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Irreversibility in Nuclear Disarmament: Practical steps against nuclear rearmament

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Dear friends and colleagues,

First, let me just say that it is wonderful to be back at the United Nations again, and especially during the General Assembly. As some of you know, my arms control career began in this building. More than ten years ago, I spent an autumn interning for the Department for Disarmament Affairs. Most faces, and the name, have changed since then, but the importance of the office remains intact.

Also, I'm very pleased to have James Acton chairing this session. The last time we appeared on the same panel was in this very building, when we gave evidence to the Secretary-General's Advisory Board on Disarmament Matters in February 2009. It is good to see you again.

Finally, it's a great pleasure to appear alongside Ian Anthony. For many years, I have admired his work at a distance. It is great to finally appear alongside him on this panel.

Introduction to the project

Ladies and Gentlemen, today's launch event marks the conclusion of a project that was begun nearly a year ago, when VERTIC first started work on the subject of nuclear disarmament irreversibility under a grant from the Swiss government. When we started, we knew that there is such a thing as a 'principle of irreversibility'. It appears in statements such as the one you see on the screen. But we did not know what that principle meant. We found that there has been no definition, no attempt to give it practical meaning.

So let me tell you. This project has been an exciting one to be involved with; the feeling of venturing into unexplored territory has been almost tangible. We found new things all the time, aspects that thus far, as we understand it, have only been elaborated on in classified literature. And this is the result.

I want to emphasise that today's two reports are not, by any means, the end of the story. These reports are only the first two attempts to structure the debate. We want to stimulate thought, debate and action; we want to challenge readers and to introduce new approaches and options.

At the same time, we do not want to be prescriptive. We do not want to try to tell you that this is the truth, and everyone else is wrong. We can only reach our objective, a world free of nuclear weapons, through serious debate, not prescription.

Therefore, these reports have been drafted with several audiences in mind. They are for disarmament practitioners, government officials and diplomats as well for policy analysts, academics, representatives of non-governmental organisations and the wider public.

The underlying reversibility of disarmament

So let me now introduce the VERTIC report. And let me begin with our conclusions.

Our first conclusion is an obvious one. On the whole, ‘irreversibility’ remains an ill-defined concept, with no clear, universally-understood meaning. We understood in the first week that it may not be possible to offer a definition that carries the prospect of universal acceptance. So, we wanted to provide an understanding of the term that is as useful as possible. We wanted this understanding to be functional, derived from practice, and of operational use. To the greatest degree possible, we’ve stripped away political, ethical or moral considerations. And I understand that this has been controversial to some.

Let me touch on one fundamental truth. You cannot get a nuclear weapon if you do not have access to nuclear materials. It is difficult, from an irreversibility perspective, to separate nuclear fuel from nuclear arms. Our report therefore focuses to a large degree on the civilian and military nuclear fuel cycle, as well as the significance of the junction of the two.

Another starting point is that ‘disarmament is armament in reverse’. A disarmed state can always rearm. Fundamentally, all disarmament actions can be reversed. To make rearmament difficult and costly, change has to happen on the ground.

In extreme, this leads to the conclusion that there is no such thing as irreversible disarmament. Yet delegates speak of irreversibility as a principle. Something with functional, perhaps even enduring, value. The SIPRI report is an important contribution to this normative debate.

As noted in the SIPRI report, most delegates in the 2000 NPT Review Conference were, and I quote, ‘...using the term in a broad sense, to mean erecting strong barriers against backsliding from disarmament commitments related to nuclear weapons. The intention was to convey a sense of permanency in the disarmament process.’ This is to say, there is more to this than controlling, removing and destroying weapons and facilities. From this perspective, irreversibility is a complex, normative, variable in the disarmament equation.

But, as I said, we aspired to provide functionality in our analysis. Therefore, *within the context of nuclear disarmament, the VERTIC report argues that it may be more appropriate to consider irreversibility in terms of the costs and difficulty of rearmament.* The question, then, becomes not whether nuclear disarmament could be reversed, but how costly and difficult would it be to do so. We primarily think about physical difficulties and monetary costs. It is, however, also suitable to think of other costs, such as political, ethical and legal.

At first, we wanted to insert estimations of the cost and time of reversing disarmament steps. However, we quickly realized that this would be too time-consuming and would require far more work than our budget and our delivery timeline allowed.

At the end of the day, we didn't need to. Our analysis led us to the conclusion that it is indeed possible to conceive of irreversibility in terms of an abstract scale. We put readily reversible measures addressing only the dismantlement of nuclear explosive devices at the low end and the complete abandonment of all nuclear weapons, reactors and other nuclear facilities at the other. Informally, the project team refer to the latter as the 'green-field option'. Along that scale, the array of different possible 'end states' is vast—to the point of being almost endless—and the consequent implications for disarmament irreversibility similarly so.

So what empirical knowledge did we base our conclusions on? First, we examined four historical situations in which the principle of irreversibility has been applied or touched upon: bilateral agreements between Russia and the United States; disablement in the DPRK, disarmament in Libya; and the verified dismantlement of nuclear devices in South Africa. We tried to extract basic principles from these past experiences in order to inform our study. These cases have now been moved to annexes. This was an editorial decision, but I still believe that the conclusions, and the Applications chapter in particular, cannot be fully appreciated without first having some awareness of past experience.

We then tried to apply some of the concepts derived from history onto the future. We constructed a number of fuel cycles from scratch. We also created a treaty context, as well as a military situation, for each individual example. We then gamed-out these scenarios over a period of two months. Part of our team looked at the scenario from the disarming state's perspective while the others looked at it from the perspective of the international community. Perhaps unsurprisingly, we found uniformity in disarmament steps, and some degree of verification of our central thesis—that all disarmament steps are, in fact, reversible.

