

Weapons

Subcritical Test Containment

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An important component of the Science-Based Stockpile Stewardship Program is a series of tests that are aimed at closing critical gaps in our knowledge of the equation of state of nuclear weapons materials. These tests are conducted about 275 m underground in the U1, a facility at the Nevada Test Site. The tests are subcritical because even though they may use nuclear materials, there is no nuclear yield; the explosive component of the test is entirely driven by conventional explosives. U1a consists of an underground tunnel complex with test alcoves.

EES Division contributes to the testing program by helping ensure that the materials used in the tests and the energy released is contained within the alcoves. This responsibility involves characterizing and predicting the ability of high-pressure gases to flow through the porous walls of alcoves into tunnels, aiding in the design of the shape and size of test alcoves, and designing plug systems that close permanently seal alcoves during and after tests. In addition, we help design and interpret data from monitoring systems that would detect a containment failure. To date, all Los Alamos subcritical tests within U1a have been performed safely and have remained fully contained.

Test-Readiness Archiving

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Based on the present world situation, and the failure of the U.S. Senate to ratify the CTBT, the resumption of underground nuclear testing at the Nevada Test Site, although still unlikely, has received renewed interest. Should national security concerns dictate a resumption of testing, the level of urgency would likely be very high. With expertise and data relating to containment of underground nuclear tests diminishing rapidly, it is important to capture this information while it is still available. To this end, we are archiving irreplaceable geological and nuclear explosion phenomena data and containment-related information that will be vital to any future nuclear test.

Most of the geological data is being sent to the National Geological Data Center, where it will be maintained for the foreseeable future. For the Nuclear Weapons Archiving Project at Los Alamos, we are documenting historical containment information in various reports and videotaping subject-matter experts' panel discussions.