ESARDA/INMM Workshop:  
Future Directions for Nuclear Safeguards and Verification  

WG 3: Broader Perspective on Nonproliferation  
And Nuclear Verification  

An International Cooperative Verification Agenda for Arms Reduction  

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Background

In 2007, George Shultz, William Perry, Henry Kissinger, Sam Nunn came together in their remarkable op-ed in the *Wall Street Journal* in which they made the case for the international community to engage in a joint enterprise of working toward a world free of nuclear weapons and linking this vision with concrete threat reduction steps. These steps would reduce urgent nuclear dangers and build support for reducing reliance on nuclear weapons, ultimately leading to a world free of such weapons. They said, “Without the bold vision, the actions will not be perceived as fair or urgent. Without the actions, the vision will not be perceived as realistic or possible.” They have since authored 3 additional op-eds that continued their thinking on how to move forward.

What you may be less familiar with is that in 2007 they also launched the Nuclear Security Project (NSP) at the Nuclear Threat Initiative. Through the NSP, NTI coordinates the activities of the Four Statesmen as well as undertaking a robust agenda of international activities and substantive analytic work to help them make progress on their goals. This is not “Global Zero”. Like Kleenex or Petrol, unfortunately Global Zero has come to be understood by some as the name for nuclear disarmament. In fact, this is a specific organization with an advocacy mission that is not shared by all others, even those who support President Obama’s call for the peace and security of a world without nuclear weapons.

For these “cold warriors” the task at hand is not to declare a date certain for nuclear disarmament, but rather to define the steps that will (1) help create the conditions under which the elimination of nuclear weapons makes the world more safe and secure, rather than destabilized and more dangerous, and (2) through which the world is more safe and secure even if we never get to a world without nuclear weapons.

Developing verification approaches is one of the steps listed in the first op-ed, and is an area that was immediately recognized by the Four where more meaningful work needed to be done. Fundamentally, we are never going to move toward a world of far fewer nuclear weapons unless all states can have confidence that we can verify disarmament.
commitments, nonproliferation obligations and the peaceful nature of existing civil nuclear activities.

This is the background for NTI’s work, but I want to emphasize that this work is not about a world without nuclear weapons, it is about the effort necessary to get from here to there – needed steps even if we never arrive at that goal. But if we don’t pursue these endeavors, we are guaranteed to never even get close. We are now in the midst of the substantive work related to verification of nuclear material and deep reductions of nuclear weapons. We completed an edited volume called “Cultivating Confidence” published last year and are working with partners to develop international working groups to dig deeper and derive practical approaches and technical solutions to some of the verification challenges. Some of the findings and recommendations from “Cultivating Confidence” can be instructive in thinking through future verification needs.

Findings of “Cultivating Confidence”

Perhaps the greatest reason for optimism from the study is that the international community already knows how to do much of what we anticipate will be needed to verify a world free of nuclear weapons.

So often, “verifiability” is the hook upon which people who disagree with the end goal hang their objections. While there are still many technical and policy issues left to be addressed for which an appropriate research agenda will need to be developed and completed, it is gratifying to note that the work over the last several decades within the scientific and technical community have resulted in significant accomplishments directly bearing on our ability to envision and scope a credible verification regime on the path to, and ultimately in, a world free of nuclear weapons.

A few elements that demonstrate why the current debate about verification produces new and different discussions than those held in the past.

The first element is the “stakeholders” who will need to be identified during any discussion of verification regimes. Traditionally, the technical problems of arms control verification, and decisions about acceptable risk, have been within the jurisdiction of the nuclear weapon states, particularly the US and Russia. In a world where states commit to a joint enterprise to work towards a world free of nuclear weapons, we recognize that all states have equities and responsibilities in the progress of disarmament efforts. The role of the non-nuclear weapons states in helping define their needs for assurance and contributing their substantial technical expertise to the verification task cannot be underestimated.

A second element is the need to rethink the classified nature of information and the implementation of information security. With respect to nuclear technology and nuclear weapons, the standards by which information is deemed to be classified may rest on potentially outdated assumptions about the unique value of the information and how it is shared. It may ultimately be more practical to share certain previously classified information than to develop complicated procedures designed to protect information no longer deemed sensitive. This is not to say that there is not an appropriate role for the protection of classified information, but rather to carefully review the underlying
assumptions if sharing the information would be critical to the success of a future verification regime.

A third element is determining compliance or non-compliance with norms, legal obligations, or commitments. Non-compliance is often in the eye of the beholder. For example, the IAEA has recently made judgments related to the intent of violators in a way that may influence the reaction of the international community to the violation. The same safeguards violation - like the production of a small amount of undeclared nuclear material - may invoke different consequences depending on a judgment of intent. Did the country deliberately attempt to develop clandestine capabilities or was it the work of a small handful of scientists in a program that was not transparent to national leadership? Making this statement here in South Korea may be particularly meaningful for those who know their recent history.

