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## TRUST AND NUCLEAR WARHEAD DISMANTLEMENT VERIFICATION

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In recent years, much attention has been directed to the goal—distant and far from unanimously supported though it may be—of reaching a world without nuclear weapons. Aside from a great deal of commentary, these years have seen a new US-Russian nuclear arms treaty, the New START agreement, signed and brought into force as well as renewed efforts to establish a nuclear weapons-free zone in the Middle East that may or may not lead to an ongoing process of regional dialogue and confidence-building in the coming years. Indonesia has also now ratified the Comprehensive Nuclear-Test-Ban Treaty, bringing the number of key hold-outs necessary for entry into force of that treaty down to eight.

All of which is not to suggest that momentum for worldwide nuclear disarmament is building. None of the world’s nuclear-armed states look set to do away with their nuclear weapons capabilities in the foreseeable future. Indeed, many justify holding on to nuclear weapons because the future is inherently *unforeseeable*. At present, expensive modernisation programmes are underway in a number of these states, and in some, fissile material stockpiles are being actively increased. What’s more, concerns persist about the possible emergence of new nuclear-armed countries, principally Iran, and the knock-on effects of any such new entrants to the nuclear ‘club’ for regional horizontal proliferation. Concerns of this nature tend to call into question the long-term viability of the Nuclear Non-Proliferation Treaty (NPT) as well.

### **The meaning of ‘disarmament’**

There is, too, little agreement on what nuclear ‘disarmament’ actually means, as it can mean a number of different things. There are, firstly, two ways to consider the term: one as the *process* of reaching zero (whatever zero is taken to refer to); and second as the *end state of zero* itself. Arguably the second of these definitions is more accurate, but the term is used fairly interchangeably to describe both process and end state.

If it is taken to mean an end state in which a country no longer has nuclear weapons in its military arsenal—or its political arsenal, as many would say that nuclear weapons have *only* political utility—then additional confusion arises over what a ‘disarmed’ state would or should look like. In other words, *what is zero?* Would the de-mating of all warheads from their delivery systems constitute disarmament, for instance, or would additional measures have to be taken to increase the difficulty of re-engineering a nuclear weapons capability? How irreversible does disarmament have to be to really count as disarmament?

In my view, which I have argued elsewhere,<sup>1</sup> the dismantlement of nuclear warheads underpins the concept of nuclear disarmament. This follows from the logic that, to be considered disarmed, a state must not be in possession of any ‘usable’ nuclear warheads. Considerations of usability might be informed by a number of factors—such as a state’s ability to deliver its warheads to desired targets in a reliable fashion (i.e. to have a true weapons capability). But warhead dismantlement, while not in and of itself an irreversible procedure, arguably represents the baseline for what constitutes a warhead’s inability to be used. Anything less than what Steve Fetter has called, as the minimum level of disarmament, ‘the dismantling of all nuclear explosive devices under national control’<sup>2</sup> and a state cannot really be said to have reached a point of nuclear disarmament. (Or it certainly becomes harder to make such a claim—if a state had de-mated all warheads but only dismantled some, for example.)

### **The role of trust**

What role, then, does trust play? Verification of warhead dismantlement attempts to negate, as far as possible, the need for trust. A state could claim to have dismantled its nuclear arsenal—but for some, or even many, that claim may not be accepted as having fully and completely taken place. If the United Kingdom was to dismantle its nuclear arsenal, a declaration to that effect might be sufficient to for British actors to be satisfied (although even that is doubtful) but it would likely not be sufficient to satisfy other P5 nations, other nuclear-armed states, or the non-nuclear-weapon states of the world.

For them, to take on trust something of such importance would be an enormous leap of faith—particularly if it was to have a bearing on their own defence posture. In the case of warhead dismantlement, most if not all actors will want *confidence based on evidence* that dismantlement has taken place. That kind of evidence can only be arrived at through verification—of the kind discussed in this paper (which deals with the step-by-step process of dismantling warheads in a verifiable fashion) or, as in the case of South Africa, through verification after-the-fact of dismantling having taken place behind closed doors.

