantlement of nuclear warheads subject to the treaty
- The NWRT also includes a set of managed access procedures for implementation of inspection PPTT in a manner that protects sensitive information

[1] See http://ipndv.org/wp-content/uploads/2017/11/WG1-Deliverable-Two-Final.pdf, https://www.ipndv.org/wp-content/uploads/2020/04/WG4_Deliverable_FINAL.pdf, and https://www.ipndv.org/wp-content/uploads/2020/04/WG5-Deliverable_FINAL-.pdf.

[2] See https://www.ipndv.org/reports-analysis/ipndv-basic-scenario

Host Verification Objectives: Fulfilling Obligations and Protecting Interests

Host Overall Verification Objectives

The Host has two overarching verification objectives: (1) to demonstrate its compliance with the specific obligations under the agreement; and (2) to ensure that inspections are carried out in a safe and secure manner, that proliferation-sensitive and other sensitive information are protected, and that normal operations at the inspected sites can carry on with minimal disturbance.

The first objective is shared by the Host and the Inspectors; they have a joint interest in implementing the treaty satisfactorily and providing sufficient confidence that the Host is meeting its obligations under the agreement. For the Host specifically, building such confidence strengthens its international credibility and global political standing and encourages compliance by other States party to the agreement. The level of confidence builds over time as the verification process, with its mixture of declarations and inspections, demonstrates success in confirming compliance with the agreement.

An efficient and effective verification process also reduces the burdens, disruptions, and costs of verification for the Host. In that regard, the Host and the inspecting entity have a shared interest in limiting the financial, administrative, and personnel costs of the inspection process.

With regard to the second overall objective, the Host needs to guarantee the safety and security of its personnel at the inspected bases and facilities and the visiting Inspectors.[3] It also has the obligation to ensure compliance with safety and security requirements. It

Treaty-Specific Host Objectives: Examples from the NWRT

- Facilitate the Inspection Team's conduct of required inspection activities at a given site
- Restrict Inspectors' access to that which is specified in the NWRT
- Do not allow Inspectors to view uncovered nuclear warheads
- Do not allow Inspectors to view interior of nuclear warhead containers
- Do not allow Inspectors' access to facilities unrelated to the specific inspections
- Protect proliferation sensitive and other sensitive information
- Ensure safety of personnel and operations
- Protect information regarding the physical security of nuclear warheads and their storage sites
- Protect information about operations at sites being inspected not related to the inspection and limit impacts on any ongoing operations at the site not related to the inspection

[3] The corresponding obligation of the inspectorate is to follow Host state instructions.

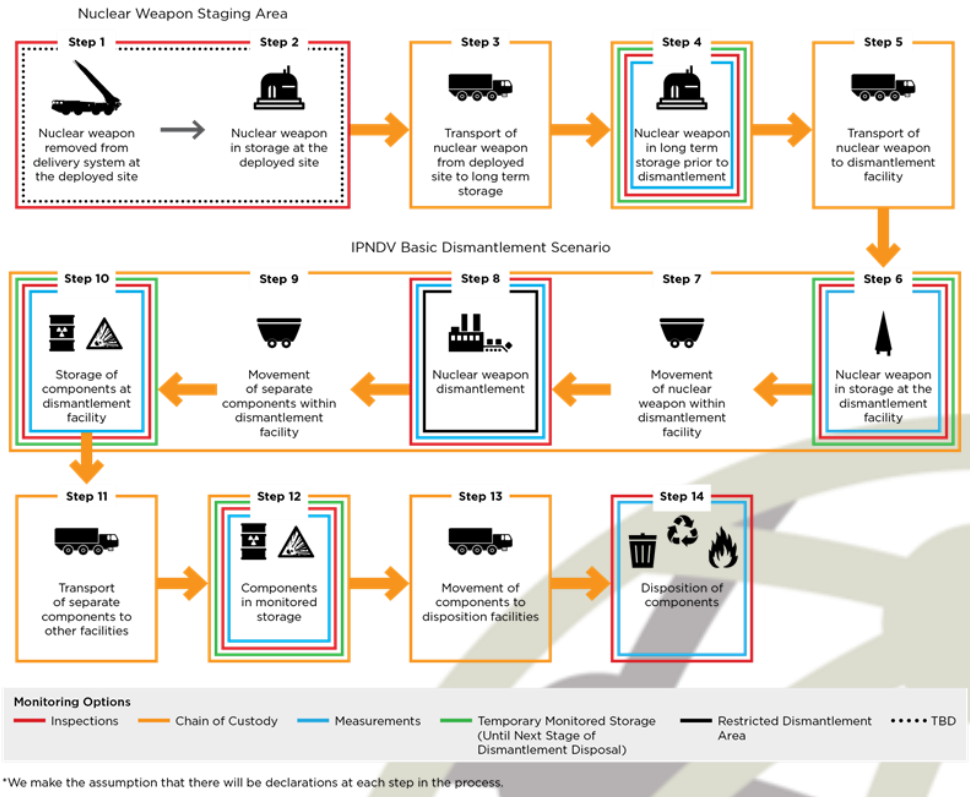
also seeks to protect system information (capabilities and vulnerabilities), proprietary information, and other non-nuclear programs co-located at nuclear sites that are not relevant to the agreement's provisions.

