

Stockpile Stewardship

Big Explosives Experimental Facility (BEEF)



WATUSI is one of the largest activities conducted at BEEF by Los Alamos National Laboratory. The 36,600 pound TNT-equivalent, research and development activity was designed to validate low-end detection capabilities associated with ground motion and the acoustic footprint of an explosives detonation.

Introduction

The Big Explosives Experimental Facility (BEEF) is a hydrodynamic testing facility, located at the Nevada National Security Site (NNSS), about 65 miles northwest of Las Vegas. BEEF provides data, through explosive experiments, to support the Stockpile Stewardship Program, along with a variety of new experimental programs that expand the nation's non-nuclear experimental capabilities. In addition, the Baker Site Facility is utilized to receive, store and assemble test articles incorporating explosives.

The Establishment of BEEF

When the U.S. Department of Energy's Lawrence Livermore National Laboratory (LLNL) was limited in the size of experiments allowed at the LLNL Site 300, located near Tracy, California, due to community encroachment, a new site had to be identified. Fortunately, an ideally configured location already existed at the NNSS. The existing site consisted of two earth-covered, two-foot thick steel-reinforced concrete bunkers built to monitor atmospheric tests at Yucca Flat in the 1950s. LLNL moved its high-explosive experiments to the NNSS and BEEF was established in 1994.

The facility consists of a control bunker, a camera bunker, a gravel firing table and associated control and diagnostic systems. The facility safely conducts conventional high-explosive experiments

using a test bed that provides sophisticated diagnostics, such as high-speed optics and X-ray radiography on the firing table, while operating personnel are in the bunker.

Before large conventional high-explosive experiments could be conducted on the site's firing table, it had to be certified as safe. To achieve this, scientists conducted "Popover"—a series of high-explosive (up to 7,800 pounds) tests which were detonated 27-feet from the bunker's buried outer wall.

Present Day

BEEF plays a significant role in accumulating data to support the Stockpile Stewardship Program. Scientists conduct weapons physics experiments, using high-explosives



An aerial view of BEEF.



Fuel fire experiment (mock test article) at BEEF.

and pulsed laser power, to study and investigate impacted materials as they merge together by the detonations. The data collected supports shock physics, seismic-acoustic monitoring, explosive source prediction, and opportunities for explosion research.

Additionally, the programs exercise the design and experiment skills in the primary development groups at the national laboratories. These will be required for the execution of future stewardship and management missions. As with other NNSS experiment programs, the continued operation of BEEF assists in pushing the shock physics knowledge boundary, allowing open-air explosive experiments with hazardous materials, over-pressure testing of containment vessels, and weapons component testing.

BEEF has recently supported several Life Extension Program experiments including the Legacy Fragmentation Series, and the Los Alamos National Laboratory (LANL) LT-19 and Lyle's hydro series. The Legacy Fragmentation experiments utilized legacy weapons components to evaluate potential



Helios experiment at BEEF.

fragmentation patterns of components, including depleted uranium from explosives.

A LANL-operated firing site, called Kappa West, also exists at BEEF. This firing site lies within the BEEF radioactive material area facilitating the use of certain low-hazard radiological materials, like depleted uranium, in intentional detonations.

Fuel fire, another recent experimental campaign supported at BEEF, subjected test devices to a range of thermal conditions by burning, using a specially engineered propane burner system. This data is instrumental in understanding reactions of test device components to extreme conditions.



Set up and blast protection



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