Icecap

Introduction

At 152 feet tall, it remains a well-known, highly visible landmark at the Nevada National Security Site (NNSS). It is the modular tower built for Icecap, a joint United Kingdom, Los Alamos National Laboratory underground nuclear test scheduled for the spring of 1993. What was scheduled to be the 929th test came to a halt when President Bush signed the Underground Nuclear Testing Moratorium on October 3, 1992. The tower still remains in Area 7 of the Nevada National Security Site.

A temporary modular tower designed to hold the diagnostic rack for Icecap is a current landmark at the Nevada National Security Site.

The display area located in the bottom floor of the Tower.

The Icecap tower stands 152-feet tall and sits on top of a shaft which was originally drilled to a depth of 1,600 feet. The tower houses a custom-made, 7-foot-wide instrumentation rack, which would have weighed 350,000 pounds at the beginning of descent and 500,000 pounds by the time it was at the proper depth of burial. The diagnostic rack is presently suspended from a strong back at the top of the tower and at the time the moratorium began it was almost fully instrumented. The nuclear device would have been attached to the bottom of the rack and kept cold by using dry ice - hence the name Icecap. Subzero-degree air from the dry ice would have chilled the nuclear device to minus 42 degrees simulating the temperatures a missile system would encounter in space.

Icecap was predicted to be between 20 to 150 kilotons (150 kilotons is approximately 10 times the size of the bomb that detonated over the Japanese city of Hiroshima in 1945). The blast would have vaporized the diagnostic rack and melted the rock around it. Scientists say Icecap may have been felt 22 seconds later in tall buildings in Las Vegas. The crane, which would have lowered the canister down into the ground, was originally rated to lift 750,000 tons (equivalent to a 747 jumbo-jet).

How the Process Works

The physics based understanding of how such devices perform is confirmed by experimentation, which in the past could involve the detonation of nuclear explosives and measurement of the resulting outputs. Such a test involved the boring of a deep hole in the rock into which the device was lowered. Above the device would be a large diagnostic rack connected to dozens of cables which carried vital information quickly from the detectors to recording instruments in trailers above ground. A thorough understanding of the physics involved in the actual diagnostic techniques is also crucial to the interpretation of the data.

The interpretation of UGT data requires a deep understanding of many branches of physics, including: high and low temperature plasma physics, hydrodynamics, nuclear reactions, thermonuclear reactions, and the transport of energy by radiation and conduction. The tested devices are modeled with complex simulations using large computer codes, which have been written 'in house' and are still being improved. The results of such simulations are compared to the diagnostic measurements in order to understand the operation and performance of nuclear weapons, and so help to maintain and develop capability, as well as assure the safety and integrity of the current stockpile.

Left: The bottom portion of the Ice Box that would have been used to provide cooling by way of dry ice and circulation fans for the area immediately around the nuclear device.

British Testing

The British government conducted its first underground test, Pampas, at the Nevada National Security Site on March 1, 1962. It had a yield of less than 20 kilotons. By the time the last test - Bristol (named after a Nevada ghost town) - was detonated on November 26, 1991, the British government had conducted a total of 24 tests.

It should be noted that Courser, one of the 24 British tests at the Nevada National Security Site on September 25, 1964, did not proceed as planned and did not produce a nuclear yield.

Nuclear tests at the Nevada National Security Site were conducted under the terms of an United Kingdom/United States agreement signed in 1958 on cooperation on the uses of atomic energy for mutual defense purposes.

For more information, contact:
U.S. Department of Energy
National Nuclear Security Administration
Nevada Site Office
Office of Public Affairs
P.O. Box 98518
Las Vegas, NV 89193-8518
phone: 702-295-3521
fax: 702-295-0154
email: nevada@nv.doe.gov
http://www.nv.energy.gov

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