The “Hows” of Nuclear Disarmament Verification

Submitted by Ambassador Knut Langeland (Norway), Chair of the Group of Governmental Experts to consider the role of verification in advancing nuclear disarmament

1. The first session of the Group of Governmental Experts to consider the role of verification in advancing nuclear disarmament was convened 14-18 May 2018. During the week, the Chair invited select experts to make presentations on verification and verification-related issues. Speakers included individuals engaged first-hand with past and ongoing national activities, international treaties and conventions, and bilateral and multilateral initiatives. An exposé follows, with presentations listed in the order in which they were given.

I. Presentations Overview

A. Verification and the Chemical Weapons Convention

Lynn Hoggins, Senior Chemical Demilitarisation Officer, Verification Division, Organisation for the Prohibition of Chemical Weapons (OPCW)

2. The speaker briefed the GGE on the immense resources required for any verification regime with an expansive scope like the OPCW. The Organisation in 2017 had an operating budget of 68 million Euro and comprised 450 staff members to execute verification measures and functions. Detailed procedures in the Chemical Weapons Convention allowed States Parties to pursue its non-proliferation and disarmament objectives separately but simultaneously. For non-proliferation, this included detailed material destruction processes, extensive industry involvement and reporting, and national legislation on imports and exports. For disarmament, procedures included chemical analysis of reaction mass and the mutilation of munition bodies. Subsequent reports on converted facilities and continuation of inspections ensured irreversibility. The presentation also highlighted the value of the culture of cooperation and consensus—as an example, challenge inspections have never been
invoked. Along those lines, the OPCW has had to be flexible with commitments given complications from armed conflict situations and unsecure environments.

B. New Strategic Arms Reduction Treaty (START): Implementation Update and Overview of the Inspection Regime

Michael Edinger, Foreign Affairs Officer in the Office of Multilateral and Nuclear Affairs, Bureau of Arms Control, Verification and Compliance, Department of State, United States of America

Vladimir Leontiev, commissioner, Bilateral Consultative Commission, New START; Deputy Director of Department for Non-Proliferation and Arms Control Ministry of Foreign Affairs, Russian Federation

3. In detailing the verification procedures of the New START, speakers underlined the importance of setting clear expectations through tightly prescribed provisions. For instance, the treaty contains much detail regarding the selection and use of inspectors and equipment across its two types of on-site inspections, which serve as the basis of verification and are used to confirm the accuracy of declared data. Complementary means of verification include exhibitions, invaluable given a lack of precise knowledge of both sides, and National Technical Means, in place to prevent concealment measures. Bolstering the verification framework was the Bilateral Consultative Commission to address technical and practical issues. Detailed conversion and elimination procedures also serve as a means towards irreversibility.

C. The Comprehensive Nuclear-Test-ban Treaty Organization and its Verification Related Activities

Xavier Blanchard, CTBTO

4. The speaker provided an overview of the Comprehensive Nuclear-Test-Ban Treaty (CTBT), then outlined main elements in its intrusive and non-discriminatory verification system. This included the International Monitoring System (IMS) and the International Data Centre (IDC)—many of the technical ideas for which emerged from a Group of Scientific Experts convened during negotiations. The presentation then turned to the collaborative relationship between the CTBTO and States in verification. This took the form of confidence-building measures to calibrate the IMS, a mechanism for consultation and clarification, and national implementation measures—key as States own the station operators and operate the National Data Centres that communicate with the IDC. The speaker concluded with an overview of the on-site inspection system to be incorporated after the treaty enters into force, sharing an extensive list of inspection techniques to be deployed and noting that training activities have been undertaken to build this capacity.

D. The South African Experience

Johann Kellerman, Director Disarmament and Non-Proliferation, Department of International Relations and Cooperation, South Africa

5. The speaker explored the life of the weapons program in South Africa, emphasizing the primordial impact of political will in nuclear disarmament—and its verification. He noted myriad challenges linked to the after-the-fact verification in the case, citing demands placed on record-keeping (of even greater concern for states with decades of development and material production). The verification process involved national and international actors engaged in a breadth of activities, including the covering of test shafts, core removal, decontamination, and conversion. Because of this, the technical competencies of the International Atomic Energy Agency (IAEA) was especially appreciated. This experience, the speaker noted, contributed to the later elaboration of the Additional Protocol. The success of the case also reflected the flexibility in procedure of all sides, and due to clear
boundaries— as South Africa’s accession to the Nuclear Non-Proliferation Treaty (NPT) did not require discussion of its past.

