

Working Group 4 Deliverable Part V. Report of the CFE Table-Top Exercise

Working Group 4: Verification of Nuclear Weapons Declarations

August 2019

Abstract

To learn as much as possible from previous verification regimes, and their applicability to the verification of nuclear weapons declarations, Working Group 4 (WG4) undertook a trial table-top walkthrough exercise on one specific treaty's verification regime: The Conventional Forces in Europe (CFE) Treaty. Such an exercise was aimed at exploring ideas and concepts from an existing monitoring and inspection regime and to test them against the requirements for verifying nuclear weapons declarations. It was not expected that verification mechanisms developed for conventional or chemical weapons regimes were exactly applicable in the nuclear case, but certain aspects and concepts could be transferable. By testing the existing mechanisms in an exercise-like format, we thought it would best identify relevant elements and concepts.

Page | 1 <u>www.ipndv.org</u>

The Exercise

During the London IPNDV Plenary meeting in December 2018, Working Group 4 (WG4) undertook a one-day tabletop exercise to explore whether the verification aspects of the Conventional forces in Europe Treaty (CFE) could provide lessons for future nuclear disarmament verification.

After reviewing some of the existing verification regimes in previous meetings in Seoul and Stockholm, WG4 determined that the CFE declarations and verification mechanisms would be a good starting point. They are less complex than those found in the Strategic Arms Reduction Treaty (START) family of Treaties, yet focus on issues related to deployed and non-deployed weapon system of direct relevance to WG4, more than for example the Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on their Destruction (CWC), which has a greater focus on monitoring civilian industry and weapons destruction. WG4 also thought it was relatively obvious that START and New START would have transferable elements, and hence it would to be more instructive to see if a verification regime from a very different area—in this case a conventional arms control agreement—could indeed provide lessons for verification of nuclear disarmament.

Two background aspects were developed in order to conduct the exercise:

- A simplified version of the CFE declarations and verification mechanisms;
- A scenario and "fake State" to provide the context in which the declarations are made.

The aim was to look for transferable "concepts," not specific language or numerical limits. So when the CFE has restrictions on the numbers of inspections, or minimum sizes of buildings that could be inspected for example, it was the concept of having limits on these aspects we wished to explore, not whether the specific limits in the CFE were appropriate for future nuclear disarmament verification arrangements. Discussions focused on the implications of such limits, if they could apply in a future nuclear disarmament arrangement, if not then why not, and whether we could suggest different figures more appropriate for our case, or whether such details could only be determined during future negotiations.

The CFE concepts had to be modified and simplified to be applicable to nuclear weapons declarations. To aid discussions, the exercise focused on aspects applicable to the declaration of the total number of nuclear weapons in a single fake State. The participants were then asked to focus on how the verification concepts in the CFE would aid inspectors to gain confidence in both the initial declaration of nuclear weapons numbers and how this is maintained. For the purpose of the exercise, we did not differentiate between different types of nuclear weapons and concentrated only on the overall number of weapons declared. Also, for the exercise, and consistent with previous IPNDV work, WG4 defined a nuclear weapon as a container with weapons-grade nuclear and explosive material present. For delivery vehicles with multiple nuclear explosive devices present, each explosive device would be counted individually.

Page | 2 <u>www.ipndv.org</u> Two weeks prior to the exercise, all WG4 members were sent the simplified version of the CFE verification regime in order to familiarize themselves with it (see Annex 1). This included what declarations need to be made by the nuclear weapon possessor State, and when and how changes to initial declarations are made if weapons are moved, produced, or reduced. It also included the basis for where and when inspections can be called, notice periods, how long each inspection can be, and how many inspections can be undertaken each year. This included information for undertaking inspections of both declared and undeclared locations.

At the beginning of the exercise, WG4 members reviewed the initial declarations of our fake State, including weapons numbers, site diagrams, and photographs of delivery vehicles and weapon containers (see Annex 2). To add a sense of realism, all the photographs provided were of historic UK nuclear capable missiles and nuclear or military related facilities, except for a single photograph from a historic U.S. missile silo (which was advertised for public sale).

The exercise had two parts: The first reviewed the general Treaty concepts in light of the declaration of the State. During the first part, the group was guided using a presentation on CFE Treaty concepts and were asked a series of key questions at each stage of the process. The presentation and questions are in Annex 3. In the second part, the group split into four subgroups. Three subgroups examined in detail how an inspection could be undertaken at a specific weapon deployment site (naval, missile silo, and road mobile missile base), and looked at the practicalities and activities that could be undertaken to verify the declarations on that specific site. The subgroups examined actual aerial photographs of facilities (from historic UK sites; see Annex 4). The subgroups examined implications of both an initial visit and subsequent visits to consider the process of building confidence over time. The final subgroup considered the process and practicalities of undertaking inspections of undeclared locations under CFE rules, with a view to confirming the completeness of the declaration. This subgroup looked at the possible choices of sites that could be inspected, how to prioritize them, and what could be achieved in an inspection.

Information on the CFE mechanisms, the State facilities, and verification options were kept to a level so that they were easy to follow, to enable broad concepts to be evaluated yet not get trapped in details. Furthermore, to facilitate these subgroup discussions, three experts were present (one on each of the CFE, new START, and nuclear weapons) to which the subgroups could turn to for advice.

Following discussions, each subgroup presented their findings back to the main group for comparison. As with the initial discussion of the general arrangements, groups highlighted concepts most transferable to verification of nuclear weapons, concepts that could not be transferred, or how certain concepts might be modified so that they would be more applicable. In total the exercise took three two-hour sessions to complete.

Page | 3 <u>www.ipndv.org</u>

Findings from Part One: The Initial Walkthrough

The list of questions in Annex 2 and the walkthrough presentation in Annex 3 set out what WG4 was asked to consider as part of the exercise. Discussions were not limited to these questions, but they provided the starting point for consideration of each concept, as set out below.

Concept 1. Initial Declarations and Information Exchange, Including Photographs of

Items

CFE includes:

- Numbers of weapons in the State
- Photographs of delivery vehicles and containers

The group's initial reaction was that the photographs of items were too limited. Physical viewings and more technical data would be required, particularly if unique identifiers, tags, or seals would need to be applied to items or containers. The group also thought that it was difficult to say at this initial point exactly what would be required in such an information exchange, before the details of the inspections had been discussed. To answer this question would need much further work, including input from technical experts on information needed to ensure the successful use of technologies. It could certainly be helpful to include exhibitions of delivery vehicles and containers, but the group noted that physical trials of measurements or applying chain of custody technologies may be necessary, to ensure technology was fit for purpose and that inspections would run efficiently. WG4 identified this area for more study within the group and across the IPNDV.

Concept 2. Annual Data Exchange

CFE includes:

- Number of weapons at each site
- Notification of changes only above 10 percent changes
- Notifications five days after movements
- Site diagrams
- Temporary locations

An important aspect of the declaration on the overall holdings was the difference between this declaration and the Treaty agreed limit. In the exercise, the Treaty limit was 850 weapons within the State, the declaration was 800. The group noted that the closer the declaration to the limit, the more extensive inspections would need to be to have confidence in Treaty compliance, because smaller discrepancies would be of greater importance, with regard to remaining below the Treaty limit.

The group thought regular updates would be necessary; this could be annually but could be on other timescales as appropriate to the agreement, depending on expected changes in such numbers. The group also agreed that all changes and movements of items should be declared,

Page | 4 <u>www.ipndv.org</u> not just changes over a certain level because of the relative importance of each item in a nuclear disarmament agreement as opposed to conventional armaments in the CFE.

WG4 thought post-notification was a necessary element, because for security reasons we believed disclosing prenotification and any further details of transport arrangements would be problematic. The group thought allowing five days to make such a notification was reasonable, although a slightly shorter or longer delay could also be acceptable, although not significantly longer.

The group agreed that the exercise site diagrams were too limited because they just provided a functional view of the site, including only major buildings in an approximate layout rather than a geographical plan. The group thought it necessary to require a more realistic geographical site diagram in order to plan efficient and effective inspections, because the smaller the nature of the items to monitor, the greater the range of buildings that may need to be inspected. Further information on the State as a whole would also be required so the relationship between different sites and to the points of entry to the State could be understood. Understanding what the IAEA requires in site declarations would be a useful addition, although recognition that information available on a civil nuclear State may be greater than on a military one because of security restrictions. WG4 also noted that site diagrams under New START only shows buildings which can be inspected, if all buildings can be inspected then potentially all buildings should appear on the site diagram.