Building on a disarmament 'minimum'

The VERTIC report is a technically-focused study, and one that begins from an assumed point at which a state has done away with its nuclear weapons. In this respect, it has been informed by Steve Fetter's understanding that nuclear disarmament requires, at a minimum, the dismantlement of all nuclear explosive devices under the national control of a state.

Following this definition, for a state to have been 'disarmed' of its nuclear weapons capability, it would need to have dismantled its entire existing arsenal of nuclear warheads (or have had them dismantled by others).

The use of the word 'existing' is important. There are two different aspects of a state's nuclear arsenal that disarmament actions can take into account. First, and most fundamentally of all, the current nuclear arsenal of a state. Second, the supporting infrastructure that could potentially be drawn on to produce new nuclear weapons. As we note in our report, a state that controls the raw materials, the necessary industrial infrastructure and the requisite technical and scientific knowledge will always be able to hedge against the loss of its nuclear arsenal.

All disarmament actions are, therefore, reversible. In nuclear disarmament, it may be more suitable to talk about *unarmed states* than *disarmed states*.

Steps beyond warhead dismantlement

Beyond just the dismantlement of warheads, my team's report has suggested that nuclear disarmament to a 'high' level of irreversibility could additionally entail:

- The destruction of the fissile material components of dismantled warheads;
- The disposition of all weapons-usable fissile material within a state (i.e. not just those from weapons);
- The elimination, disablement or conversion to civil uses of all facilities involved in the final assembly of warheads and the manufacture of warhead pits;
- The elimination, or the severe disablement, of all facilities used in the production of potentially weapons-usable fissile materials (primarily enrichment and reprocessing plants);
- The placement of all fissile materials under international safeguards; and
- The elimination or conversion to non-nuclear roles of all nuclear delivery vehicles.

Cumulatively, all of the above steps would make the process of nuclear rearmament costly, difficult, time-consuming and more than likely to be apparent to the international community.

Key factors in irreversibility

Overall, if all nuclear warheads in a state were dismantled (as per Fetter) then the irreversibility of that state of disarmament would depend, above all, on the following five factors:

- The amount of weapons-usable fissile material in intact pits that are able to be directly used or re-used in warheads;
- The amount of weapons-usable fissile material in forms not immediately able to be implanted in weapons, irrespective of whether the material is safeguarded;
- The capabilities of the state to produce weapons-usable fissile material and, separately, to fabricate that material into pit forms that can be implanted into warheads;
- The existence or absence of warhead assembly facilities within the state, where pits and the various non-nuclear components of a warhead would be combined; and
- The availability of delivery systems that could deliver warheads to a target in a reliable fashion.

The ‘endurance of knowledge’ of nuclear weaponization and the impact of verification are, of course, important factors also. Knowledge and expertise provide a link between nuclear technology and materials and a workable nuclear explosive device.

As for verification, if it functions properly as a deterrent, then monitoring measures will inevitably play a role in changing the calculations of states with regard to decisions over rearmament. If a state knows that any move toward rearmament would be met with a forceful response, it would very likely be less inclined to make any such move in the first place.

Ensuring irreversibility

The particular circumstances and capabilities of a state in question matters also. So at the end of the day, perhaps the best way of ensuring irreversibility after disarmament is:

- To destroy all fissile materials removed from dismantled weapons;
- To reduce to very low levels—or eliminate—any and all stockpiles of highly-enriched uranium and plutonium in a former nuclear-armed state; and
- To eliminate any and all facilities involved in enrichment and/or reprocessing, whether for civilian purposes or not.

After all, a state with low-enriched uranium would be unable to produce weapons-usable highly-enriched uranium (HEU) without the means to enrich it, and without reprocessing plants that state would be similarly unable to separate weapons-usable plutonium from spent reactor fuel.

Recommendations from the VERTIC study

The VERTIC report points to three areas which, if treated as priorities now, could entail significant benefits for disarmament irreversibility in the years to come.

Warhead dismantlement is the first. So far, warhead dismantlement has been almost entirely overlooked in major nuclear arms reduction treaties. This is perhaps unsurprising given the dangers involved in dismantling, and especially in *verifying* dismantlement. Nonetheless, furthering the state of warhead dismantlement verification knowledge is one area where research now could pay dividends in the future.

Second, *efforts to establish controls on—and make reductions in—weapons-usable fissile material stockpiles* around the world are critical for irreversibility. This area of priority can be subdivided into three areas of its own:

- The need to reach agreement to halt the production of fissile material for weapons purposes as soon as possible;
- The importance of encouraging states to be more open about the amount and character of the weapons-usable fissile materials that they hold; and
- The need to support efforts to reduce stocks of any such materials (whether excess from weapons or otherwise) to very low levels or—as we put in our report—to eliminate them altogether.

The third priority area, in our view, is that of *fuel cycle multilateralisation*. Our report has noted that a state with no intact warheads, no weapons-usable fissile materials and no means of producing such materials would be faced with a significant set of hurdles on a path to nuclear rearmament. The difficulty in eliminating enrichment and reprocessing plants, though, is that these facilities have legitimate civilian applications as well.

One way to potentially overcome the obstacle to elimination that the civilian applications of sensitive nuclear technologies present is to encourage states to subscribe to schemes that would place enrichment and reprocessing under multilateral control. Those schemes themselves should also be robustly and consistently supported. The benefits for disarmament irreversibility of removing enrichment and reprocessing from potentially unregulated national control are clear.

Ladies and gentlemen, this concludes my presentation. Let me again thank you for your attention and for giving me your time here today.

It is my sincere hope that these two reports provide food for thought and for further work. I look forward to your questions and comments.