Treaty-Specific Host Verification Objectives

In addition to the two overarching objectives, the Host has specific treaty-based verification objectives. These specific objectives are derived primarily from its overarching objectives, but their implementation may vary depending on the specific treaty obligation and the associated inspection activities being conducted to verify it.

For example, within the Basic Scenario summarized in the text box on page 2, Ipindovia has agreed under the NWRT to reduce, dismantle, and eliminate 500 nuclear warheads. Ipindovia is to follow the 14-Step dismantlement framework set out in IPNDV Phases I and II (Figure 1). Implementation of the treaty-specific objectives needs to be tailored to the specific site at which an inspection is taking place and the particular inspection activities being carried out (e.g., restricting Inspectors' access as specified in the agreement, protecting information about operations unrelated to the inspection, or ensuring the safety of personnel and operations).

Figure 1. Monitoring and Verification Activities, as Identified by the IPNDV for Key Steps in the Process of Dismantling Nuclear Weapons



*We make the assumption that there will be declarations at each step in the process.

Host Perspectives on Verification Objectives: Implications for Defining Treaty Elements and Implementing Inspections

The importance of the verification objectives listed above begins well before inspections start, as they will significantly shape the Host's perspectives on the verification provisions to be included in a nuclear disarmament agreement. Once a treaty is concluded, the dual priorities of being cooperative and enabling effective inspections while protecting non-proliferation, proprietary, and other sensitive information will influence how the Host implements any agreement. Because these objectives have different implications for treaty negotiation and implementation, it is useful to explore both.

Host Perspectives on Verification Objectives: Implications for Treaty Elements

The foundation of any verification process is declarations: Initial, Baseline, Periodic, and Ad Hoc/Notifications. In essence, the verification process confirms the correctness of declarations made by a party to an agreement. The specific *scope and content* of these declarations will be an important component of any future disarmament agreement. From the Host's perspective, the need to balance demonstrating compliance and protecting sensitive information while ensuring safety, security, and minimizing disruption of operations at the site will influence the scope of the declarations that it wants reflected in any agreement. Another determinant factor is the Host's concerns about costs and its interest in avoiding unwarranted requests. Thus, for the Host, it will be an important decision as to which sites and facilities to include within an agreement's provisions for declarations and which notifications to mandate.

Taking the IPNDV Basic Scenario as an example, Ipindovia meets its objective of demonstrating compliance by agreeing that the NWRT include declarations of the number and types of its nuclear warheads, referred to as Treaty Accountable Items (TAIs), and detailed information about nuclear-weapons bases, storage, and production sites in Ipindovia where such warheads may be located.

The Host's objective of protecting sensitive information while ensuring safety, security, and minimizing disruption of site operations, however, is likely to lead it to seek to draw the line at some point with regard to what would be required in such declarations at what level of detail. For example, the Host perspective makes a state likely to seek to define very precisely what information it is required to provide in site diagrams of locations subject to inspection. Similarly, the overarching objective to minimize interference with other ongoing military operations is likely to make the Host reluctant to agree to a provision that requires the Host to provide information about bases and facilities that are not or have not been directly linked to its nuclear weapons enterprise at any time. Or it might seek to only include facilities that recently closed, but not former facilities that were eliminated or converted for other purposes.

