

Requirements for Verifying the Prohibition of Nuclear Weapons

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Verification requirements for transition to low levels of nuclear weapons depend mostly on the evolution of international politics. Beyond the current international political environment, it is possible to imagine future environments in which the technical demands for verification would be very much lower, and possibly very much higher. The 1980s taught us to be aware of the potential for dramatic and unanticipated change.

For example, it is not out of the question that, 10 or 20 years from now, relations among the nuclear powers could be quite friendly. Democratic rule might be solidified in a prospering Russia, and the Taiwan issue might be resolved in a more pluralistic China. If we get to the point where armed conflict between the nuclear powers seems implausible or unimaginable, then low levels of nuclear weapons could be achieved with little in the way of formal verification. Certainly no verification would be required between the United States, the United Kingdom, and France, even if their relations cooled a bit. Perhaps it is unrealistic to imagine that relations between these three countries and Russia and China could ever be so warm, but we are moving in that direction and I'd rather not rule out the possibility altogether.

Although less likely, it also seems possible that a movement toward low levels of nuclear weapons could take place in a much less hospitable international environment. For example, if terrorists steal or purchase a Russian nuclear weapon and use it in a city in North America or Europe, if the government of a nuclear power collapses less gracefully than the Soviet Union, or if nuclear war breaks out in South Asia with horrible consequences, one could imagine strong public demands for deep reductions and much greater safety, security, and accountability for nuclear weapons, if not for their complete prohibition. In any case, it would be evident that a large U.S. arsenal offered absolutely no protection against this sort of threat. In this sort of environment, the demands on verification might be higher than we now imagine.

The requirements for verification depend on what the world will look like many years from now, and that's hard to predict. Only if we assume that things will look pretty much like they do today, can we extrapolate in a straightforward way from the verification requirements of existing arms control and nonproliferation agreements to what might be required as we move to low levels of nuclear weapons.

Existing nuclear arms control agreements between the United States and Russia have not dealt with nuclear weapons *per se*. Instead, these agreements have focused on strategic delivery vehicles and their launchers—intercontinental-range missiles, silos, submarines, and long-range bombers. This is mostly because missiles, submarines and bombers are much easier to count and much harder to hide than nuclear weapons. It's also true that delivery vehicles are much more expensive than the nuclear weapons they carry, so controlling their number is a bigger barrier to breakout; and nuclear weapons that are

mounted on strategic delivery vehicles, ready to be delivered quickly almost anywhere in the world, are much more militarily and politically salient than warheads in storage.

So the START agreements, like the earlier SALT agreements, limit strategic delivery vehicles and launchers. The number of warheads mounted on these delivery vehicles is limited by counting rules, although there are provisions to inspect a few missiles each year to make sure they aren't carrying more than the counting rules allow. There are no limits of any kind on the number of strategic warheads that can be maintained in storage, nor are there any verifiable limits on deployed or stored non-strategic warheads. There are agreed limits on the number of nuclear-armed SLCMs and unilateral commitments to reduce or eliminate certain classes of tactical warheads, but none of these are verifiable.

The fact that non-deployed or tactical warheads remain outside verified controls has not interfered with the ability of the United States and Russia to agree, over the last decade, to reduce the number of deployed strategic warheads from over 10,000 deployed strategic warheads to about 2,000 warheads. But significantly deeper reductions will not be possible unless we subject the warheads themselves—all nuclear devices, regardless of their status—to accounting and verification.

Non-deployed and non-strategic warheads pose a threat. The U.S. could mount stored warheads onto its Minuteman and Trident missiles, and load extra bombs onto its B-52 and B-2 bombers. It could reconfigure the B-1 bomber to carry nuclear warheads, or it could use tactical aircraft. Unconventional means of delivery would also become a significant issue as nuclear forces are reduced. Nuclear weapons could be delivered with a wide variety of military and commercial aircraft and ships—they even could be smuggled across borders. If we reduced to low levels, we would not be content to simply count the number of ICBMs, subs, and bombers. We'd want to count the individual warheads. In today's international environment, if the U.S. had 200 warheads, we'd want to make sure that Russia or China also had 200, and not 500 or 1000 warheads.

Thus, at least in the current international political environment, the essential verification requirement for a transition to low levels of nuclear weapons is a comprehensive regime for counting all nuclear warheads. This would begin with the nuclear powers exchanging detailed information on their warhead stockpiles, and would grow to include on-site inspections at deployment and storage sites to confirm these declarations, at assembly facilities to verify the dismantling of warheads, and challenge inspections to gain confidence that there are no secret stockpiles or warhead production facilities. This will be hard, because nuclear weapons are fairly small and need relatively little maintenance. Although we will never be completely confident that there are no hidden warheads, the operation of this sort of regime should give us the confidence to go to very low levels of warheads.

Nuclear materials

To bolster our confidence, we will need a comparable regime for nuclear explosive materials—plutonium and high-enriched uranium. The main elements of this are a production cutoff, to verify that nuclear explosive materials are not being produced for

nuclear weapons; secure storage for excess materials recovered from dismantled warheads; a method for permanently disposing of these materials or rendering them unsuitable for reuse in weapons; and a comprehensive declaration of historical production and current stockpiles, including stocks in warheads. Because materials in warheads and warhead components probably would not be subject to verification, nuclear archaeology techniques could be used to confirm the accuracy and completeness of the declarations.

We have to subject nuclear warheads to the same degree of accounting as strategic delivery vehicles, and we have to subject nuclear explosive materials in weapon states to roughly the same degree of accounting as these materials enjoy in non-weapon states. If we can do this, we could reduce to very low levels, and perhaps all the way to zero.

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