

Yes, the Russians Are Testing Nuclear Weapons and It Is Very Important

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In May 2019, Lt. Gen. Robert P. Ashley, Jr., Director of the Defense Intelligence Agency, in an important speech at the Hudson Institute, stated:

Russia's development of new warhead designs and overall stockpile management efforts have been enhanced by its approach to nuclear testing. The United States believes that Russia probably is not adhering to its nuclear testing moratorium in a manner consistent with the "zero-yield" standard.

Our understanding of nuclear weapon development leads us to believe Russia's testing activities would help it to improve its nuclear weapons capabilities. The United States, by contrast, has forgone such benefits by upholding a "zero-yield" standard.^[1]

This is an extremely important conclusion because it linked covert Russian nuclear testing to the development of new nuclear warhead designs with improved capabilities, which is very significant because of the threat posed by Russia's ever growing nuclear capability. Despite the uproar in the arms control enthusiast community about his remarks, there is substantial open-source evidence going back over two decades to support his statement. The 2009 U.S. Strategic Commission report stated, "Apparently Russia and possibly China are conducting low yield tests."^[2] Russian press reports concerning Russian conduct of very low-yield hydronuclear tests have appeared since the 1990s.^[3] According to Ralph Alewine, then-Director of the Pentagon's nuclear treaty programs, "We do have information that a seismic event with explosive characteristics occurred in the vicinity of the Russian nuclear test range at Novaya Zemlya on August 16 [1997]."^[4] Writing in *The New York Times* in March 2001, William J. Broad and Patrick E. Tyler reported, "Some [in the intelligence community] have concluded that Russia is lying and is instead detonating small nuclear blasts..."^[5] In May 2002, the *New York Times* again

reported that some CIA intelligence analysts were saying, "Russia may already have detonated tiny nuclear devices."^[6]

There are declassified, but highly redacted CIA reports from the late 1990s that clearly discussed Russian hydronuclear testing. One of them observed that "Authorities including First Deputy Minister for Atomic Energy Mikhaylov have said Russia is looking at a range of techniques—including hydronuclear experiments—that they say would allow them to continue warhead design and maintenance research within the limits of the Comprehensive Test Ban Treaty."^[7] Another report said that Mikhaylov had published an article "justifying" hydronuclear tests for weapons safety and the development of new types of nuclear weapons, noting that hydronuclear experiments "are far more useful for Russian weapons development" than subcritical tests.^[8] A third declassified CIA report noted that in response to a Western press report of a covert Russian nuclear test, the Russian "Ministry of Atomic Energy claimed no knowledge of a nuclear test, but declared that adherence to the moratorium was the prerogative of the Russian President."^[9] Notably, there was no clear Russian denial.

While the bottom line judgments were redacted from the public CIA reports, it is clear that long reports were not written on non-existent issues. Statements by Mikhaylov about hydronuclear testing were brought up by Senator Richard Shelby during the Comprehensive Test Ban Treaty (CTBT) ratification hearings.^[10] The CTBT, which sought to ban all nuclear tests, was defeated by a majority vote in the U.S. [Senate](#).

Russian Hydronuclear Testing

In 1999, when Russia made public its new military strategy which entailed the first use of nuclear weapons, President Boris Yeltsin reportedly authorized conducting "hydronuclear field experiments."^[11] However, hydronuclear testing in Russia reportedly started years before the reported Yeltsin decree authorizing it. Hydronuclear tests are those in which a nuclear device is deliberately detonated to produce a very small nuclear yield. The recent statement by Siegfried Hecker, a former Director of the Los Alamos National Laboratory, suggesting that hydronuclear tests have a yield of four pounds of TNT^[12] is inaccurate. He confused the U.S. definition of "one-point safety" with the Russian definition of "hydronuclear" testing. We know for sure that the Russian definition of a hydronuclear test is much higher than four pounds of nuclear yield. We don't really know the maximum yield associated with Russian hydronuclear testing or even if all of the reported Russian tests are hydronuclear as distinct from low-yield nuclear.

The Russians, during the Mikhaylov era, talked a lot about hydronuclear tests apparently because Atomic Energy Minister Viktor Mikhaylov was trying to legitimize them under the CTBT. Hydronuclear testing was the most that Mikhaylov could publicly discuss since there was no way to claim that low-yield nuclear testing did not violate the CTBT obligation not to defeat the object and purpose of the Treaty, the announced Russian nuclear testing moratorium or the legal requirement to notify at least two nuclear tests a year under the Threshold Test Ban Treaty (TTBT). The official U.S. statements talk about Russian nuclear testing, not hydronuclear testing.