The concept of a temporary location could only be understood in terms of a deployed nuclear weapon on board a submarine or road mobile delivery system. For security and defense reasons, inspected States would not reveal the exact location of such delivery systems. The weapons would still be associated with a particular base, with the number of weapons on temporary deployment declared to inspectors in their briefing at the base. This concept would not be studied closely in the second part of the exercise, because these systems would not be available for counting, but more importantly would be for inspectors to convince themselves no extra systems could be included in such deployments, hence the declaration was accurate and the agreement was being complied with.

Concept 3. Inspections at Undeclared Locations

Although the CFE labels these as "challenge" inspections, they are routine occurrences of which each side gets a calculated number each year. The term "challenge" here refers to the fact they are at undeclared sites expected not to contain declared items.

CFE includes:

- Limit to area inspected 65 square kilometres
- Refusal to accept a "challenge" inspection

The group thought the routine nature of "challenge" inspections with a set number allowed each year was a significant benefit. Although a geographical limit of some kind would be required on such an inspection, other ways to limit such an inspection could also be considered

Page | 5 <u>www.ipndv.org</u> rather than a set area. This could be a time limit rather than a geographical one, or if a specific site is chosen the bounds of that site may be more appropriate.

The concept of refusing an inspection was troubling to some members. However, the group realized that certain sites would have safety and security concerns, including military and industrial sites, or operational reasons for not being able to facilitate an intrusive inspection. Further work is required to see if rather than allowing a refusal, a delay with some kind of interim monitoring could be put in place for such inspections. Further study of this concept would be undertaken in the second part of the exercise.

Concept 4. Number of Inspections

CFE includes:

- Declared sites: 15 percent of sites can be visited per year
- Non-declared sites: one visit per year
- Baseline period with extra inspections allowed

WG4 agreed limits are required on the number of inspections per year for practical reasons and to allow normal activities at the sites. The CFE rules did not seem to be fit for purpose due to the likely much lower number of declared sites. A minimum of one visit per site per year at each declared site appears to be required to allow inspectors to build confidence over time, although the group noted that the START limit of a maximum of two visits in a year to any one site was a practical measure. Precise numbers of visits would need to reflect the exact nature of any agreement and the number of sites in each State.

Having more visits in an initial baseline period would appear to be a helpful concept. An alternative concept could be familiarization visits, which allow inspectors to become familiar with sites and items, hence being able to undertake effective inspections even on first inspections. Such familiarizations visits could be undertaken at mutually agreed times, allowing the inspected state a greater degree of preparation.

More than one "challenge" inspection would also be required if any significant degree of confidence was expected to be built. The subgroup was charged with exploring whether specific sorts of sites should be the focus of these inspections, specifically sites that would have the characteristics necessary to host nuclear weapons, and how to balance this with holding the entire State at risk of inspection, an important concept in of itself.

The group noted these inspections were only related to our focus of establishing confidence in the total number of weapons in the State. The numbers of inspections required for verifying other activities such as dismantlement would need to be related to the confidence required and activities involved.

Concept 5. Notification Periods and Points of Entry

CFE includes:

Page | 6 www.ipndv.org

- 36-hour notice of an inspection
- Six-hour notice of the specific site
- Single or multiple points of entry

The group agreed the concept of having notice periods was necessary. The exact times would be a matter for negotiation, because site-specific aspects, including how long to make such sites safe and secure for inspections, would need to be considered. The shorter time the better for inspection purposes but practicalities would need to be allowed for.

Multiple points of entry would mean that only a part of the State or a set number of declared sites would then be possible to be chosen by the inspectors for the actual inspection. Hence normal operations could continue at other sites once the point of entry was known. Whether this is helpful or required would depend on the size of the State and number of declared sites. For New START, the United States and Russia each have two points of entry, with one associated with declared locations in the east or west of each State. This should be considered by negotiators, but there was no reason foreseen that either single or multiple points of entry would be problematic.

The group also considered concepts of whether any movement of items would be allowed after an inspection had been called or whether nearby systems would have to return to base. These are not concepts in the CFE but were included in the START treaty. Both of these would seem useful additions regarding delivery systems such as road mobile or submarines. Further study would be required to understand the implications for planned movements of non-deployed weapons not included in START.

Concept 6. Number of Inspectors and Inspection Duration

CFE includes:

- Limit of nine inspectors
- Limit of three subgroups
- 48 hours for an inspection including traveling time

The group recognized that a limit on numbers of inspectors and the duration of the visit at a nuclear weapons site would be required for cost and practical reasons. The exact numbers should be flexible and depend on the nature of the site and the activities to be undertaken. The group also recognized that only a limited number of inspection activities could be undertaken simultaneously on a nuclear weapons facility for safety and security reasons. However, allowing more inspectors and activities may be advantageous for inspected state facilities if this shortens the duration of the inspection. The numbers for CFE would appear to be low if any practical activities such as measurements would be needed. This would be explored in more detail in the second section of the exercise.

Concept 7. Equipment

• Host supplied equipment in sensitive areas

Page | 7 <u>www.ipndv.org</u> Although the CFE allows inspectors to bring certain equipment, in previous nuclear disarmament verification studies the need for host-supplied equipment in sensitive areas has been shown. As with previous IPNDV work, the need to ensure such equipment would still be trusted by inspectors is crucial, and further study on how this is achieved will be required. Inspectors will need their own IT to analyze any data received from such inspections, and the host will need to facilitate this in appropriate areas of the site or in an off-site location.

Concept 8. Overflights

WG4 recognized this would be problematic on many nuclear weapons sites, as most nuclear establishments, civil or military, do not allow overflights for safety as much as security reasons. Overflights would also be of little utility on small sites, where activities and objects of interest to inspectors are all within buildings. Using drones may be better, but would also have security and safety implications. This would be a site-specific issue, and we recognized it may not be allowed at all sites. Satellite imagery is a more likely source of such information, and how this could be used would be a matter for negotiations. Overflights or aerial imagery could have more utility, and less safety or security concerns, when looking for or at undeclared sites for absence confirmation purposes.

Concept 9. Rules to Discount Buildings and Objects to Inspect

CFE includes:

- No inspections of buildings with a less than two-meter entrance way
- No inspections of shrouded items less than two meters in diameter

WG4 thought that this concept was not one that translated to the nuclear weapons regime, given the small size of the TAI. Hence no building or item (shrouded or otherwise) should be off limits simply due to size alone. However, inspectors will need to decide how much time to spend looking at buildings that are unlikely to be used for weapons, such as offices and accommodation or recreational facilities as opposed to bunkers and shielded facilities. The group thought the ability of inspectors to hold all buildings and items at risk of inspection was an important concept, hence the importance of not having anything ruled out. WG4 thought this was particularly important when related to ensuring the absence of undeclared weapons at declared sites.

WG4 expected some security or otherwise sensitive items would be shrouded, but any such item if not declared as a weapon should be subject to confirmation measurements if inspectors require it. Questions for technical experts in IPNDV's Working Group 6 (WG6) came from this discussion on how much confidence that a shrouded or containerized item could be gained from a measurement. Is there a size beyond which an item could contain sufficient shielding that a measurement would not work? What other information or measurements could then help with this? Weighing the item if practical was one possible option.

Consideration and further work would be required to consider items that may be encountered at undeclared non-weapon facilities. This could then include items that have nuclear signatures

Page | 8 <u>www.ipndv.org</u> that could not be opened for safety reasons. Could absence of explosives be used in these circumstances? The group suggested the possibility of weapon systems that contain radioactive signatures such as depleted uranium as a potentially particularly difficult problem to account for.

Concept 10. Video and Photography

WG4 thought that the use of video was unlikely to be acceptable within sensitive facilities unless it was very carefully host-controlled and in cases to ensure absence of activities. It was noted even in the CFE this was predominantly used to record initial briefings, so no information was missed. This may be allowable depending on the acceptance of the specific individuals involved. Photography would be expected to be widely used to record activities, unique identifiers, tags and seals, as well as any anomalies found. This is similar to CFE and START. Any such photography would be host controlled and images would be reviewed for security before releasing to inspectors. Chain of custody of equipment and data storage devices would be required to maintain confidence in such images.

> Page | 9 <u>www.ipndv.org</u>

Findings from Part Two: Site-Specific Inspections

The subgroups were only given two hours to discuss how they would verify declarations they were given at each site. Hence, the subgroups only expected they would be able to identify a few key challenges to using the CFE concepts, and not create any detailed inspection plans or arrangements. Each section below sets out the initial declarations subgroups were given for each site, any general observations made by the subgroups at the beginning of their discussions, the approaches the subgroups took to explore verification concepts, and the issues or questions they identified. The following sections are taken directly from the summaries made by the subgroups themselves. Key conclusions from both parts of the exercise are discussed at the end of this paper. Annex 2 also contains some key points and questions each subgroup was asked to consider as part of their deliberations.