The Host's objective of building confidence in its compliance provides an impetus to accept a robust set of *inspection provisions* in any agreement, such as those included in the NWRT of the Basic Scenario. At the same time, the Host's objective of protecting sensitive information will lead it to seek limitations on the specific inspection activities included in the agreement.

To take some examples from the Basic Scenario, Inspectors are prohibited from viewing the actual nuclear warhead within its container during any inspection. In addition, any radiation measurements to confirm the presence of fissile material will take place in a way to limit the information provided to Inspectors (e.g., by use of a so-called Information Barrier).

Closely related, the Host's objective of ensuring the physical security of nuclear warheads will also significantly impact what inspection provisions the Host seeks in any agreement. For example, a Host will likely not be prepared to accept an obligation of prior notification of movement of nuclear warheads from site to site on open roads (as opposed to within a given site) during the process of their dismantlement. It also would likely seek to limit the use of containment and surveillance equipment during or in-between inspections (e.g., in bunkers in a long-term storage site).

NWRT Inspection Processes, Procedures, Techniques, and Technologies

- Visual observations by inspectors
- Reviews of applicable documentation
- Application and checking of tags and seals, unique identifiers on nuclear warhead containers
- Radiation measurements to detect presence/absence of fissile material—and to compare with previously made nuclear warhead templates
- Use of containment and surveillance equipment to detect unauthorized movements of TAI

Given its interest in minimizing operational disruptions and protecting proprietary information, the Host would have difficulty agreeing to inspections at non-declared sites and facilities. By contrast, under a regime like the NWRT that obligates parties not to possess more than 500 nuclear warheads, the right of a multilateral body to inspect locations, sites, and facilities that have not been declared could be a useful treaty provision to help add confidence in compliance. Such a provision would require specific obligations on what basis such inspections could be conducted.

The Host perspective can also be expected to drive the inclusion of a set of so-called *managed access procedures* to govern how specific PPTT are used in a particular agreement. As the name

suggests, such procedures manage Inspectors' access to a given site and how their activities are conducted. The Host's interest in causing minimal disturbance to ongoing activities at the inspection site is also likely to impact what it wants in other treaty provisions (e.g., the timing of any inspection, quotas for inspections, and whether there is a freeze on movement in or out of a site to be inspected and when such a freeze would occur).

Examples of Managed Access Provisions from the NWRT

- Restrictions on what Inspectors can observe, from what location, for how long, and by how many Inspectors
- Use of specially designated sites for inspection activities
- Random selective access by Inspectors
- Shrouding and use of covers on sensitive items
- Use of Host escorts
- Use of equipment by Hosts on behalf of Inspectors

More generally, the dual objectives of the Host in demonstrating compliance and protecting sensitive information while ensuring safety, security, and minimizing disruption of operations place a burden on the Host to clarify, for itself and during negotiations, what red lines it would seek in any treaty. That balance also places a burden on the Host to identify, to the extent possible, alternative ways to demonstrate its compliance given such red lines, and to propose their inclusion in the agreement. For example, under certain conditions verification objectives at a facility might be achieved by only portal perimeter monitoring and broad surveillance through land-based sensors and satellite information instead of intrusive on-site verification measures.

Host Perspectives on Verification Objectives: Implications for Inspection Implementation

To meet its objective of demonstrating compliance, the Host needs to be prepared to facilitate the inspection process to verify that it is meeting its obligations under the agreement. In practice, this means that the Host must be ready to facilitate particular inspections, with agreed PPTT, at specific sites to be inspected, often with differing geographic, physical, structural, operational, and other dimensions. Detailed Host *inspection planning* will be essential. Such planning needs to be based on an in-depth assessment of the inspected sites and their unique characteristics, including security and safety requirements.