### **The meaning of dismantlement**

Dismantlement itself has been defined by the United States Department of Energy (DOE)—the US government department that manages the country’s nuclear stockpile—as the separation of a warheads high explosives from its fissile material components, all of which are typically contained in what is known as the ‘physics package’ of a device. Dismantlement processes are different between states and types of warhead (some take a longer to dismantle than others, for instance, and all states have their own ways of doing things) but, broadly speaking, all dismantlement processes entail a number of commonalities.

First of all, a warhead will need to be removed from deployment and transported to a dismantlement facility. At this facility, which may be co-located on sites where warhead *assembly* is taking place, the physics package will be removed from the bomb casing and the various component parts—including, most importantly, explosives and fissile materials—separated out. After dismantlement, the components that made up the previously intact device will then be re-used elsewhere, put into storage, or disposed of in some manner. What happens to the fissile material components of dismantled warheads is a matter of particular significance as it is this material that ultimately enables

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<sup>1</sup> David Cliff, ‘Multilateral Approaches to Future Warhead Dismantlement Verification’, UK PONI (Royal United Services Institute), 10 May 2012. Available online here: [http://www.rusi.org/downloads/assets/UK\\_PONI\\_2012\\_-\\_Cliff\\_-\\_Multilateral\\_Disarmament\\_Verification.pdf](http://www.rusi.org/downloads/assets/UK_PONI_2012_-_Cliff_-_Multilateral_Disarmament_Verification.pdf)

<sup>2</sup> Steve Fetter, ‘Verifying Nuclear Disarmament’, Henry L. Stimson Center Occasional Paper No.29, October 1996, p2.

a state to produce nuclear weapons. And suitable material is not easy to come by; a lot of effort and investment needs to go into producing such substances.

### **Past research on verified dismantlement**

Nowhere in the world today is nuclear warhead dismantlement being undertaken in a verified manner. Among the various nuclear weapon reduction agreements signed between the US and Russia since the end of the cold war, nowhere has there ever been any call for warheads to be verifiably dismantled—rather that only certain numbers could be out on deployment. Warheads exceeding deployment limits could be kept in storage without infringing treaty stipulations. Within the world's nuclear-armed states, warheads are being dismantled year on year, but such processes are much more, if not entirely, about retiring obsolete systems than they are being conducted out of any desire to disarm.

However, the verification of dismantlement has been a consideration of a number of nuclear-weapon states—as well, in at least one instance, of an international organisation—and to varying degrees it remains so today. As far back as the 1960s, the United States embarked on a four-month practical investigation of the 'Demonstrated Destruction of Nuclear Weapons', in which they sought to ascertain how much sensitive information might be released at varying levels of inspector access. Later in the cold war, American and Soviet scientists took part in what was known as the 'Black Sea Experiments' to examine the utility of different methods of verifying nuclear weapons at sea. The following decade, when it looked as though a START III pact might call for the verified dismantlement of warheads, the DOE undertook a study to identify 'Transparency and Verification Options' that could be implemented at DOE facilities to monitor warhead dismantlement.

The 1990s also saw the start of the so-called Trilateral Initiative between the US, Russia and the International Atomic Energy Agency (IAEA) to investigate the technical, legal and financial issues associated with IAEA verification of classified forms of weapons-origin and other fissile material deemed surplus to defence requirements. In addition, research and development in the field of arms control technology remains an activity undertaken by a number of the US national laboratories.

For its part, the United Kingdom began a research programme looking at nuclear disarmament verification in 2000, on the back of an unclassified report by the UK Atomic Weapons Establishment. That programme, which remains ongoing to this day, led to the formation of what has come to be known as the UK-Norway Initiative: a ground-breaking collaboration on nuclear dismantlement verification technologies and procedures in as much as it involves both a nuclear and a non-nuclear-weapon state.