Subgroup 1. Missile Silo Base

Initial declaration (as set out for exercise purposes):

- 100 weapons present on the site
- 50 weapons deployed on missiles located in 16 silos
- Each missile capable of carrying five weapons
- 50 weapons located in a separate storage area

General Observations

The silo subgroup found it important to demonstrate trust to the inspected State, and in this regard decided to focus first on the red-marked facilities (i.e., facilities declared to have nuclear weapons) on the site diagram (see Annex 2).

The subgroup also agreed that as many facilities as possible should be at least visually screened within the limited time, and that a handful blue-marked (indicating declared as no weapons present) facilities would undergo in-depth inspection.

Approach Discussed by the Subgroup

The subgroup tested if a team of 12 inspectors could gain sufficient confidence in the time allowed. They postulated that the inspectors would be split into three groups of four people. The first group to inspect the silo area, the second group to inspect the storage area and the base headquarters, and the third group to compile and analyze the data sent by the first two groups.

The first group would be split into two subgroups. On the first day of inspection, while the first subgroup conducts inspection of one of the red-marked silos, the second subgroup drives throughout the entire silo area and visually screens the authenticity of the red/blue (weapons present/not present) declaration.

Page | 10 www.ipndv.org On the second day of inspection, while the first subgroup conducts in-depth verification of a couple of blue-marked facilities, the second subgroup inspects the red-marked interim storage building located next to one of the silos.

The second team will spend a day-and-a-half inspecting the storage area and half a day inspecting the base headquarters. The second team would also be split into two subgroups to try to verify as many facilities as possible. Similar to the first group, it will visually screen all facilities, if possible, arbitrarily select a red-marked facility for in-depth verification and undergo same procedure for a blue-marked facility.

Issues or Questions Identified

If a silo contains a missile not loaded with a nuclear weapon, then it would be marked with blue. The inspectors decide whether to verify such a silo.

If the missile and the nuclear warhead are stored separately at the interim storage building next to the silo, then it would take less time to conduct verification. However, if the warhead is loaded on the missile, then it would take a longer time to verify.

As for the blue-marked facilities, if they are empty, then it would easy to screen visually. However, if there are objects similar to nuclear weapons containers, then this would delay the verification process and require additional time.

It was clear the CFE limit of 48 hours was too restrictive; the exact time required would depend on activities needed, although this would always be limited. A multinational inspection conducted under substantial time constraint would require sufficient prior training and coordination to ensure effectiveness.

Subgroup 2. Road Mobile Base

Initial declaration (as set out for exercise purposes):

- 100 weapons associated with the site
- 25 weapons temporarily on missiles on deployment
- Each missile capable of carrying one weapon
- 75 weapons located in a separate storage area

General Observations

The group quickly realized that it was not feasible to develop a comprehensive inspection plan, given the limited time and amount of information available. Instead, the group used the opportunity to discuss several aspects related to carrying out such inspections.

Approach Discussed by the Subgroup

Initially, one group of inspectors could check the site perimeter to ensure the overview of the site and check, for example, that suspicious items are not stored or hidden directly off the site perimeter.

Page | 11 <u>www.ipndv.org</u> At the same time, a second subgroup could start verifying the presence of declared warheads in the red structures. This task, limited to verifying the unique identifiers (such as serial numbers) on each warhead container, should be manageable for all 75 containers containing weapons.

Inspectors should never be left alone, so at least two inspectors should at any time be present in the inspectors' office where they can account for inspection activities and execute necessary compilation and analyze collected information.

When the perimeter has been inspected, the same subgroup may inspect some of the blue structures looking for any suspicious items or activities.

- It is not realistic to visit all buildings. Some will appear more relevant than others, and future visits to the same site may be used to inspect some of the buildings not visited earlier.
- In some locations, selected by the inspectors, the subgroup should carry out absence measurements by looking for weapons-related radiation. Sufficient time should be allocated to make several such measurements as long as no suspicious radiation is detected.

One subgroup should, if possible, collect information about the whereabouts of the warheads, such as the unique identifiers associated with the deployed weapons.

• It is important for confidence-building to be able to follow the weapons over time. Documents do not prove anything, but consistency over many years is difficult to fake.

The inspecting group is assumed to be able to confirm the presence of nuclear weapons by performing certain measurements. Because measuring one weapon takes half a day, realistically, the group would therefore be expected to verify only one or two weapons by actual measurements in any one visit.

- These weapons must be selected by the inspectors.
- Confidence must be built over time as new inspections are carried out and new weapons are measured.

Issues or Questions Identified

The given CFE-based frequency of inspections is not satisfactory for nuclear disarmament verification. Just carrying out the verification of the initial baseline declaration would take several years and verifying the movements of individual weapons over time would be almost impossible.

The CFE-based rule of excluding structures with a door width less than two meters is not applicable to nuclear disarmament verification. Missiles are large, but nuclear weapons may be much smaller than two meters even if they are placed in a container.

• Nuclear disarmament verification may therefore call for much more comprehensive inspections than those performed under existing treaties.

Page | 12 <u>www.ipndv.org</u> The limited duration of inspections as in the case of this exercise, albeit meaningful from a practical perspective, comes as a detriment to the reliability and accuracy of the inspection and hence the credibility of the verification regime. This is due to the fact that a single nuclear weapon can be highly relevant strategically, as opposed to a small number of conventional weapons (for instance a tank under the CFE Treaty). Given the complexity of nuclear disarmament verification activities, such activities will need significantly greater resources in terms of personnel, logistics, and budgets than verification activities under the CFE treaty.

Subgroup 3. Naval Base

Initial declaration (as set out for exercise purposes):

- 100 weapons associated with the site
- 50 weapons temporarily on submarines
- Each missile capable of carrying three weapons
- 50 weapons located in a separate storage area

General Observations

Importance of prior information, including on the submarines, included the number of boats, the number of launch tubes on each boat, how to uniquely identify each boat, as well as serial numbers or other unique identifiers (UIDs) for the missiles and the weapons. This would be essential to ensure confidence on the total numbers of weapons that could be gained over multiple visits. Given half of the weapons are not present on the initial visit limited any potential confidence that could be gained.

If possible, intrinsic UIDs would help increase confidence over time because these would always be directly associated with the items (weapons, missiles, boats), rather than attached tags or seals, or printed serial numbers.

Approach Discussed by the Subgroup

The group gave priorities to identifying and counting the declared weapons present on the site, including physically checking the stores and ensuring unique identification of the items present. The group preferred to make a measurement on a randomly selected item to ensure it was a real weapon system.

If a boat was present during the inspection, the group would check the number of tubes and how the boat is uniquely identified; this is important for subsequent visits to ensure there are no extra boats. The group would need a declaration of how many launch tubes contain missiles and how many weapons were on each missile. The group would choose to inspect one tube declared as empty, and one missile to count the number of weapons (these would be shrouded so just "lumps") attached. The group would take measurements of any "lumps" declared not to be weapons. Much of this could replicate procedures from START baring any State-specific differences.

> Page | 13 <u>www.ipndv.org</u>

The group would perform a visual inspection of any other boats or vessels and buildings. Everywhere should be available for inspection, and the inspectors would use a random selection process to choose which areas to physically inspect to check for absence of weapons.

Issues or Questions Identified

Based on CFE inspection rules, it could be a very long time before all boats would have been seen by inspectors. The group determined that more work is required into how much confidence could be gained that all weapons were being counted. Statistical methods should be looked at to assess the reliability of random selection as a methodology and how to optimize it to gain most confidence.

Considering how to make random selection most effective would allow a better estimate of how many inspections would be required to gain sufficient confidence in the declarations, and how long each inspection would need to be.

Subgroup 4. State-Wide Completeness Considering Undeclared Locations

General Observations

Based on the discussions on applicability of CFE verification rules to the given scenario, a convergence of opinion emerged that it should be, in principle, possible to verify the absence of undeclared items or activities in a State as a whole with sufficient levels of assurance.

NTMs would likely play a very large role in State-wide completeness verification efforts.

Approach Discussed by the Subgroup

In the context of State-wide verification of completeness, it is most promising to further look into the "holding everything at risk" concept of the CFE Treaty.