Judgments of intent have been encouraged by some who feel that it allows for flexible and appropriate response, and criticized by others who think that the IAEA should detect and report violations without making qualitative judgments about their significance. This discussion highlights the fact that the concepts of compliance and non-compliance are not always “black and white.”

A fourth element is a systems based approach to verification. We need to conceive of verification as a system of different policy and technical approaches that has political acceptance informed by an acknowledgement of the defined risk. No individual verification measure is infallible and there is not a technical solution to all problems related to it. Rather, by constructing a “system of systems,” we maximize the opportunity for the weakness of one measure to be compensated for by another. An effort to structure a system that leverages all tools available, including technical approaches, legal and political commitments, the roles of the public and insiders, incentives for compliance, deterrence of noncompliance, and an honest qualitative and quantitative acceptance of risk is the only appropriate way to determine if the system makes sense.

The fifth, and last element I want to highlight, is that we have been struck by the creativity of people thinking about verification and the value of considering nontraditional approaches as part of a verification system. Some of the newer ideas include the concept of societal verification – what role those with no legal obligation to find or report violations can play- and the model of public-private partnerships to take advantage of information that may be held by particular segments of society, such as industry, that are not traditionally fed into verification systems. These kinds of approaches require more rigorous analysis to determine their real marginal value in a state-driven verification system.

Finally, the biggest challenge to the overall verification and monitoring agenda for future arms reductions may be that posed by uncertainties regarding the quantities of existing stocks of fissile material and nuclear weapons. We must develop strategies to reduce the residual uncertainties regarding completeness of initial declarations as all declared weapons-related inventories go to zero. Establishing this confidence in countries’ initial
baseline declarations will likely be a key point in all states’ decisions to move to very low numbers, much less zero.

This challenge is compounded in the context of growing inventories of declared nuclear materials in civil applications and the spread of nuclear capabilities to previously non-nuclear regions of the world.

Not surprisingly, the study found that verifying agreements on the path towards a world free of nuclear weapons will be complex and challenging. In some cases, the negotiation of future agreements between the United States and Russia may be both a driver to better refining verification regimes, as well as being the result of progress on verification. Similarly, during the NPT review process and other international discussions, verification and enforcement of current agreements may serve as a point of departure for cooperation and progress but also as a roadblock to further action if confidence in such measures is low. In all cases, progress on both unilateral and cooperative efforts on verification could positively influence the ongoing nonproliferation and disarmament agenda.

The "Menu" of Next Steps

The next steps and research agenda highlighted in the NSP study are worth further consideration. Please note that these are not consensus proposals among all the book authors, but rather proposals that may have been suggested by one or more of the individual contributors. [For the sake of time, I am going to only talk about these in broad strokes, but I can give the specifics in the discussion if people are interested.]

Technical tasks include those that require new or renewed lines of scientific and practical investigation by experts. Often these activities will be well suited for investigation by the national laboratories or by independent scientists.

With regard to fissile materials, there are many questions that will need to be addressed if there is to be significant progress in negotiating and implementing a verifiable fissile material cutoff treaty (FMCT). There are additional challenges which go beyond the presumed scope of an FMCT. These tasks include:

1. Examining how best to address verification requirements at complex, operational facilities not designed for such measures;
2. Seeking better methods to detect and characterize fissile materials, at high resolution, in remote and non-intrusive ways;
3. Developing verification techniques for fissile material used for non-explosive military applications (such as for HEU in naval or space reactors) or exploring how and where HEU can be eliminated from these applications thereby obviating the need for the same level of verification;
4. Utilizing environmental sampling and WAEM for detecting undeclared fissile material production
5. Investigating the usefulness of techniques such as isotope ratio methods to confirm historical plutonium production as a means to improve confidence in baseline declarations in the final stages of reductions.

There are also a number of challenges related to the dismantlement of nuclear weapons including:

1. Developing a common approach among all states for designing a process for converting classified forms of fissile material (such as the plutonium triggers or HEU “secondary” components) by removing their classified properties;

2. Refining the criteria for determining whether data are classified in order to enable greater transparency and facilitate verification;

3. Certifying completed warhead dismantlement prototype or template systems through vulnerability testing to confirm that their use would not divulge classified information, and to assure that the results obtained were authentic;

4. Developing and certifying “chain of custody” technology for verifying the process of removing warheads from weapon delivery systems.

