What are Subcritical Nuclear Tests?

Why are they dangerous to peace?

Subcritical nuclear tests are explosive experiments conducted in an underground chamber at the Nevada National Security Site, previously known as the Nevada Test Site, where more than one thousand above and below-ground nuclear tests were detonated before 1992, when the nuclear testing moratorium act was signed into law.

Subcritical tests use weapons-grade plutonium, but the small amounts involved do not reach a self-sustaining "critical" fission chain reaction, or nuclear explosive yield. While subcritical tests may not technically violate the Comprehensive Test Ban Treaty (CTBT), which the U.S. has signed but not ratified, the tests undermine the spirit of the treaty.

Conducting subcritical tests underground at the Nevada National Security Site poses additional specific risks to the global test moratorium and the CTBT. Subcritical tests are conducted at the same site and exact same shaft and underground facility where fully critical underground nuclear weapons tests were conducted. Subcritical tests play a role in maintaining the readiness of the nuclear test site and the ability to prepare for resumption of nuclear explosive tests—but preparations for subcritical tests look very similar to preparations for what would be a fully critical test in violation of the CTBT and the test moratorium.

In 2019, the National Nuclear Security Administration (NNSA), which oversees the nation's stockpile and the U.S.'s dormant test site in Nevada, proposed in budget documents that it wants to increase the rate of subcritical testing to two to three tests per year—a major increase in the rate of subcritical nuclear testing—and spend large sums of money on a diagnostics program called "Enhanced Capabilities for Subcritical Experiments," or ECSE. The total cost for the ECSE program will approach $1 billion by fiscal year 2024. Per budget documents, data acquired from the ECSE program will be used for re-designing warheads. Since 1997, the NNSA/Department of Energy has consistently argued that subcritical tests are used for studying the aging properties of plutonium to ensure reliability of the nation's nuclear stockpile. Importantly, the re-design language in the 2019 budget documents marks the first instance since subcritical testing was initiated in 1997 that the stated purpose of the tests has changed. According to a new analysis, 'these activities that make changes to weapons create pressure to consider resumption of nuclear explosive testing in order to certify them.' Expanding and enhancing the subcritical test program in the context of the broader plans of the Trump Administration to develop new nuclear weapons, expand production capabilities, and walk away from arms control agreements, raises alarm bells.

The NNSA most recently conducted its 29th subcritical nuclear test since 1997 on February 13, 2019. That test, code-named 'Ediza,' leaked radioactivity in an underground alcove when a containment vessel breached. After a perfunctory root cause analysis, the NNSA is maintaining its plans to conduct three subcritical tests in 2020.

This brief is based on an analysis about subcritical tests by TriValleyCAREs. The full version is available at: http://www.trivalleycares.org/new/Subcritals_in_the_Budget.html