That means *all* undeclared locations should, in principle, be at risk of being inspected. In other words, no location on the territory or under jurisdiction/control of a State should be exempted, although safeguards against frivolous or excessively disruptive inspections are required (in addition to the possible deterrent effect of reciprocity).

The wide scope of a State-wide inspection regime could perhaps be made more manageable by distinguishing between different types of locations (less or more suitable for undeclared items/activities) and allocating different types of inspection regimes to the different categories.

Locations especially suitable for undeclared items or activities (e.g., because of security, military nature, accessibility, remoteness, proximity to military facilities with delivery vehicles) would receive higher inspection quotas than other locations.

Even so, credible procedures/arrangements would have to be in place for a large range of different types of locations and terrains (determination of size of sites, transport, observation methods, technology, etc.).

Page | 14 www.ipndv.org

Issues or Questions Identified

It is highly unlikely that any State could be provided with absolute certainty that another State has not hidden a single or small batch of warheads; however, this uncertainty should be offset by other checks and verification regimes, for example, on delivery systems and fissile materials.

Adequate verification of absence of undeclared items in a State-wide context will require a highly cooperative setting or an extremely high verification burden. Unless a minimum of confidence exists between parties and they actively cooperate to reassure others of their compliance, verification of State-wide completeness will likely be too cost-intensive to be feasible. Exceptions could be joint efforts to verify disarmament in a single (smaller) State.

Conclusion

Many concepts could be used from the CFE. Although comprehensive verification solutions could not be developed in the timescale of this exercise, no reasons were found why sufficient confidence could not be gained with a relatively similar approach to the CFE, modified for the practicalities of nuclear weapons and facilities.

The details would likely need to change in each concept (number of inspections, inspectors, subgroups, time, etc.), but the principles involved would be the same. Future negotiators would be taking the same considerations (confidence, intrusiveness, efficiency) to decide such details, which relate directly to the principles the IPNDV developed in Phase 1.

Further details developed in START and New START would also be directly relevant and would provide the basis for many of the activities to count deployed declared items. However, site-specific issues in different States may require different solutions.

The exercise showed the importance of detailed information on sites, delivery vehicles, and containers prior to inspections. The more detailed information provided, the more efficient and effective inspection could be. Prior information would include not just written information and data, but visits to sites, exhibitions of missiles and delivery vehicles, and establishment of how measurements and unique identification would work, including trials. This would also be in the inspected State's interest to ensure inspections could be as efficient as possible and hence spend less time physically on their sites.

WG4 also noted the need to identify and be able to account for delivery vehicles, even when it is the nuclear weapons that are the items of account. Accounting for delivery vehicles provides the most effective way of being able to account for weapons on deployment, and by ensuring no extra delivery vehicles exist provides confidence in no excess weapons.

The routine application of "challenge" inspections was a very useful concept to build confidence in the absence of weapons in non-declared locations. This was an aspect not included in the START Treaties. WG4 thought much further work is required in building how

Page | 15 www.ipndv.org verification of absence could be most effectively undertaken during inspections both at declared and non-declared locations.

The importance of random selection and holding "everything" at risk of inspection was demonstrated. Further study of methods to assess the effectiveness of statistical approaches to verification should be undertaken. This will particularly aid the understanding of how best to build confidence in the absence of declared items in undeclared locations based on random selection of inspections.

WG4 identified two immediate points during this phase of the IPNDV:

- Coordination with technical experts in WG6 is required on how to make effective and efficient measurements to indicate the absence of a weapon in containers or under shrouds.
- Coordination with technical experts in WG6 is required on unique identification, particularly intrinsic features, to enable re-identification of items on subsequent visits. Because items can legitimately move between inspections, and not all items will be available for counting on each inspection (on deployment), sealing items in containers may not provide a benefit in many cases. Need to ensure items can still be identified, and hence avoid "double accountancy."

These questions could also be taken up by technical experts beyond IPNDV.

Overall, as with previous work by the IPNDV, participants thought although there was still much work to do, that this exercise built further confidence that verification could be successfully accomplished for nuclear disarmament in the future.

Page | 16 www.ipndv.org

Working Group 4 Deliverable Annex: Exercise Documentation

Annex 1. WG4 Walkthrough Exercise on Declarations: CFE Treaty Case Study

Annex 2. Exercise Handouts: Initial Declaration, Site Diagrams, and Photographs

Annex 3. Walkthrough Presentation

Annex 4. Aerial Photographs of Facilities

Page | 17 www.ipndv.org

Annex 1. WG4 Walkthrough Exercise on Declarations: CFE Treaty Case Study

Reference Material: A Simplified Version of the CFE Treaty

INITIAL DECLARATIONS

Each State Party shall provide at the signature of this Treaty notification to all other States Parties of the maximum levels for its holdings of **NUCLEAR WARHEADS**.

Technical Data and Photographs

Technical data together with photographs (**WEAPON CONTANERS/DELIVERY VEHICLES**) shall be provided by each State Party to all other States Parties at the signature of the Treaty.

NOTIFICATIONS AND EXCHANGE OF INFORMATION

Annual Exchange of Information

- Information on the overall holdings (NUCLEAR WARHEADS);
- Information on the location, numbers, and types of **NUCLEAR WARHEADS** not in service with Armed Forces (exp. research and development facilities, etc.);
- Information on **DECLARED FACILITIES**;
- Points of Entry/Exit;
- Information on the location of sites from which NUCLEAR WARHEADS have been withdrawn (the locations of these sites shall be notified for three years following such withdrawal).

Operational Notifications

• Any change of 10 percent or more in number of **NUCLEAR WARHEADS** assigned to any location. Such notification shall be given no later than five days after such change occurs, indicating actual holdings after the notified change.

Page | 18 <u>www.ipndv.org</u>

VERIFICATION (INSPECTIONS)

General Obligations

- No more than one inspection team conducting an inspection may be present at the same time at any one inspection site.
- Each State Party shall be obliged to receive a number of inspections pursuant to not to exceed its passive **DECLARED FACILITIES** inspection quota for each specified time period:
 - During the first 120 days after entry into force of the Treaty—20 percent of DECLARED FACILITIES;
 - Each year, commencing after completion of the 120 days after entry into force of the Treaty, for the duration of the Treaty—15 percent of **DECLARED FACILITIES**.
- Each State Party with territory within the area of application shall be obliged to accept challenge inspections as follows:
 - During the baseline validation period, up to 15 percent of the number of inspections of **DECLARED FACILITIES** which that State Party is obliged to receive on its territory;
 - During each year of the residual period, up to 23 percent of the number of inspections of **DECLARED FACILITIES** which that State Party is obliged to receive on its territory.
- Notwithstanding any other limitations, each State Party shall be obliged to accept a minimum of one inspection each year of its **DECLARED FACILITIES**, and each State Party with territory within the area of application shall be obliged to accept a minimum of one inspection each year within a specified area.
 - An inspection team's in-country period shall not exceed the 48 hours for the inspection of a **DECLARED FACILITIES** or within a specified area;
- An inspection team conducting an inspection shall spend no more than 48 hours at a DECLARED FACILITIES and no more than 24 hours in inspection within a specified area.
- The inspected State Party shall ensure that the inspection team travels to an
 inspection site by the most expeditious means available. Time between completion
 of the inspection conducted by an inspection team on the territory of the State
 Party where an inspection is carried out and the arrival of that inspection team at
 the point of Entry/Exit does not exceed nine hours. Excess time shall not count
 against that inspection team's in-country period.

Page | 19 <u>www.ipndv.org</u>

Notification of Intent of Inspection

The inspecting State Party shall notify the inspected State Party of its intention to carry out an inspection, such notifications shall be made **no less than 36 hours in advance of the estimated time of arrival** of the inspection team at the point of Entry/Exit and shall include:

- (A) The point of Entry/Exit to be used;
- (B) The estimated time of arrival at the point of Entry/Exit;
- (C) The means of arrival at the point of Entry/Exit;
- (D) A statement of whether the first inspection shall be conducted as a DECLARED
 FACILITIES or challenge inspection and whether the inspection will be conducted on foot, by cross-country vehicle, by helicopter, or by any combination of these;
- (E) The time interval between the arrival at the point of Entry/Exit and the designation of the first inspection site;
- (F) The likely number of sequential inspections.

The inspected State Party shall acknowledge receipt of notification within three hours.