For example, in the Basic Scenario, Ipindovia has to prepare for activities by Inspectors to verify that it has eliminated 500 nuclear warheads and retained no more than 500 nuclear warheads. Doing so includes hosting, for example, inspections to confirm the declared number of nuclear warheads at declared sites (or their absence if so declared) and the dismantlement of declared nuclear warheads. It could also include being prepared to receive Inspectors at non-declared

sites. Planning to facilitate such inspections will need to cover a multitude of practical issues, like transporting Inspectors to and from sites to be inspected, providing them access to bunkers where nuclear warheads subject to the agreement are stored, and supporting Inspectors' requests to use agreed verification technologies.

In addition, inspection planning will be needed to meet the Host's objectives related to protecting proliferation-sensitive information and other sensitive information relating to physical security, and operations at the facility, for example. At the heart of such planning will be the consideration of how to use agreed upon managed access provisions at a given site in a way that still allows the Inspectors to carry out their essential tasks.

For example, one of the PPTT available to Inspectors under the Basic Scenario is their right to observe the removal of a nuclear warhead from its delivery system subject to the dismantlement provisions of the NWRT. The agreement also allows for Ipindovia to use managed access provisions to protect sensitive information during such observations by limiting where Inspectors can stand and how many of them can do so. How to do so in practice will need to be agreed by Host and Inspectors.

The Host's objective of *ensuring the safety* of its personnel, the Inspectors, and the site being inspected will be of particular importance for inspection implementation. Ensuring safety in the presence of nuclear warheads and at nuclear-weapons sites will be a rigid and unbreakable requirement. What meets or does not meet that requirement also is likely to be determined by dedicated Host safety personnel associated with the facility being inspected and not by the Host escorts who are accompanying the Inspectors. For example, Host safety considerations will shape what inspection equipment can be used and how, where specific inspection activities can be conducted, and responses to possible unexpected contingencies resulting from man-made and natural events.

In planning and implementing agreed inspection PPTT under a nuclear disarmament agreement, the Host also has to consider the impact of *unexpected contingencies* that could disrupt the inspection process (e.g., from a technical malfunction of inspection equipment to a natural weather event). In responding to such contingencies in coordination with Inspectors, the Host will need to take into account its dual objectives of demonstrating compliance and protecting sensitive information while ensuring safety, security, and minimal disruption of operations.

Declarations and Implications from a Host Perspective

Types of Declarations

During Phase II, the IPNDV's Working Group 4 stated that the objective of a declaration is

> … to offer information that provides the basis for the effective implementation of disarmament agreements and to facilitate the detection of non-compliance by establishing the baseline of declared activities and informing specific monitoring/inspection procedures.[4]

More specifically, prior to the entry into force of a disarmament agreement, the parties provide an *Initial Declaration* that specifies all nuclear weapons holdings and related sites and facilities that are on their territory or under their jurisdiction and control and subject to declaration under the agreement. In addition, the verification regime includes three types of declarations and notifications that are the foundation and building blocks for planning, preparing, and conducting nuclear disarmament verification and tracking implementation of an agreement. Their specific elements will be defined by the particular nuclear disarmament agreement.

1. **Baseline Declaration.** Submitted after the entry into force of the treaty, a Baseline Declaration is the overall scene-setter. It determines and contains the information to be verified and facilitates inspection planning by both hosts and Inspectors. In the Basic Scenario, specific information in the Baseline Declaration for Ipindovia could include data on (1) the number and type of warheads currently in Ipindovia and their status (deployed or non-deployed); (2) the number and type of all operational nuclear weapons bases, storage sites, and related nuclear facilities and site diagrams for each of these locations; (3) the number of warheads at each base or facility; (4) identification of a nuclear warhead dismantlement center; and (5) former nuclear facilities and their status (closed, converted, abandoned, eliminated).
2. **Periodic Declarations Updating the Baseline Declaration.** At treaty-specified intervals, periodic updates reflect new information and changes in the overall Baseline Declaration (e.g., changes in the locations of TAIs, the status of declared sites, or the numbers of TAIs dismantled under the agreement). Together, the Baseline Declaration and the subsequent Periodic Declarations give a complete picture of what TAIs and facilities there are and where they are located.
3. **Notifications (or Ad Hoc Declarations).** Incident-driven notifications that reflect changes to the relevant data that may include plans to remove a nuclear warhead from its delivery system or from storage at an operation nuclear base, movement of a TAI from one site to another, plans for the dismantlement of one or more nuclear warheads, or unexpected issues that cause deviations in procedures or issues with monitoring and verification equipment, for which Inspector presence may be required to resolve. Such Notifications may then generate an associated verification activity.