In January 1999, Lev Ryabev, then-head of the Atomic Energy Ministry's Nuclear Munitions Development and Testing Department, said that so-called "subcritical" tests could produce very small nuclear yield (i.e., 0.1 gram).^[13] This was repeated in a 2006 Russian press report in state-run *Ria Novosti* on nuclear testing at Novaya Zemlya.^[14] This, in effect, makes them very low-yield hydronuclear tests rather than sub-critical tests which by definition can't release nuclear energy resulting from

a supercritical chain reaction. According to a report of Russia's Sarov nuclear weapons laboratory, the Soviets conducted "89 [hydronuclear tests] including air, surface and underground (tunnel) experiments" which involved "a mock-up of a nuclear device with no considerable nuclear energy release (its value did not exceed that characteristic for a high explosive)."^[15] Viktor Mikhaylov was the main author of this report, which stated that "The nuclear energy released during most of these experiments was less than 100 kg of chemical explosive equivalent."^[16] [Emphasis added]. The implications of this statement are that some, or perhaps almost one-half, of Soviet hydronuclear tests, were over 100-kg of TNT. The Sarov report referenced air-burst hydronuclear tests which suggest a yield that is more likely to be in the low-yield range because it would be silly to stage an air-burst hydronuclear test because of the requirement to obtain data from the test through instrumentation. The Russian definition of a nuclear test is apparently the release of one metric ton of TNT in nuclear yield.^[17] If so, hydronuclear tests could have up to one ton of TNT yield. Such tests cannot possibly be detected and identified as nuclear tests seismically.

On April 23, 1999, then-First Deputy Atomic Energy Minister Viktor Mikhaylov stated that Russia would conduct "so-called test-site hydronuclear experiments, where there is practically no release of nuclear energy," and on April 29, 1999, he stated that "...developed traditional nuclear powers can use hydronuclear experiments to perform tasks of improving reliability of their nuclear arsenal and effectively steward its operation."^[18] [Emphasis added]. These statements are particularly important because they are associated with the announcement of Russia's new policy with regard to nuclear weapons development. The year 2000 book by Russian nuclear weapons designers, including V.A. Logachev, revealed that "Since 1994, numerous additional hydrodynamic and hydronuclear experiments have been successfully carried out at NZTS [Novaya Zemlya Test Site]."^[19] [Emphasis added]. If this report is correct, Mikhaylov conducted hydronuclear tests five years before President Yeltsin reportedly authorized them.

"Boris Litvinov, the chief weapons designer for 31 years" at the Chelyabinsk-70 nuclear weapons laboratory reportedly told Siegfried Hecker, "We didn't bury it [the hydronuclear device] the way you guys did. We did [tests] out on the surface. We dug a little trench. We put our experiments in there. And we just blew it up. Then we took bulldozers and bulldozed that over, and we took care of it. We thought, who is ever going to go out there?'"^[20] This is a clear violation of the 1963 Nuclear Test Ban Treaty, which prohibits all atmospheric nuclear tests, even those of very low-yield.

According to a report by the National Institute for Public Policy on the CTBT, "In November 2003, during an event at Lawrence Livermore National Laboratory Georgiy Rykovanov, then- Director of the Russian nuclear weapons laboratory at Chelyabinsk, explained to his hosts that hydronuclear experiments were being conducted in Russia but at a yield sufficiently low to make them undetectable."^[21]

In November 2010, writing in Russian state media, Alexei Fenenko of the Russian National Academy of Scientists said, "Over the past 15 years, significant progress has been made in subcritical and hydronuclear testing."^[22]

In January 2011, Russian Major General (ret.) Vladimir Belous, then a research associate at the World Economics and International Relations Institute of the Russian Academy of Sciences, wrote that, "Back before the signing of the CTBT in 1994-1995, a series of hydronuclear tests with a total yield of 10 kilograms of TNT was performed at the Novaya Zemlya test site. Currently, hydronuclear tests are considered contrary to the CTBT requirements, since a nuclear explosion, albeit a small one, nevertheless occurs when conducting the experiment."^[23]