E. Kazakhstan’s Experience on Nuclear Weapon Non-Proliferation

Erlan Gadletovich Batyrbekov, Director General of RSE (“National Nuclear Center of the Republic of Kazakhstan”)

6. The presentation on Kazakhstan’s verification experience highlighted a variety of activities and facilities involved under different contexts. The speaker cited the removal of deployed strategic nuclear weapons under the Lisbon Protocol to the START treaty, the removal of nuclear material in cooperation with the U.S. government under Project Sapphire, the destruction of intercontinental ballistic missile (ICBM) silo launchers, and the elimination of infrastructure at Degelen Mountain. A common thread identified was flexibility in procedure, exemplified by “gentlemen’s agreements” that came into play on sensitive sites, as cited by the speaker. The presentation also highlighted the value of involvement by the United States, Russia, and the IAEA; meanwhile, Japan’s assistance suggests a potential facilitating role for non-nuclear weapon states in verification. Because of its extensive experience and unique facilities, the speaker noted Kazakhstan’s potential value as a test site for verification methods and procedures.

F. Nuclear Disarmament Verification - Potential Role of Safeguards and the IAEA

Annette Schaper, UNIDIR external expert

7. The speaker briefed the GGE on the essential role of safeguards in maintaining a world without nuclear weapons. It was suggested that this end stage could be easier in terms of verification than intermediary disarmament stages given IAEA tools and methods in existence. The presentation discussed safeguards definitions, the IAEA and its organs, and safeguards agreements in existence; it then outlined significant quantities and parts of the nuclear fuel cycle subject to safeguards. The speaker then detailed relevant verification procedures for maintaining a world without nuclear weapons, discussing declarations and material accountancy, containment and surveillance, on-site inspections, environmental sampling, information analysis, National Technical Means, and societal verification—all of which feature in the IAEA’s spectrum of experience. A non-discriminatory verification system based on universal safeguards has many benefits, inserting irreversibility into the nuclear disarmament process.

G. Brazilian-Argentine Agency for Accounting and Control (ABACC)

Maria Jimena Schiaffino, Counselor, Directorate for International Security, Nuclear and Space Matters, Ministry of Foreign Affairs and Worship, Argentina

Marcelo Câmara, Head of Division Disarmament and Sensitive Technologies, Ministry of External Relations, Brazil

8. The presentation on ABACC focused on both the practical functioning of the arrangement as well as its broader value. The speakers noted that the 1997 Quadpartite Agreement created an ongoing partnership between Brazil, Argentina, ABACC, and the IAEA. The arrangement has helped to prevent duplication in verification activities among the parties. They noted that the ABACC requires the minimum data necessary to carry out its responsibilities of accounting and control, which helps to assuage concerns about privacy; sensitive facilities and information are identified and negotiated with the IAEA. The ABACC also contains a Commission to resolve disputes as necessary. The speakers stressed that the presence of the Quadpartite Agreement — and the ABACC in particular — has played a key

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1 The IAEA was not able to give a presentation the safeguard system at the meeting in May, but will give such a presentation at the meeting in November.
role in cultivating confidence among all states, providing greater assurance for the global community. They suggested this has allowed more verification by the IAEA as a result.

H. The United Kingdom-Norway Initiative on Nuclear Dismantlement Verification

Steinar Høibråten, Research Scientist, Norwegian Defence Research Establishment

9. The presentation on the UK-Norway Initiative elaborated on this first technical cooperation between a nuclear weapon state and a non-nuclear weapon state. The initiative, which commenced in 2007, focused on the potential role of non-nuclear weapon states in nuclear disarmament verification through a bilateral exercise on warhead dismantlement. The stages encompassed include temporary storage, mechanical dismantlement, physics package dismantlement, and monitored storage. Through this technical engagement featuring lab-to-lab collaboration, the UK trained Norwegians in scenarios involving generic facilities. The speaker noted the initiative’s focus on two elements: managed access and information barriers. Takeaways included the importance of resolving access procedures and conflicts beforehand. Detailed procedures were rigorous and highly structured, with mutual understanding and design key.

I. Quad Nuclear Verification Partnership (Letterpress)

David Chambers, Arms Control and Disarmament Research Unit, Foreign and Commonwealth Office, United Kingdom

10. The Quad partnership marked an expansion of the technically focused UK-Norway initiative, with the 2015 inclusion of the United States and Sweden. The presentation detailed the simulation exercise meant to build capacity, exercise and evaluate monitoring technologies, and deploy model verification strategies. The stages in disarmament under its umbrella included long-term storage of nuclear warheads, transport to dismantlement facility, and storage at a dismantlement facility. The speaker highlighted the need to have elaborated procedures in advance. A variety of techniques were deployed to make the system more robust, with national-level adjustments in infrastructure and operations to facilitate transparency. Notably, security and safety-sensitive information were more prevalent than proliferation concerns. Accordingly, the speaker suggested whether the inspecting party in such verification activities is a nuclear weapon state or a non-nuclear weapon state appeared largely irrelevant.