Procedures upon Arrival at Point of Entry/Exit

- The escort team shall meet the inspection team and transport crew members at the point of Entry/Exit upon their arrival.
- Equipment and supplies that the inspecting State Party brings into the territory of the State Party where an inspection is to be carried out shall be subject to examination each time they are brought into that territory. This examination shall be completed prior to the departure of the inspection team from the point of Entry/Exit to the inspection site. Such equipment and supplies shall be examined by the escort team in the presence of the inspection team members.

GENERAL RULES FOR CONDUCTING INSPECTIONS

- An inspection team shall consist of up to nine inspectors and may divide itself into up to three sub-teams.
- The inspection team shall be permitted to bring such documents as needed to conduct the inspection, in particular its own maps and charts. Inspectors shall be permitted to bring and use portable passive night vision devices, binoculars, video and still cameras, Dictaphones, tape measures, flashlights, magnetic compasses, and laptop computers. The inspectors shall be permitted to use other equipment, subject to the approval of the inspected State Party.

Page | 20 <u>www.ipndv.org</u>

- The inspection team shall specify on each occasion it designates the **DECLARED FACILITIES** to be inspected whether the inspection will be conducted on foot, by crosscountry vehicle, by helicopter, or by any combination of these.
- The inspection team shall have the right to conduct helicopter overflights of the **DECLARED FACILITIES**, using a helicopter provided and operated by the inspected State Party. The duration of such helicopter overflights at an inspection site shall not exceed a cumulative total of one hour.
- The inspected State Party shall not be obliged to provide a helicopter at any **DECLARED FACILITIES** that are less than 20 square kilometers in area.
- During an inspection of a **DECLARED FACILITIES** or within a specified area, inspectors shall be permitted access, entry, and unobstructed inspection:
 - In the case of a specified area, within the entire specified area; or
 - Inspectors shall not have the right to enter other structures or areas within structures the entry points to which are physically accessible only by personnel doors not exceeding two meters in width and to which access is denied by the escort team.
- The inspected State Party shall have the right to shroud individual sensitive items of equipment.
- The escort team shall have the right to deny access to sensitive points, the number and extent of which should be as limited as possible, to shrouded objects and to containers any dimension (width, height, length, or diameter) of which is less than two meters. Whenever a sensitive point is designated, or shrouded objects or containers are present, the escort team shall declare whether the sensitive point, shrouded object or container holds any NUCLEAR WARHEAD.
- Inspectors shall have the right to take photographs, including video, for the purpose of recording the presence of weapon. The escort team shall cooperate with the inspection team's taking of photographs.
- Photography of sensitive points shall be permitted only with the approval of the escort team.
- The inspection shall be deemed to have been completed once the inspection report has been signed and countersigned.
- After completion of an inspection at a **DECLARED FACILITIES** or within a specified area, if no sequential inspection has been declared, then the inspection team shall be transported to the appropriate point of Entry/Exit as soon as possible and shall depart the territory of the State Party where the inspection was carried out within 24 hours.

Page | 21 <u>www.ipndv.org</u>

DECLARED FACILITIES INSPECTION

- Inspection of a **DECLARED FACILITIES** shall not be refused. Such inspections may be delayed only in cases of force majeure.
- An inspection team shall arrive on the territory of the State Party where an inspection is to be carried out through a point of Entry/Exit associated with the declared site it plans to designate as the first inspection site.
- The inspected State Party shall have the right to utilize up to six hours after designation of a **DECLARED FACILITIES** to prepare for the arrival of the inspection team at that site.
- At the number of hours after arrival at the point of Entry/Exit, which shall be no less than one hour and no more than 16 hours after arrival at the point of Entry/Exit, the inspection team shall designate the first **DECLARED FACILITIES** to be inspected.
- The inspected State Party shall ensure that the inspection team travels to the first declared site by the most expeditious means available and arrives as soon as possible but no later than nine hours after the designation of the site to be inspected, unless otherwise agreed between the inspection team and the escort team, or unless the inspection site is located in mountainous terrain or terrain to which access is difficult. In such case, the inspection team shall be transported to the inspection site no later than 15 hours after designation of that inspection site. Travel time in excess of nine hours shall not count against that inspection team's in-country period.
- Immediately upon arrival at the **DECLARED FACILITIES**, the inspection team shall be escorted to a briefing facility where it shall be provided with a diagram of the declared site. The declared site diagram, provided upon arrival at the declared site, shall contain an accurate depiction of the:
 - (A) Geographic coordinates of a point within the inspection site, to the nearest 10 seconds, with indication of that point and of true north;
 - (B) Scale used in the site diagram;
 - (C) Perimeter of the declared site;
 - (D) Major buildings and roads on the declared site;
 - (E) Entrances to the declared site; and
 - (F) Location of an administrative area for the inspection team.
- Within one-half hour after receiving the diagram of the declared site, the inspection team shall designate the **DECLARED FACILITIES** to be inspected. The inspection team shall then be given a pre-inspection briefing which shall last no more than one hour and shall include the following elements:

Page | 22 <u>www.ipndv.org</u>

- (A) Safety and administrative procedures at the inspection site;
- (B) Modalities of transportation and communication for inspectors at the inspection site; and
- (C) Holdings and locations at the inspection site.
- The pre-inspection briefing shall include an explanation of any differences between the numbers of **NUCLEAR WEAPONS** present at the inspection site and the corresponding numbers provided in the most recent notification, in accordance with the following provisions:
 - (A) If the numbers of **NUCLEAR WEAPONS** present at the inspection site are less than the numbers provided in that most recent notification, such explanation shall include the temporary location of **NUCLEAR WEAPONS**; and
 - (B) If the numbers of NUCLEAR WEAPONS present at the inspection site exceed the numbers provided in that most recent notification, such explanation shall include specific information on the origin, departure times from origin, time of arrival, and projected stay at the inspection site of such a NUCLEAR WEAPONS.

CHALLENGE INSPECTION WITHIN SPECIFIED AREAS

- Each State Party shall have the right to conduct challenge inspections within specified areas.
- The term "specified area" means an area anywhere, on the territory of a State Party within the area of application other than **DECLARED FACILITIES** within which a challenge inspection is conducted. A specified area shall not exceed 65 square kilometers. No straight line between any two points in that area shall exceed 16 kilometers.
- If the inspecting State Party intends to conduct a challenge inspection within a specified area as the first inspection after arrival at a point of Entry/Exit:
 - (A) It shall include in its notification the designated point of Entry/Exit nearest to or within that specified area capable of receiving the inspecting State Party's chosen means of transportation; and
 - (B) At the number of hours after arrival at the point of Entry/Exit, which shall be no less than one hour and no more than 16 hours after arrival at the point of Entry/Exit, the inspection team shall designate the first specified area it wishes to inspect. Whenever a specified area is designated, the inspection team shall, as part of its inspection request, provide to the escort team a geographic description delineating the outer boundaries of area. The inspection team shall

Page | 23 <u>www.ipndv.org</u> have the right, as part of that request, to identify any structure or facility it wishes to inspect.

- The inspected State Party shall have the right to refuse challenge inspections within specified areas.
- The inspected State Party shall inform the inspection team within two hours after the designation of a specified area whether the inspection request will be granted.
- If access to a specified area is granted:
 - The inspected State Party shall have the right to use up to six hours after it accepts the inspection to prepare for the arrival of the inspection team at the specified area;
 - The inspected State Party shall ensure that the inspection team travels to the first specified area by the most expeditious means available and arrives as soon as possible after the designation of the site to be inspected, but no later than nine hours from the time such an inspection is accepted, unless otherwise agreed between the inspection team and the escort team, or unless the inspection site is located in mountainous terrain or terrain to which access is difficult. In such case, the inspection team shall be transported to the inspection site no later than 15 hours after such an inspection is accepted. Travel time in excess of nine hours shall not count against that inspection team's in-country period; and
 - Within such specified area the escort team may delay access to or overflight of particular parts of that specified area. If the delay exceeds more than four hours the inspection team shall have the right to cancel the inspection. The period of delay shall not count against the in-country period or the maximum time allowed within a specified area.
 - If the inspected State Party so wishes, the inspection team may be briefed on arrival at the specified area. This briefing is to last no more than one hour. Safety procedures and administrative arrangements may also be covered in this briefing.
 - If access to a specified area is denied:
 - The inspected State Party or the State Party exercising the rights and obligations of the inspected State Party shall provide all reasonable assurance that the specified area does not contain NUCLEAR WEAPONS.
 - No inspection quota shall be counted, and the time between the designation of the specified area and its subsequent refusal shall not count against the in-country period. The inspection team shall have the right to designate another specified area or declared site for inspection or to declare the inspection concluded.