5. Performing architectural studies to design warhead dismantling facilities that could incorporate design features to facilitate verification, and allow occasional managed access into the dismantling areas;

6. Refining attribute verification capabilities to verify receipts of warheads at dismantlement;

7. Creating techniques for identifying a given model for a nuclear weapon pit or secondary, and thereby confirming the demounting, storage, dismantling or conversion of specific weapon systems without divulging classified information.

In support of greater security as the world works towards the elimination of nuclear weapons, individual States could begin immediately by increasing the transparency of their nuclear activities. This could include working to develop full baseline inventories of holdings of nuclear weapons and fissile materials, as discussed earlier.

It is also possible to work on models for creating “win –win” situations in the field of information sharing between industry and governments. Through public-private partnerships, verification might be improved with information that industry and technology holders glean from export activities.

There is an important role for international organizations and bodies, such as the IAEA, the United Nations Security Council, and regional groups, to play in supporting the agenda. It is important to note that in most cases, the international organs are functions of the policies of states parties and thus are not independent actors. Therefore, one cannot “call on” a body to do something without first building consensus among the states parties for the common agenda. The agenda could include:
1. Creating a “culture of compliance” or “zero tolerance” toward non-compliance with arms control agreements. Countries could be reminded in a timely fashion of their obligations and failures to comply would be publicized—a form of “name and shame.” If a country needed advice or assistance in meeting its obligations, which likely would be the case for many countries, they could request it and the means to do so would be developed by members of the international community.

2. Developing an International Satellite Verification Agency (ISVA) and beginning to train an international cadre of experts in imagery analysis to increase international knowledge about, and stakes in, monitoring and verification. This idea was originally proposed by France in the 1970s, but was rejected by both the U.S. and then USSR. This agency would use commercial imagery now widely available and could even develop its own satellite capability.[1]

3. Motivating still abstaining states to adopt the IAEA Additional Protocol. Efforts would be made to refine and strengthen its measures, and to demonstrate increased transparency.

Some measures will likely need to be undertaken by specific groups of states or “coalitions of the willing.” Examples may include:

1. Conducting a U.S-Russian or multilateral pilot program on monitoring and verifying reductions and the ultimate elimination of nuclear weapons through the verified dismantlement of warheads;

2. Reaching consensus among non-nuclear weapon states on which attributes must be verified, with sufficient confidence and without breaching the NPT, regarding the presence of a nuclear weapon subject to dismantlement, or weapons-grade fissile materials subject to monitored storage or destruction;

3. Discussing the concept of “trusted agents,” or non-nuclear weapons states that could be proxy for the others in disarmament verification activities. In any disarmament verification process, there should be inspectors present from a small group of “trusted agent states” acting on behalf of the broader group of non-nuclear weapons states (NNWS);

4. Discussing, among all the nuclear weapons states, relevant monitoring and verification issues. Talks could be started soon among any subset of nuclear armed states willing to participate in the process;

5. Developing further the concept of a Fissile Material Control Initiative. In this voluntary endeavor, states would collaborate in order to increase security, transparency, and control over fissile material stocks, to prevent their theft or diversion to non-state actors or additional states, and to move fissile materials verifiably and irreversibly out of nuclear weapons and into forms less attractive for nuclear weapons use.

Value of multilateral approaches
1. Build capacity

If we look toward a world of far fewer nuclear weapons, and if we believe the proposition that we need verification and that there are more stakeholders than just the US and Russia, or even the states with nuclear weapons, then there is a need to build both the depth and breadth of the international community to develop, assess and implement verification approaches. [we heard Andreas say yesterday that capacity is limited in the UK, and there is even less in many of the nonnuclear weapon states.] Even in the US, work on verification was stagnant for more than a decade before the New Start treaty process began. Much of the past experience rests with retiring technical experts and those at the national laboratories were routed to other missions. There is a lot of relevant and related expertise that can be utilized in the US and elsewhere, but we need to channel that toward verification challenges. This can also benefit the IAEA, Euratom, CTBTO, possible FMCT and other nuclear verification agencies down the road.

2. Increase confidence

It will be increasingly important to build confidence in all states of the process of arms control and arms reductions. If we expect the arms control process to provide assurance and gain broad support internationally, the process of building confidence will matter. The best way to do this is to involve more countries in developing and implementing verification approaches. This is important also to help build understanding about the limits to verification participation. Limits to access are expected to be necessary, even with a more open process, and we need to build a common understanding of where those limits are and what kinds of information are being protected in order to prevent accusations of undue secrecy or obfuscation.

3. Promote freer flow of information

4. Take advantage of expertise

Despite the lack of specific verification capacity, there is expertise in nonnuclear weapon states and states with nuclear weapons beyond those involved in arms control to date. It is to the benefit of the verification effort to involve and engage this expertise. Interestingly, the broad view of verification that will be required for future arms control and verification is likely to include areas beyond the traditional disciplines of as well: data management, systems engineering, etc.