J. International Partnership for Nuclear Disarmament Verification (IPNDV): Assessment of Phase I and Expectations for Phase II

Maria Jimena Schiaffino, Counselor, Directorate for International Security, Nuclear and Space Matters, Ministry of Foreign Affairs and Worship, Argentina

11. The final presentation traced the progress of the IPNDV to date. The speaker underlined inclusivity as the partnership’s key feature, as it allowed capacity-building that would address the information and experience gap between nuclear weapon states and non-nuclear weapon states. It also allowed valuable technical research to be conducted without compromising sensitive information. The presentation noted that Phase I of IPNDV focused on a particular section of the dismantlement lifecycle, with working groups examining monitoring and verification objectives, on-site inspections, and technical challenges and solutions. Concrete deliverables in the form of technologies, information barriers, and inspection procedures allowed the group to move its work forward. In looking ahead, the speaker highlighted that subsequent working groups will examine the verification of nuclear weapon declarations, verification of nuclear reductions, and verification technologies.
II. Lessons Learned

12. While expert presentations spanned a breadth of experiences, including some outside the realm of nuclear weapons, there were common themes relevant to any consideration of the role of verification in the advancement of nuclear disarmament.

A. The Need for Resources

13. Disarmament verification requires a breadth of activities, likely at multiple facilities, likely with national and international actors involved. While the scope of a verification regime plays a determinant role, any effective system necessitates staff to execute its inspection and assessment functions, and entails the deployment of a variety of techniques (and technologies and tools) to ensure robustness. National implementation measures also help to uphold any multilateral verification systems. At all levels then, considerable resources must be mobilized.

B. Clarity in who is to be engaged

14. The presentations and following discussions clearly identified that only experts for Parties to a given treaty may be engaged in relevant verification activities. This has been applied to the bilateral and trilateral treaties such as START, New START and INF. At the same time, it was observed that the broader UN membership have been informed on the progress in the implementation of these treaties.

15. For multilateral treaties, the questions will become more complex. The scope and aim of a future treaty will have a bearing on both verification procedures as well as the institutional framework. Such discussions already take place in the deliberations on a future FM(C)T. It would be expected that the same questions will have to be addressed in a treaty towards general and complete disarmament.

C. Value of Capacity-Building

16. The technical competencies of the IAEA and select UN Member States were cited by numerous speakers as key to facilitating disarmament verification processes. While there are knowledge and experience gaps between nuclear weapon states and non-nuclear weapon states, all sides can contribute to technical and scientific research that can push verification forward — for instance in developing tags and seals for use by inspectors, in researching information barriers that ensure the protection of security and safety-sensitive information, in collaborating on hands-on exercises that contribute to procedural refinements. Because of the breadth of activities involved, the system benefits by a greater pool of verification knowledge.

D. Clarity of Expectations

17. The more tightly prescribed the provisions are for a verification regime, the more effective that regime is likely to be. Several presentations made note of the importance of clear expectations for all involved sides. This is true at an organizational level in terms of division of labour, and at a practical level pertaining to procedures in access and information exchange. Procedures set to address the technical and practical conflicts—including through the establishment of dispute resolution mechanisms—further preserved the culture of trust and cooperation so vital to effective verification in disarmament.

E. Flexibility in Execution

18. At the same time, while experts stressed the importance of elaborated procedures and clear expectations upfront, another common refrain was the value of flexibility on the ground.
Fundamentally, this is because of the lack of uniformity across cases, including the purpose of verification, and consequently, the activities being verified and the facilities and individuals involved. As a result, involved parties often had to make adjustments based on surrounding context. The presence of a certain level of flexibility about the means with which to achieve verification goals was critical in the achievement of those goals, across experiences.

III. Further Study

19. In almost all cases, experts acknowledged the limits of their case applicability to the study of nuclear disarmament verification. After all, their experiences were defined by their context, and by the unique purposes for which verification activities were deployed in each instance. They were linked to a bilateral arms control treaty, a test ban treaty, to unilateral dismantlement decisions. Even the ongoing multilateral initiatives focusing specifically on nuclear disarmament has focused on a small segment of that process-centering on warhead dismantlement. In considering the role of verification in advancing nuclear disarmament, research must examine all the various phases of the disarmament process: including reductions and limitations on nuclear weapons, as well as reaching and maintaining a world without nuclear weapons.