The Impact of Hydronuclear Testing on Russian Nuclear Weapons Modernization

Mikhaylov's statement that hydronuclear tests can improve the reliability of the Russian nuclear arsenal is very significant. In July 2001, he reiterated that ". . . the developed, traditional nuclear powers, using hydronuclear experiments, can perform the task of improving reliability of the nuclear arsenal and effectively track its operation while reducing the risk of possible accident."^[24] It is quite possible that many or even all of the so-called Russian subcritical tests are actually very low-yield hydronuclear tests. The National Institute for Public Policy CTBT report quoted Viktor Mikhaylov in August 2003 as telling Dr. John Foster, former Director of the Lawrence Livermore National Laboratory, that at some point Russia would have to test but "he was not convinced that it will definitely have to be a powerful nuclear explosion."^[25] Concerned about hydronuclear testing, Dr. Paul Robinson, then-Director of the Sandia National laboratory, cautioned in his CTBT ratification testimony that, "If the United States scrupulously restricts itself to zero yield while other nations may conduct experiments up to the threshold of international detectability, we will be at an intolerable disadvantage."^[26]

Hydronuclear tests can be used to develop new types of low-yield nuclear weapons. The 2002 study by the National Academy of Sciences on CTBT verification reported:

At the lower end of the very-low-yield category, Russia could develop and test new very-low-yield tactical weapons in the range of 10 to 100 tons. Regarding seismic detection, the 10-ton weapon could confidently be adequately tested under decoupling conditions even at Novaya Zemlya [Russia's nuclear test site], and might even be tested in a steel or composite containment so that it would give no ground shock at all. Indeed, with its experience in testing and weapons design, Russia could develop a 10-ton nuclear weapon using only hydronuclear tests in the kilogram-yield range, and be reasonably confident of its performance.^[27]

In January 2016, Dr. John Foster, probably the greatest living U.S. nuclear weapons designer, stated that hydronuclear tests "of less than one ton" yield could provide high confidence in the "performance [of nuclear weapons] at low yield."^[28] This is very important because, as noted above, the internal Russian definition of a nuclear test is apparently one metric ton of TNT.^[29] Hence, the range of hydronuclear testing appears to be up to a ton of TNT yield in Russian testing policy, although this does not exclude the possibility they are really conducting low-yield tests.

Senior Russian officials and Russian press reports during the Bush administration reported that Russia was introducing new and improved nuclear weapons.^[30] For example, in 2005, Russian Defense Minister Colonel General Sergei Ivanov asserted, "We will develop, improve and deploy new types of nuclear weapons."^[31] According to Colonel General Vladimir Verkhovtsev, then-chief of the Defense Ministry's 12th Main Directorate, Russia's nuclear weapons organization, the newly developed and manufactured nuclear munitions will have "improved tactical and technical specifications...."^[32]

A number of Russian press reports indicated that Russia had developed a new warhead with a weight 100-kg with a yield of about 100-kt.^[33] This warhead was apparently a new design. According to Russian expatriate Pavel Podvig, an expert on Russian strategic forces, the warhead for the new Bulava-30 SLBM is better than the best Soviet-era designs which he says we're in "the 110-130-kg range (this includes reentry vehicle body and electronics) and [had] yields of 50 and 75 kt. respectively."^[34] However, Podvig's claim that this type of increase in yield-to-weight ratios is easy to do without testing is simply not true.

The Implications of Possible Russian Low-Yield Nuclear Testing

If Russia is testing at the sub-kiloton level or higher (i.e., at yields of several kilotons or even up to ten kilotons) which is technically possible without detection, or without conclusive detection because of the difficulty of detecting and proving a nuclear test seismically, if conducted in a manner to minimize the seismic signal,^[35] the military implications are much more significant than from hydronuclear testing. This, at a minimum, permits full yield tests of low-yield or low-collateral damage nuclear weapons, weapons effects tests and very important tests of new primaries (fission triggers) for new types of thermonuclear weapons. As Dr. Michaela Dodge, then with the Heritage Foundation, has written, "The United States would have a lot to gain from conducting very-low-yield nuclear-warhead experiments. For example, it could further validate computer codes it uses to make judgments about the impacts of aging on nuclear warheads. It could improve the proficiency of people in charge of the U.S. nuclear warhead stockpile and increase overall flexibility and resiliency of the U.S. nuclear posture."^[36]

In a 2012 talk at the Heritage Foundation, Ambassador Dr. Paul Robinson who participated in the CTBT negotiation said, "At that time [1995], we in the U.S. labs requested that the permitted test level should be set to a level which is, in fact, lower than a one-kiloton limit, which would have allowed us to carry out some very important experiments, in our view, to determine whether the first stage of multiple-stage devices was indeed operating, successfully."^[37] The implication of this is that much of what the Clinton administration told the Senate about maintaining the U.S. nuclear stockpile without nuclear testing was a lie. The experts told the Clinton administration that low-yield nuclear testing was necessary and they ignored the advice and promulgated disinformation. Despite this, the CTBT was defeated by a majority vote in the U.S. Senate, a clear commentary on how weak the case for it was.