[4] On declarations, see https://www.ipndv.org/wp-content/uploads/2020/04/WG4_Deliverable_FINAL.pdf.

Host Perspectives on Declarations: Implications for Defining Treaty Elements

The content of declarations under a nuclear disarmament agreement will be included in the text of that agreement. In that regard, the Host perspective drives a state to ensure that the *scope and content of required declarations* would not undermine its control of information on some aspects of its nuclear enterprise. At a general level, this includes especially proliferation-sensitive information, proprietary information, and operational information about management of nuclear and non-nuclear operations. Other nationally sensitive information from the Host perspective is likely to include proprietary technical, business, or industrial information. In turn, the Host perspective may limit declarations of information directly related to the verification of the reduction, dismantlement, and elimination of nuclear weapons rather than the absence of undeclared nuclear warheads.

There also is a relationship between the number and scope of declarations and the overall burden of treaty implementation. More detailed and comprehensive declaration provisions will result in a greater reporting burden and potentially a greater number of declared sites subject to verification. This, too, suggests an overall Host interest in limiting the scope and content of declarations.

The Host perspective may result in a number of "cutouts" to the declarations required by an agreement. Using the Basic Scenario as an example, Ipindovia as the Host probably would oppose on security grounds any requirement to provide notifications that nuclear weapons subject to the NWRT are to be moved between sites, before initiating such movements. It also may seek to limit any Baseline Declaration to sites that are active nuclear bases, or at least active *or* former nuclear bases, and exclude information about non-nuclear military bases even if in principle such non-nuclear sites could be used to store undeclared nuclear warheads. A Host's interest in protecting information would argue for carefully defining in an agreement what site diagrams need to include. The Host may be reluctant to provide detailed information on the physical dimensions and construction of buildings, including nuclear warhead storage bunkers. It can be expected that these and other Host considerations will come into play when drafting an agreement and associated verification/inspection protocols.

Host Perspectives on Declarations: Implications for Implementing Declarations

In principle, once negotiated, providing specific information included in Baseline and Periodic Declarations and Notifications under a nuclear disarmament agreement should not be problematic from a Host perspective. Potential problems with regard to what information to include or exclude should have been addressed and resolved in the process of negotiating the detailed verification and inspection protocol associated with the disarmament agreement.

In practice, the Host is responsible for ensuring the accuracy and completeness of the data in its declarations and notifications. The challenge is that nuclear forces are not static; their deployments and status changes over time as elements move through various cycles of production, maintenance, deployment and elimination. A Host will also need to undertake maintenance and renewal activities of facilities, delivery vehicles, and warheads in a stockpile as long as it exists. As a result, some lapses and disputes can be expected with regard to the timely provision of required information. Thus, from a Host perspective, it would be important to build into any such agreement an effective mechanism to resolve disputes over compliance with the agreement's required declarations.

Moreover, if only for practical and technical reasons, implementing the type of nuclear disarmament agreement envisaged in the Basic Scenario will take many years. During that time, more fundamental changes to the Host's nuclear enterprise could occur, including but not limited to developing a new kind of warhead that would require new inspection PPTT (e.g., a radiation template) and constructing new facilities or re-opening closed (former) facilities. From a Host perspective, the inclination to protect sensitive information could impact the timeliness of any updates to such activities.

Finally, the Host will want to store all information relevant to the verification process in a database in order to ensure consistency. To demonstrate compliance and protect sensitive information, it has an interest in having in place an efficient and effective system for meeting its declarations' obligations.

About IPNDV the International Partnership for Nuclear Disarmament Verification

The International Partnership for Nuclear Disarmament Verification (IPNDV), through a unique public-private partnership between the U.S. Department of State and the Nuclear Threat Initiative, brings together more than 25 countries with and without nuclear weapons. In this ongoing initiative, the partners are identifying challenges associated with nuclear disarmament verification, and developing potential procedures and technologies to address those challenges. Learn more at www.ipndv.org.