

# VERIFICATION RESEARCH, TRAINING AND INFORMATION CENTRE

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## **VERIFICATION AND IRREVERSIBILITY WHEN GOING TO ZERO**

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Conditions for Zero

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Many thanks for allowing me to speak today. I have to admit that the invitation from Dr Akiba was wholly unexpected. There are many unfamiliar faces in the meeting, which is a welcome change from my usual routine. I did enjoy both the plenary sessions and the working group yesterday, and I am looking forward to a good debate today also.

I have been asked to address verification, the current range of tools and what is needed and being developed for a zero regime. I've also asked to address irreversibility, and am indeed grateful to the citation of our work in the briefing paper for this conference.

Verifying a nuclear weapon free world is a subject that will require a fair deal of speculation. I think that a nuclear weapon free world is many years away, if it indeed ever becomes reality. The road ahead is cast in shadows. Indeed, thinking about a nuclear weapon free world is a bit like thinking about Plato's cave allegory. In this allegory, a group of prisoners are stuck in a cave facing a wall. Behind them is a fire and a walkway. People walk in front of the fire, casting shadows on the wall. For the prisoners, the shadows are reality. They do not know, nor can they know, that these shadows are nothing but an approximation of the true form of reality. I'm starting to believe that we, as a community, are trapped in this cave, and we're watching the shadows dance in front of us. The community throw around truisms and assumptions, and we don't reflect on them.

Let's be honest. We do not really know what conditions will enable a world free of nuclear weapons. We all have wishes, which we state with conviction, many sensible and good, but we do not have good answers. As we do not, almost every answers assumes almost equal weight. In my view, many arguments, like deterrence for instance, becomes articles of faith, not carried by empirical evidence. You believe, or you don't. You approve, or you don't.

### **Irreversibility**

Let us ask ourselves what we mean when we use the term “a world free of nuclear weapons.” For some, the phrase simply means a place where there are no nuclear explosives in existence. For others, it means a world without weapons, but also where the capacity of states to re-establish their arsenals is curbed. We examined these questions in some detail in our Swiss funded irreversibility report published a year ago.



In our report, we found that nuclear disarmament is not a binary state. We argued that a country can be disarming while not being fully disarmed. We also held that the process to achieve the final abolition of an entire class of weaponry may still be called disarmament. In other words, nuclear disarmament is not a binary condition, it is a movement towards an ultimate goal.

Even if all weapons are gone, are we disarmed? No, not really. Even a fully disarmed state can rearm, if there is political will and resources to do so. A country that controls the raw materials, the necessary industrial infrastructure, and technical and scientific knowledge will always be able to hedge against the loss of nuclear weapons.

Therefore, we found it more suitable to talk about unarmed states rather than disarmed states. From this perspective, any state with capacity to enrich or reprocess nuclear material are practically speaking on the threshold of weapons acquisition. There are nine armed states, perhaps 30 more unarmed.

This also means that irreversibility becomes, essentially, an economic argument. The key question is how difficult, but above all how costly, it will be for a country to reverse a state of disarmament. The more facilities a state decides to get rid of, and the more fuel cycle options it foregoes, the more irreversible disarmament will be. If a country has no nuclear facilities, and no stocks of fissile materials, it cannot produce weapons without re-establishing a major industrial infrastructure.

What this means is that the question of irreversible nuclear disarmament is closely associated with the question of the future of nuclear energy. You cannot have the cake and eat it too. If we assume that states do not want to totally forgo the nuclear energy option, we quickly find ourselves focusing on familiar questions relating to acceptable risk.

What kind of nuclear processes constitutes an acceptable risk? Is it an acceptable risk to allow for enrichment by any government? Is it an acceptable risk to allow for reprocessing? If it is so, how should these most sensitive processes be regulated?

We wanted to address the cost of rearmament in our study, information that Paul Dewar asked for yesterday. Establishing a full costing on the military nuclear establishment would be very useful. The nuclear weapon itself is just the tip of a very large iceberg, a huge investment in industrial infrastructure, resource extraction and scientific training.

A couple of months ago, when I first gave a variant of this talk, Professor Thomas Schelling asked where the “rearmament specialists” were in the disarmament debate. It’s a key point. We need to understand nuclear armament, before we can devise effective schemes for disarmament. Sadly though, the Swiss did not pay us enough for us to complete the work. If anyone else in the room is willing to fund us to continue the work, let’s talk.