To date, the UK-Norway Initiative has held a number of practical exercises, including a mock inspection in Norway in June 2009 and a smaller 'managed access' exercise held in the UK in November 2010. More recently, the UK-Norway Initiative has led to the development of a student version of itself, involving students from King's College London in 2011 and from King's and also the University of Hamburg in 2012. On all three occasions, mock inspections took place in Norway with the involvement of the University of Oslo and a number of Norwegian research institutes. This educational and capacity-building effort looks set to continue and expand in 2013 and beyond.

### **Verifying dismantlement—balancing openness and confidentiality**

The verification of nuclear warhead dismantlement can essentially be done in two ways. One might be labelled the 'input-output' model of verification and involves inspectors recording items entering the dismantlement chain and items leaving it. The second might then be called 'dismantlement chain verification' and it is this model—which sees inspectors track warheads and their components

through each stage of the dismantlement process—that has attracted most study and served as the basis for the UK-Norway Initiative and its student spin-off exercises.

In the case of dismantlement chain verification, which the rest of this paper will focus on, extreme care needs to be taken in the crucial stages of dismantlement (i.e. the removal and disassembly of the physics package) to ensure that no sensitive information is released. Information relevant to national security will always be a concern; if any personnel from non-nuclear-weapon states are involved in the verification process then ensuring that no potentially proliferative information is released will be a key concern as well.

During an inspection, a careful balance needs to be struck between inspectors' need for access and the need—and natural tendency—of the hosting party for confidentiality. This begins with a declaration by the hosting side. A substantive declaration by the host is critical to the success of a verification mission. A hosting party must be prepared to provide inspectors with enough information about the object, or objects, under inspection to enable those inspectors to stand a realistic chance of being able to verify what is taking place. Ultimately, it is up to the host to decide how much information to release (mass and isotopic information may also be provided, for example, or detailed documentation on the provenance of the device) but the verification process is underpinned by this declaration—and so the declaration can make or break the success of the mission.

Procedures for an inspection itself will be negotiated between the two parties ahead of the mission getting underway. A host, for its part, will need to ensure that the level of access it provides to inspectors is enough—but no more—than they require to judge with confidence that dismantlement has taken place as declared. Excessive restrictions on inspectors' freedom of movement and access will result in a judgement of low confidence and a correspondingly low degree of acceptance by those not involved in the verification process (i.e. the wider international community). For their part, inspectors should aim to get as much information as they deem necessary to make a confident judgement that a declared item has been fully and properly dismantled—and that the item presented for dismantlement matches the item that has previously been declared. But, they should resist any temptation to go further by pushing for either information or access than may be desirable but that is not strictly required.

### **The need for trust—and the 'trust paradox' in warhead dismantlement verification**

The goal of inspectors, then, is to negotiate for and conduct verification activities that will give them the best chance of reaching a confident judgment in the truthfulness and fullness of the process they have witnessed. At the same time, they must work within the red lines and other restrictions of the hosting party, who will be seeking to prevent the transmission of any sensitive information, or information *perceived* to be sensitive—whatever the form and nature of that information.

Importantly, attaining a 100 per cent level of confidence in the verification of warhead dismantlement is impossible, as it is in all verification regimes. It is here that warhead dismantlement verification intersects with trust as *at a certain point, verification has to fall back on whatever level of trust exists between the parties involved*. In the case of warhead dismantlement, the objective of inspectors should be to gain as much confidence through pre-agreed verification measures as possible, thereby minimising the extent to which trust will need to become a factor.

Trust, though, entails a kind of paradox in the realm of warhead dismantlement. The extent to which trust needs to become a factor should be minimised as far as possible during the inspection process, but verified dismantlement also serves a larger purpose of building trust between states more

generally. Indeed, as hinted at earlier on in this paper (where the lack of acceptance of a purely trust-based dismantlement process was noted), as a means of building trust and confidence between states, dismantlement is of limited value unless it occurs in a transparent and verifiable manner.