Page | 24 <u>www.ipndv.org</u>

Annex 2. Exercise Handouts: Initial Declaration, Site Diagrams, and Photographs

INITIAL DECLARATIONS

Table V-2-1. Overall Holdings of Nuclear Weapons

Line Number	Category	Type of Nuclear Weapons	Number of Nuclear Weapons
1	NUCLEAR WEAPONS	TYPE A	800

Table V-2-2. Information on the Location, Numbers, and Types of Nuclear Weapons Not in Service with Armed Forces

Line Number	Location	Type of Nuclear Weapons	Number of Nuclear Weapons
1	FACILITY "RESEARCH&DEVELOPMENT" 151515N0151515E	ΤΥΡΕ Α	1

Table V-2-3. Information on Declared Facilities

Line Number	Record Number and Location of Declared Facilities	Point of Entry/ Exit	Designation of Declared Facilities	Number of Nuclear Weapons	Type of Nuclear Weapons
1	001 LOCATION1 111111N0111111	01	FACILITY "NAVAL BASE"	100	ΤΥΡΕ Α
	E				

Page | 25 www.ipndv.org

2	005 LOCATION2 222222N0222222 E	01	FACILITY "ROCKET SILO"	100	TYPE A
3	006 LOCATION3 333333N0333333 E	01	FACILITY "MOBILE- ROAD POINT"	100	TYPE A
4	007 LOCATION4 444444N0444444 E	01	FACILITY "DISMANTLEMENT"	100	TYPE A
5	008 LOCATION5 555555N0555555 E	01	FACILITY "CENTRAL STORAGE"	100	TYPE A
6	009 LOCATION6 66666600666666 E	01	FACILITY "AIR BASE 1"	100	TYPE A
	010	01		100	
/	LOCATION7 777777N0777777 E	01	FACILITY "AIR BASE 2"	100	ΙΥΡΕ Α
8	011 LOCATION8	01	FACILITY "AIR BASE 3"	100	TYPE A
	8888888N08888888 E				

Table V-2-4. Points of Entry/Exit (POE)

Line Number	POE Record Number	Name of POE	Location	Туре
1	01	POE1	99999 <mark>9009</mark> 99999999	AIR, GROUND

Page | 26 www.ipndv.org

Table V-2-5. Information on the Location of Declared Sites which Nuclear Weapons HaveBeen Withdrawn

Declared Facilities Record Number	Declared Facilities	Location of Declared Facility	Year of Withdrawal
002	FACILITY "FORMER TEST SITE"	121212N0121212E	2015
003	FACILITY "FORMER AIR BASE"	131313N0131313E	2016
004	FACILITY "FORMER ROAD POINT"	141414N0141414E	2017

Page | 27 www.ipndv.org

SITE DIAGRAMS

Naval Base site diagram



Road Mobile site diagram



Page | 28 www.ipndv.org

Missile Silo site diagram



Missile Silo site diagram Base Headquarters



Page | 29 www.ipndv.org

PHOTOGRAPHS OF MISSILES AND WEAPON CONTAINERS

Lundund I metre

Road Mobile Missile—One Weapon per Missile

https://commons.wikimedia.org/wiki/File:Blue Steel missile.png



Road Mobile Missile—One Weapon per Missile

Page | 30 www.ipndv.org https://commons.wikimedia.org/w/index.php?search=blue+steel+missile&title=Special%3ASea rch&go=Go&ns0=1&ns6=1&ns12=1&ns14=1&ns100=1&ns106=1#/media/File:Blue_Steel_missil e_at_RAF_Museum_London.JPG





https://commons.wikimedia.org/wiki/File:Blue Streak.JPG

Page | 31 www.ipndv.org



Submarine Launched Missile—Up to Three Weapons per Missile

https://commons.wikimedia.org/w/index.php?search=british+missile&title=Special:Search&go= Go&ns0=1&ns6=1&ns12=1&ns14=1&ns100=1&ns106=1&searchToken=4izguicf7bmtwv76li61y uiol#%2Fmedia%2FFile%3ABritish Polaris Missile - Imperial War Museum 1.jpg

> Page | 32 www.ipndv.org

Air Delivered Bomb



https://commons.wikimedia.org/wiki/File:We177 science museum.jpg

Weapon Container

Photo courtesy of the QUAD nuclear disarmament verification partnership (UK, US, Norway, Sweden)

Page | 33 www.ipndv.org

QUESTIONS AND ISSUES TO CONSIDER

- In examining the simplified CFE Treaty (in the order it is written), we might wish to ask questions not limited to the following. We may not be able to answer these immediately in our first session, but may need to revisit these after the exercise.
- Are photographs sufficient, or are exhibitions of the items required? What technical data are required on weapons, their containers, and delivery vehicles? Does this include certain baseline or template measurements?
- Regarding the notification system of only notifying changes of 10 percent or greater within five days, is this sufficient, if not, then why not?
- Is allowing 20 percent of the sites to be visited in one year sufficient? Given there are likely to be far fewer nuclear sites than military sites under CFE, what figure balances intrusiveness with providing sufficient confidence?
- Given the lower number of declared sites, the number of undeclared site visits in a year is likely to be very low (probably one in most nuclear weapon possessor States), does this matter? If so why?
- Are site visits of a maximum of 48 hours (less once travelling is included) sufficient? If not, what would balance intrusiveness and providing sufficient confidence?
- Does the notification timeline pose issues for the inspected State? Giving 36 hours of a notification of an inspection, but not identifying which site?
- The CFE allows use of inspector-supplied equipment; it has been suggested this is unlikely to be the case for nuclear weapons inspections. What issues does this pose? Does this apply in all areas of nuclear weapons facility or only in the highest sensitivity areas? Inspectors will need to be able to use their own computers and equipment for certain data analysis; the inspected State will need to enable this at a location in reasonable proximity to the inspection site.
- Is a team of nine inspectors in three sub-teams sufficient? How many could a nuclear site be expected to facilitate?
- Is the use of a helicopter reasonable at nuclear sites?
- The CFE uses a criterion of a two-meter door width to define which buildings can or cannot be inspected. Is this a useful concept for nuclear weapons facilities? If so, what would be an equivalent criterion?

Page | 34 <u>www.ipndv.org</u>

- Shrouded items are likely to be used to protect sensitive security and proliferative items. Is a size criterion a useful concept of which are measured for absence? If so, what should the size be? Is there an alternative criterion?
- Is taking video footage helpful to inspectors? Would this pose security issues for the inspected State?
- The inspected State will get six hours' notice of which site will be inspected. Is this sufficient to allow inspected State preparations but without causing concerns over the integrity of the inspection?
- Are the site diagrams appropriate and sufficient? If not what else may be useful to or assist verification activities?
- For challenge inspections, is the limit on area size a useful concept? Is 65 square kilometers appropriate?
- The time allowed for challenge inspections is the same as for declared sites. Does that seem appropriate or are there reason they should be different? What might determine this?
- Is the concept of not being able to refuse inspections to declared sites, but being able to refuse challenge inspections appropriate?

Questions and Issues to Consider for Inspection and Monitoring Activities at Nuclear Bases

- Distribution of **SUBTEAMS**—one team will need to be based in an office to collate information, communicate with the field teams, and to be able to swap members of the field team as the day progresses.
- No inspector should ever be left alone.
- There is **LIMITED TIME** available, so we need to decide on priority actions:
 - How should we prioritize between counting declared items and looking for undeclared items?
 - Do we need to make confirmation measurements on declared items and if so on how many?

Page | 35 <u>www.ipndv.org</u>

- What kind of non-declared items do we need to measure to confirm absence of nuclear/explosive material?
- Measurements on nuclear weapons will take time, as they will almost certainly have to be moved to be measured in a safe location. Measurements on one weapon are likely to take a minimum of half a day if in storage and potentially up to a whole day if they are being removed from a missile. Only one weapon can be measured in any location at a time.
- For **SILO** sites, these could be physically very large, visiting all of the site will not be practicable. How might the use of the overflight or areal observations be used?
- For NAVAL and ROAD MOBILE bases, many of the nuclear weapons will be deployed outside of the base at unknown locations. How can we count these systems? Including using multiple inspections over multiple years? Do we need to keep track of or uniquely identify the delivery vehicles?
- In STORAGE locations, weapons will be in containers.
- Any unique identifier for the weapons will have to be applied to the container as the weapon will not be accessible to inspectors. How does this affect confidence and verification options?
- On any subsequent visit it is possible a different set and number of weapons will be on deployment; how does this affect keeping track of the weapons? Containers may have different weapons (of the same type) inside them to the ones seen on previous visits.
- **DEPLOYED** systems will be attached to missiles, how does this affect access arrangements? If missile nose sections can be opened to show inspectors the number of weapons attached, they will be shrouded so only "covers" will be seen, this may include non-nuclear items as well as the declared weapons.
- For buildings declared **FREE OF WEAPONS**, are there building types that should be prioritized for checking? Are there buildings that can be safely ignored (e.g., offices)? Is there an equivalent to the two-meter rule from the CFE as to which buildings to check?