## **Verification**

There may be two principal tasks for a verification regime. During the transition period, the regime needs to be able to verify that nuclear explosives are being destroyed. After the world has been declared nuclear-weapon free, it need to ensure that explosives do not re-emerge. These two top-level tasks are sounds easy enough, but they involve many complications.

Both tasks require a fundamental investment of thinking about details and particulars. We, as a community, has not invested nearly enough energy and thought into the problems. This leaves us in a state of unpreparedness and, perhaps, resignation.

Where do we start?

Do we start our examination by looking at the warheads, how they can be verifiably dismantled? Do we rather focus our attention on weapons components: such as the fissile material that they contain? In my mind, only the short sighted focuses on one discreet problem. What we need to do is look at the problem in its entirety. In the 1990s, the so-called Trilateral Initiative did some conceptual thinking on how to verify the disposition of weapons-grade fissile material. They divided the verification tasks into four stages: the most sensitive stage involved verifying the removal of warhead fissile material components whereas the least sensitive stage involved unclassified nuclear material.

The Trilateral Initiative chose to focus on the disposition of weapons usable material. At the end of the day, nuclear explosives cannot function without nuclear material. In my mind, it is less important to establish that a certain number of weapons have been destroyed. It is perhaps, to quote from a 1967 memo that Allan Lebowitz once wrote to Glenn Seaborg, “immaterial whether real weapons are in fact destroyed provided that the agreed amounts of fissionable materials are transferred to peaceful uses.”

Personally, I have subscribed to this view for the last five years or so. As far as verification is concerned, it is exceptionally important to ensure that all nuclear material in a country has been declared, that there is no undeclared material remaining, and that the stuff is being put under safeguards. By the way, when I say all nuclear material, I mean all nuclear material.

## **Preparing for future verification challenges**

In other words, safeguards, as administered by the International Atomic Energy Agency, will become increasingly important in a nuclear weapon free world. Fissile material will need to be accounted for, and the absence of undeclared stockpiles of these materials would need to be confirmed. We have decades of data on safeguards implementation in the disarmed and unarmed world.

I think that verification in a nuclear weapon-free world will look very similar to safeguards in non-nuclear weapon states, but on a much larger scale. The fuel cycles of the two largest nuclear weapon states, the United States and Russia, are fundamentally different, and much larger, than cycles found elsewhere. It will be challenging to take them on, and to bring them under full-scope safeguards. There are some large

uncertainties in the stockpile numbers, and it may take decades, many decades, before anything resembling a completeness determination can be drawn.

I think that these challenges can overcome. Empowering the IAEA secretariat to be able to address some of the technical tasks that await them is a step that can be taken today. The IAEA already has a reasonably completed technical protocol for material disposition, but need to start to prepare for future verification challenges as well. This includes engaging with the IAEA on issues relating to warhead dismantlement verification, it includes thinking about how the Agency needs to change to be able to take on the task. Together with likeminded governments, VERTIC has, in close collaboration with the Agency, started this work. We have now been sketching, talking and working for more than a year. We need to invest more time, more money and more sweat into this job. This will be detailed, painful work. It would not involve grand ideas, or sweeping statements, and so would be boring. Yet, we do it because it is hard. We do it because it is necessary.

Let me be clear. I believe that this task belongs with the Agency. Perhaps not the Agency as we know it today, but a stronger, more powerful version of the body. The Agency needs to be able to show that, yes, it can handle the job. It is only then it can be viewed as a credible actor.

It is in Vienna, that we must start the path to strengthen our abilities to take care of future tasks. It is in Vienna, that non-nuclear and non-nuclear weapon states alike can, and indeed should, come together to start the process. Vienna, and the IAEA, is the place where multilateral verification already happens. It would be so simple to add a disarmament component to this.

Socrates asks us to consider a person freed from the cave. He asks, “Wouldn't he remember his first home, what passed for wisdom there, and his fellow prisoners, and consider himself happy and them pitiable? And wouldn't he disdain whatever honors, praises, and prizes were awarded there to the ones who guessed best which shadows followed which?”

We need to break free from our own assumptions, so much is clear.

I thank you for your attention.