A recent experiment series at BEEF.

A Dynamic Facility

The Big Explosives Experimental Facility (BEEF) is a hydrodynamic testing facility at the Nevada National Security Site (NNSS). BEEF provides data through explosive experiments to support the Stockpile Stewardship Program (SSP), along with a variety of new experimental programs that expand the nation's non-nuclear experimental capabilities. In addition, the Baker Site Facility at BEEF is used to receive, store and assemble explosive test articles.

NEVADA NATIONAL NNSS SECURITY SITE

Stockpile Stewardship

Big Explosives Experimental Facility

Establishing BEEF

In the 1990s, community encroachment began to limit the size of experiments allowed at the Lawrence Livermore National Laboratory (LLNL) Site 300, located near Tracy, California. With that community's safety in mind, LLNL began searching for a new site.

What LLNL found at the NNSS was ideally configured: two earth-covered concrete bunkers reinforced with two feet of steel, a structure originally built in the 1950s to monitor atmospheric tests at Yucca Flat. In 1994, LLNL moved its high-explosive experiments to the NNSS and established BEEF. The 10-acre fenced compound features a control bunker, a camera bunker, a firing pad and associated control and diagnostic systems.

Scientists at the facility conduct conventional high-explosive experiments – while safely operating from the control bunker – using a test bed that provides sophisticated diagnostics, such as high-speed optics and X-ray radiography on the firing pad. To certify the safety of the firing pad, scientists conducted "Popover" in 1995: a series of tests involving explosives up to 7,800 pounds, which were detonated 27 feet from the bunker's buried outer wall.

Pushing the Knowledge Boundary

BEEF plays a significant role in accumulating data to support the SSP and the Defense Nuclear Nonproliferation Program. The facility is authorized for a maximum, high-

A recent experiment series at BEEF.

Fuel Fire experiment (mock test article) at BEEF.

The refreshed BEEF sign outside the facility.

explosive detonation limit of 5,000 pounds; however, like the 1995 Popover experiment series, options are available to increase BEEF's detonation limit on a project-by-project basis. The facility also houses a 750-pound high-explosive storage space on site.

Scientists conduct physics experiments using high explosives and pulsed laser power to study and investigate impacted materials as they are merged together by the detonations. The data collected supports shock physics, which is the study of how condensed matter responds to extreme pressures and temperatures. Scientists also use acoustic and seismic sensors to simulate the signatures of foreign weapon systems and to detect and characterize such weapons. Advanced seismic signals enable scientists to gain insights into the movement of people, animals and vehicles. The data helps to ensure compliance with nuclear test ban treaties and provide early warning for ballistic missile launches. The data also predicts where and when explosions have occurred and provides opportunities for additional explosion research.

As with other NNSS experiment programs, BEEF scientists push the shock physics knowledge boundary. By conducting open-air explosive experiments with hazardous materials, pressure-testing containment vessels

Helios experiment at BEEF.

to ensure their structural integrity, and testing weapon components, scientists are preparing for future stewardship missions.

In recent years, BEEF has supported experiments that have extended – through refurbishment – the operational lives of the weapons in the nuclear stockpile. Those experiments include the Legacy Fragmentation Series, and the Los Alamos National Laboratory (LANL) LT-19 and Lyle's hydro series.

BEEF also houses LANL-operated firing sites. The sites sit within the radioactive material area at BEEF and facilitates the use of low-hazard radiological materials in intentional detonations. Fuel Fire – another recent experimental campaign – subjected test devices to a range of thermal conditions by using a specially engineered propane burner system. This data helps scientists understand how test device components react to extreme conditions.

A recent experiment series at BEEF.

National Nuclear Security Administration

For more information, visit:

www.nnss.gov

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