Questions and Issues to Consider for Inspection and Monitoring Activities at Non-Declared Sites

How to choose where to inspect?

• What sites will be most important to inspect?

Page | 36 www.ipndv.org

- Are there sites that should be off limits for such inspections? (Government headquarters offices? City center locations?)
- Are there sites that should have more regular monitoring options? Which are these?
- Consideration should be given to:
 - Previous nuclear weapons facilities and bases;
 - Former nuclear test sites;
 - Military bases with large explosive/conventional weapons storage facilities, or with conventional missile capabilities (dual use systems?);
 - Military ranges and exercise areas;
 - Government laboratories;
 - Nuclear facilities;
 - Explosive facilities;
 - Isolated industrial complexes (Does government or commercial ownership matter?);
 - Different geographical terrains—remote areas where items may be hidden, particularly areas with tunneling activities, some road/rail access would likely be required.
- What use can remote monitoring play (including areal or satellite monitoring, commercial, national or international capabilities)?
- Which of these sites may pose issues for the inspected State in terms of the security and sensitivity of legitimate non-nuclear weapons related activities?

How to approach inspecting a site once it has been chosen?

- Distribution of **SUBTEAMS**—one team will need to be based in an office to collate information, communicate with the field teams, and to be able to swap members of the field team as the day progresses.
- No inspector should ever be left alone.
- There is **LIMITED TIME** available, so we need to decide on priority actions:
 - These sites could be physically very large, visiting all of the site will not be practicable. How might the use of the overflight or areal observations be used?

Page | 37 www.ipndv.org

- Are there building types that should be prioritized for checking? Are there buildings that can be safely ignored (e.g., offices)? Is there an equivalent to the two-meter rule from the CFE as to which buildings to check?
- Should inspectors be searching for the weapons themselves, or start looking for other features? What might these be?
 - Swipe sampling for nuclear/explosive material?
 - o Nuclear/explosive related health and safety infrastructure?
 - Attitude and compliance of the host?
 - Can the hosts explanation of the site be validated?
- What kind of items do we need to measure to confirm absence of nuclear/explosive material?

Page | 38 www.ipndv.org



Page | 39 www.ipndv.org



Page | 40 www.ipndv.org

Initial Declarations & Technical data and photographs

QUESTIONS

• ARE PHOTOGRAPHS SUFFICIENT, OR ARE EXHIBITIONS OF THE ITEMS REQUIRED? WHAT TECHNICAL DATA IS REQUIRED ON WEAPONS, THEIR CONTAINERS AND DELIVERY VEHICLES? DOES THIS INCLUDE CERTAIN BASELINE OR TEMPLATE MEASUREMENTS?

Page | 41 www.ipndv.org



Page | 42 www.ipndv.org

• THE NOTIFICATION SYSTEM OF ONLY NOTIFYING CHANGES OF 10% OR GREATER WITHIN 5 DAYS, IS THIS SUFFICIENT, IF NOT WHY NOT?

SITE DIAGRAM

- GEOGRAPHIC COORDINATES OF A POINT WITHIN THE INSPECTION SITE, TO THE NEAREST 10 SECONDS, WITH INDICATION OF THAT POINT AND OF TRUE NORTH;
- SCALE USED IN THE SITE DIAGRAM;
- PERIMETER OF THE DECLARED FACILITY;
- MAJOR BUILDINGS AND ROADS ON THE DECLARED FACILITY;
- ENTRANCES TO THE DECLARED SITE; AND
- LOCATION OF AN ADMINISTRATIVE AREA FOR THE INSPECTION TEAM.



Page | 43 www.ipndv.org

• ARE THE SITE DIAGRAMS APPROPRIATE AND SUFFICIENT? IF NOT WHAT ELSE MAY BE USEFUL TO OR ASSIST VERIFICATION ACTIVITIES?

PRE-INSPECTION BRIEFING

An explanation of any differences between the numbers of NUCLEAR WARHEADS present at the inspection site and the corresponding numbers provided in the most recent notification:

- (A) if the numbers of NUCLEAR WARHEADS present at the inspection site are less than the numbers provided in that most recent notification, such explanation shall include **the temporary location** of NUCLEAR WARHEAD; and
- (A) if the numbers of NUCLEAR WARHEADS present at the inspection site exceed the numbers provided in that most recent notification, such explanation shall include specific **information on the origin**, **departure times from origin, time of arrival and projected stay at the inspection site** of such a NUCLEAR WARHEAD.

Page | 44 www.ipndv.org

• IT IS POSSIBLE, FROM A SECURITY POINT OF VIEW, TO PROVIDE INFORMATION ON TEMPORARY LOCATION OF NW? IF NOT HOW CAN YOU CHECK THE CORRECTNESS OF THE INFORMATION PROVIDED?



Page | 45 www.ipndv.org

TYPES OF INSPECTION

DECLARED FACILITIES INSPECTION

• CHALLENGE INSPECTION WITHIN SPECIFIED AREA (A SPECIFIED AREA SHALL NOT EXCEED 65 SQUARE KILOMETRES. NO STRAIGHT LINE BETWEEN ANY TWO POINTS IN THAT AREA SHALL EXCEED 16 KILOMETRES)

QUESTIONS

• FOR CHALLENGE INSPECTIONS, IS THE LIMIT ON AREA SIZE A USEFUL CONCEPT? AND IS 65 SQUARE KILOMETRES APPROPRIATE?

Page | 46 www.ipndv.org

REFUSAL OF THE INSPECTION

- Inspection of a DECLARED FACILITIES shall not be refused. Such inspections may be delayed only in cases of force majeure.
- The inspected State Party shall have the right to refuse challenge inspections within specified areas. The
 inspected State Party shall inform the inspection team within two hours after the designation of a
 specified area whether the inspection request will be granted. If access to a specified area is denied, the
 inspected State Party or the State Party exercising the rights and obligations of the inspected State Party
 shall provide all reasonable assurance that the specified area does not contain NUCLEAR WARHEADS.

QUESTIONS

• IS THE CONCEPT OF NOT BEING ABLE TO REFUSE INSPECTIONS TO DECLARED FACILITIES, BUT BEING ABLE TO REFUSE CHALLENGE INSPECTIONS APPROPRIATE?

Page | 47 www.ipndv.org

NUMBER OF DECLARED FACILITIES INSPECTIONS

DECLARED FACILITIES INSPECTION QUOTA FOR EACH SPECIFIED TIME PERIOD:

• DURING THE FIRST 120 DAYS AFTER ENTRY INTO FORCE OF THE TREATY - **20** PERCENT OF **DECLARED FACILITIES**;

• EACH YEAR, COMMENCING AFTER COMPLETION OF THE 120 DAYS AFTER ENTRY INTO FORCE OF THE TREATY, FOR THE DURATION OF THE TREATY, - **15** PERCENT OF **DECLARED FACILITIES**.

NUMBER OF CHALLENGE INSPECTIONS

EACH STATE PARTY WITH TERRITORY WITHIN THE AREA OF APPLICATION SHALL BE OBLIGED TO ACCEPT CHALLENGE INSPECTIONS AS FOLLOWS:

- DURING THE BASELINE VALIDATION PERIOD, UP TO **15 PERCENT** OF THE NUMBER OF INSPECTIONS OF **DECLARED FACILITIES** WHICH THAT STATE PARTY IS OBLIGED TO RECEIVE ON ITS TERRITORY;
- DURING EACH YEAR OF THE RESIDUAL PERIOD, UP TO **23 PERCENT** OF THE NUMBER OF INSPECTIONS OF **DECLARED FACILITIES** WHICH THAT STATE PARTY IS OBLIGED TO RECEIVE ON ITS TERRITORY.

Page | 48 <u>www.ipndv.org</u>

NUMBER OF INSPECTION

A MINIMUM OF ONE INSPECTION EACH YEAR OF ITS DECLARED FACILITIES,

AND ONE INSPECTION EACH YEAR WITHIN A SPECIFIED AREA.