5. Expand stakeholders

If this approach is successful, the result will be a process that helps to solve technical problems, build political support for verifications approaches (and therefore arms control steps) and make progress on the broader agenda. As noted above, not all verification challenges can be appropriately addressed through this process. In depth,
well resourced activity is still needed in the United States, Russia, and through coordination of the P5 and others. But multilateral engagement can be an important component of an overall arms control verification research and development agenda. Without it, verification will likely remain the long pole in the tent, and one that – lacking significant progress – threatens to obstruct needed efforts to reduce risks and make the world safer.

The International Verification Pilot Project

NTI’s International Verification Project is designed to bring experts from a wide array of related backgrounds together to build capacity for verification internationally in support of arms control goals (and in support of the larger objective of a world without nuclear weapons), build confidence between nuclear and non-nuclear-weapon states, promote freer flow of information among governments and between governments and NGOs and solve technical problems that could be barriers to progress. The Project does not seek to provide a comprehensive ‘solution’ to the verification problem; rather, it focuses on a limited number of high priority topics that will need to be addressed within a broader multilateral verification process. The Project’s goal is to empower partners’ own visions of what is needed to close analytic gaps and promote creative verification approaches in support of policy objectives.

Three topical areas (“baskets”) have been identified as discrete, but linked, areas for study by expert working groups [again, I will only highlight these but am happy to discuss further in discussion]:

Basket 1 – Verifying baseline inventories and enabling the next steps in arms control

- What are the key challenges to establishing and declaring accurate nuclear material baseline inventories?
- What are the key challenges to establishing and declaring accurate warhead baseline inventories?
- What are the key commonalities between nuclear material and warhead baseline inventories?
- What actions can be taken to help build consensus on corresponding international verification priorities?
  - What actions should states take now to preserve and in due course validate historic data?
  - What tools and technologies are required for the verification tasks?
  - What are the political constraints in this area, and how can they be addressed?
- How can the dialogue on future arms control treaties and agreements be expanded beyond the U.S. and Russia, and a process be developed for regular engagement among technical experts in order to build capacity and facilitate anticipated multilateral arms control?
Basket 2 – Societal verification

- Are there mechanisms to empower non-traditional stakeholders to contribute to nuclear arms control transparency via means such as social networking and whistle-blowing?
  - How would such information be integrated into more formal processes?
  - How could confidence-levels in such information be quantified?
  - How could such information be filtered to avoid information overload?

- What broader issues are raised, e.g. legal protection for those providing information, developing “values” in support of individuals providing information, and abstaining from involvement in activities prohibited by international law?

- How might a pilot project be designed to test a concept (or concepts) developed by the working group?

Basket 3 – Engagement with Non-Nuclear-Weapon States

- How can the broader international community (i.e. predominantly NNWS) be assured of the integrity and competence of verification processes for nuclear arms control and reductions?

- Would this require some direct NNWS involvement in the verification processes, or could NNWS concerns be met by options such as:
  - A multilateral inspectorate which includes NNWS nationals (such as the IAEA, or a special-purpose entity)?
  - Transparency in the verification processes – so participation would be limited to NWS nationals, but the verification procedures and standards would be well understood (and accepted) by NNWS?
  - A variation of this last, where verification would be performed by NWS nationals but there would be some form of audit by NNWS nationals?

- If there are limits on NNWS participation, how can these be minimized?
  - What is the dividing line between highly sensitive information and information that can be accessed by a multilateral inspectorate?

- How might previous or existing verification projects (such as the UK-Norway “Initiative on Nuclear Warhead Dismantlement Verification”) and other verification regimes (such
as the CWC and the CTBT) be leveraged to advance new bilateral, multilateral and/or international verification efforts.

- In areas excluded to multilateral inspectors, how do the NWS themselves derive assurance about the performance of NWS verification? In this respect NWS and NNWS share a common interest – that the verification results are valid.

Conclusions

Not surprisingly, verifying, monitoring, and enforcing agreements on the path towards a world free of nuclear weapons will be complex and challenging. In some cases, the negotiation of future agreements between the United States and Russia may be both a driver to better refining verification regimes, as well as being the result of progress on verification. Similarly, during the NPT review process and other international discussions, verification and enforcement of current agreements may serve as a point of departure for cooperation and progress but also as a roadblock to further action if confidence in such measures is low. In all cases, progress on both unilateral and cooperative efforts on verification, monitoring, and enforcement could positively influence the ongoing nonproliferation and disarmament agenda.