Russian cheating involving covert low-yield testing would have critical military implications. According to Siegfried Hecker, "[M]ost [new] designs could be adequately tested at yields between one and ten kilotons."^[38] He is apparently talking about new thermonuclear weapons. Testing at 10-kilotons outside of known nuclear test sites is assessed to be possible with intentionally covert testing in salt mines without a serious risk of detection.^[39] If the Russian nuclear tests are sub-kiloton, they will have high confidence that their nuclear weapons work while we will have diminishing confidence in ours. Covert testing in the low-kiloton range up to 10-kilotons could have significant implications for the development of new high yield nuclear weapons, giving the Russians confidence that their weapons will work. General Ashley's statement linking Russian development of new types of nuclear weapons to their nuclear testing practices suggests he may be talking about low-yield testing rather than hydronuclear testing.

Conclusion

Before the political decision by the Clinton administration on a zero-yield CTBT, the only real debate in the U.S. nuclear weapons community was whether the U.S. could live under a 1-kiloton testing threshold. The Clinton administration not only ignored the technical advice it received from the national laboratories but it largely silenced them using threats of retaliation.

As Admiral Robert Monroe, former Director of the Defense Nuclear Agency has noted, "...two respected Los Alamos nuclear experts, raise serious questions about the reliability and performance of U.S. nuclear weapons!"^[40] These individuals, John C. Hopkins and David H. Sharp concluded that "...the scientific foundation for assessments of the nuclear performance of U.S. weapons is eroding as a result of the moratorium on nuclear testing."^[41] They pointed out that U.S. nuclear weapons are physically different from the versions that were actually tested and that "the current nuclear test moratorium precludes a decisive determination of whether these changes in physical state adversely affect performance."^[42] This is not the first time

nuclear weapons scientists and engineers have told our political leadership this. A *New York Times* article by James Glanz in November 2000 noted the concerns of nuclear weapons scientist about the reliability of U.S. nuclear weapons without testing.^[43] Harold Agnew, former Director of the Los Alamos National Laboratory, bluntly said that if significant redesigns of stockpile weapons were needed, "...to consider putting those things in the stockpile without testing is nonsense."^[44] What we have now is almost 30 years of making changes to solve detected problems and in the life extension programs because of necessity without testing while the Russians have tested. Thomas Thomson, a weapons designer at the Lawrence Livermore National Laboratory, stated, "I think you just accept the fact that you're going to have a decline [in weapons reliability] ... You try to make it as gradual as possible."^[45] The Russians, on the other hand, are introducing improved nuclear weapons designs.

Secretary of Defense Robert Gates warned in October 2008 that, "To be blunt, there is absolutely no way we can maintain a credible deterrent and reduce the number of weapons in our stockpile without either resorting to testing our stockpile or pursuing a modernization program."^[46] [Emphasis in the original.] We have done neither. By 2003-2005, a consensus emerged in the national laboratories that it would "...be increasingly difficult and risky to attempt to replicate existing warheads without nuclear testing and that creating a reliable replacement warhead should be explored."^[47] Unfortunately, the politicians did not want to hear this assessment. Indeed, even the Bush administration's proposal to develop inherently more robust nuclear warheads (without nuclear testing) was rejected by the Congress.

Today, we do not have "science-based stockpile stewardship," but more like "political science-based stockpile stewardship" while, conversely, Russia has science-based development of new and improved nuclear weapons. Our politicians have corrupted the very nature of the scientific process. Because of the liberal ideology that has dictated U.S. nuclear weapons policy for decades, we have much higher cost and much less reliability and certainly no enhancement in effectiveness. Within

a decade or two, this is going to result in a national security disaster. There will be increasing uncertainty concerning the effectiveness of a declining U.S. nuclear deterrent while there will be little uncertainty about increasing Russian nuclear capabilities.

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