QUESTIONS

• IS ALLOWING 15 % OF THE SITES TO BE VISITED IN ONE YEAR SUFFICIENT? GIVEN THERE ARE LIKELY TO BE FAR FEWER NUCLEAR SITES THAN MILITARY SITES UNDER CFE, WHAT FIGURE BALANCES INTRUSIVENESS WITH PROVIDING SUFFICIENT CONFIDENCE?

• GIVEN THE LOWER NUMBER OF DECLARED SITES, THE NUMBER OF UNDECLARED SITE VISITS IN A YEAR IS LIKELY TO BE VERY LOW (PROBABLY 1 IN MOST WEAPON STATES), DOES THIS MATTER? IF SO WHY?

Page | 49 www.ipndv.org

NOTIFICATION OF INTENT OF INSPECTION

The inspecting State Party shall notify the inspected State Party of its intention to carry out an inspection, such notifications shall be made **no less than 36 hours in advance of the estimated time of arrival** of the inspection team at the point of entry/exit and shall include:

- (A) the point of entry/exit to be used;
- (A) the estimated time of arrival at the point of entry/exit;
- (A) the means of arrival at the point of entry/exit;
- (A) a statement of whether the first inspection shall be conducted as a DECLARED FACILITIES or challenge inspection and whether the inspection will be conducted on foot, by cross-country vehicle, by helicopter or by any combination of these;
- (B) the time interval between the arrival at the point of entry/exit and the designation of the first inspection site;(C) the likely number of sequential inspections.

QUESTIONS

• DOES THE NOTIFICATION TIMELINE POSE ISSUES FOR THE HOST? GIVING 36 HOURS OF A NOTIFICATION OF AN INSPECTION, BUT NOT IDENTIFYING WHICH SITE?

Page | 50 www.ipndv.org

POE PROCEDURES

- The escort team shall meet the inspection team and transport crew members at the point of entry/exit upon their arrival.
- Equipment and supplies that the inspecting State Party brings into the territory of the State Party where an inspection is to be carried out shall be subject to examination each time they are brought into that territory. This examination shall be completed prior to the departure of the inspection team from the point of entry/exit to the inspection site. Such equipment and supplies shall be examined by the escort team in the presence of the inspection team members.

QUESTIONS

THE CFE ALLOWS USE OF INSPECTOR SUPPLIED EQUIPMENT, IT HAS BEEN SUGGESTED THIS IS UNLIKELY TO BE THE CASE FOR NUCLEAR WEAPON INSPECTIONS, WHAT ISSUES DOES THIS POSE? DOES THIS APPLY IN ALL AREAS OF A NUCLEAR WEAPON FACILITY OR ONLY IN THE HIGHEST SENSITIVITY AREAS? INSPECTORS WILL NEED TO BE ABLE TO USE THEIR OWN COMPUTERS AND EQUIPMENT FOR CERTAIN DATA ANALYSIS, THE HOST WILL NEED TO ENABLE THIS AT A LOCATION IN REASONABLE PROXIMITY TO THE INSPECTION SITE.

Page | 51 www.ipndv.org

GENERAL RULES FOR CONDUCTING INSPECTION

- 9 INSPECTORS MAY DIVIDE IP TO 3 SUB-TEAMS
- INSPECTION COULD BE CONDUCTED ON FOOT, BY CROSS-COUNTRY VEHICLES, BY HELIKOPTER
- 1 HOUR HELIKOPTER OVERFLIGHTS OF DECLARED FACILITIES (NO OBLIGATION IF AREA IS LESS THAN 20 SQUARE KILOMETERS)

QUESTIONS

- IS A TEAM OF 9 INSPECTORS IN THREE SUB TEAMS SUFFICIENT? HOW MANY COULD A NUCLEAR SITE BE EXPECTED TO FACILITATE?
- IS THE USE OF A HELICOPTER REASONABLE AT NUCLEAR SITES?

Page | 52 www.ipndv.org

GENERAL RULES FOR CONDUCTING INSPECTION

DURING AN INSPECTION OF A DECLARED FACILITIES OR WITHIN A SPECIFIED AREA, INSPECTORS SHALL BE PERMITTED ACCESS, ENTRY AND UNOBSTRUCTED INSPECTION:

- IN THE CASE OF A SPECIFIED AREA, WITHIN THE ENTIRE SPECIFIED AREA;
- INSPECTORS SHALL NOT HAVE THE RIGHT TO ENTER OTHER STRUCTURES OR AREAS WITHIN STRUCTURES THE ENTRY POINTS TO WHICH ARE PHYSICALLY ACCESSIBLE ONLY BY PERSONNEL DOORS NOT EXCEEDING TWO METRES IN WIDTH AND TO WHICH ACCESS IS DENIED BY THE ESCORT TEAM.

A LORD AND A DECK

QUESTIONS

• THE CFE USES A CRITERIA OF A 2M DOOR WIDTH TO DEFINE WHICH BUILDINGS CAN OR CANNOT BE INSPECTED, IS THIS A USEFUL CONCEPT FOR NUCLEAR WEAPON FACILITIES? IF SO WHAT WOULD BE AN EQUIVALENT CRITERIA?

Page | 53 www.ipndv.org

SENSITIVE POINTS

- THE INSPECTED STATE PARTY SHALL HAVE THE RIGHT TO SHROUD INDIVIDUAL SENSITIVE ITEMS OF EQUIPMENT.
- THE ESCORT TEAM SHALL HAVE THE RIGHT TO DENY ACCESS TO SENSITIVE POINTS, THE NUMBER AND EXTENT OF WHICH SHOULD BE AS LIMITED AS POSSIBLE, TO SHROUDED OBJECTS AND TO CONTAINERS ANY DIMENSION (WIDTH, HEIGHT, LENGTH OR DIAMETER) OF WHICH IS LESS THAN TWO METRES. WHENEVER A SENSITIVE POINT IS DESIGNATED, OR SHROUDED OBJECTS OR CONTAINERS ARE PRESENT, THE ESCORT TEAM SHALL DECLARE WHETHER THE SENSITIVE POINT, SHROUDED OBJECT OR CONTAINER HOLDS ANY **NUCLEAR WARHEAD**.

QUESTIONS

 SHROUDED ITEMS ARE LIKELY TO BE USED TO PROTECT SENSITIVE SECURITY AND PROLIFERATIVE ITEMS, IS A SIZE CRITERIA A USEFUL CONCEPT OF WHICH ARE MEASURED FOR ABSENCE? IF SO WHAT SHOULD THE SIZE BE? IS THERE AN ALTERNATIVE CRITERIA?

Page | 54 www.ipndv.org

RULES OF PHOTO TAKING

- INSPECTORS SHALL HAVE THE RIGHT TO TAKE PHOTOGRAPHS, INCLUDING VIDEO, FOR THE PURPOSE OF RECORDING THE PRESENCE OF WEAPON. THE ESCORT TEAM SHALL COOPERATE WITH THE INSPECTION TEAM'S TAKING OF PHOTOGRAPHS.
- PHOTOGRAPHY OF SENSITIVE POINTS SHALL BE PERMITTED ONLY WITH THE APPROVAL OF THE ESCORT TEAM.

QUESTIONS

• IS TAKING VIDEO FOOTAGE HELPFUL TO INSPECTORS? WOULD THIS POSE SECURITY ISSUES FOR THE HOST?

Page | 55 www.ipndv.org

POE		
48 hours	24 hours	
Designation of Declared Facility or specify area		
6hrs Preparation of inspection site		
essthan 9 hrs Travel to/from the inspection site	Less than 9 hrs	
1/2 brs Site diagram study		
This Pre-inspection briefing		
Practical part of the inspection	No more than 48 hrs for Declared Facility or 24 for challenge inspection	

- ARE SITE VISITS OF A MAXIMUM OF 48 HOURS (LESS ONCE TRAVELLING IS INCLUDED) SUFFICIENT? IF NOT WHAT WOULD BALANCE INTRUSIVENESS AND PROVIDING SUFFICIENT CONFIDENCE?
- THE HOST WILL GET 6 HOURS NOTICE OF WHICH SITE WILL BE INSPECTED, IS THIS SUFFICIENT TO ALLOW HOST PREPARATIONS BUT WITHOUT CAUSING CONCERNS OVER THE INTEGRITY OF THE INSPECTION?

Page | 56 www.ipndv.org



Annex 4. Overhead Photographs of Facilities



Page | 57 www.ipndv.org



Page | 58 www.ipndv.org





Page | 59 www.ipndv.org

Page | 60 www.ipndv.org