

Fuze Testing at Yucca Lake

Introduction

A test base was established in the summer of 1946 on the shores of Salton Sea, California where Sandia Laboratory could conduct ballistic tests and monitor the operation of fuzing and firing systems. This area, then known as Sandy Beach, had been utilized by the Manhattan Project for ballistic and fuzing and firing testing of the first atomic weapons.



The Sandia crew sets up equipment to begin fuze testing at Yucca Lake on the Nevada Test Site.



Special cameras are arranged to photograph the fuze testing on Yucca Lake.

combination of these devices. In the contact fuze, the force of impact closes a firing switch within the fuze to complete the firing circuit, detonating the warhead.

Background

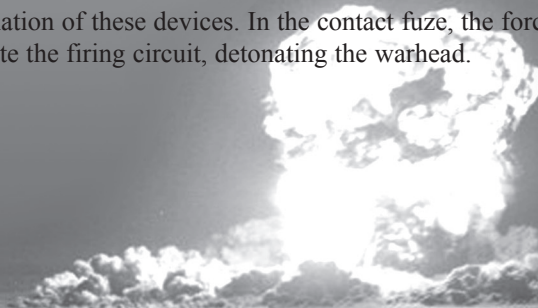
The Salton Sea Test Base provided satisfactory range facilities for several years. However, by the mid-1950's, the atmosphere became hazy, limiting visibility and obscuring photography. In addition, encroachment of the neighboring Imperial Valley began to increase. The commercial airways over the area and the new public highways complicated bombing approaches, and the number of programs requiring ballistic and operational testing continued to grow.

The search for a "tabletop flat"

The impediments on the Salton Sea Test Base made it increasingly difficult to accurately monitor fuzing and firing systems. To test contact fuzing, a large area of nearly "tabletop flat" land was needed. A temporary test site was secured in late 1954 on the bed of Yucca Lake in Nevada, about 20 miles north of Camp Mercury at the Nevada Test Site, now known at the Nevada National Security Site (NNSS). Yucca Flat was a large, dry lakebed, formed by run-off from rain and snow-washed sediment down mountainsides into deep valleys, gradually filling depressions in the valleys with alkaline sediment. Hundreds of feet deep, the sediment formed a uniformly level surface, a perfect target for testing ground contact fuzes.

Fuze testing

The fuzing and firing system is normally located in or next to the missile's warhead section. It includes those devices and arrangements that cause the missile's payload to function in proper relation to the target. The system consists of a fuze, a safety and arming device, a target-detecting device, or a



Sandia crews began monthly treks with portable instruments from Salton Sea to Yucca Flat to test contact fuzing. They placed camera stations in a 3,000-foot-diameter circle around a target on Yucca Flat for night time drops to photograph conventional bombs dropped at night from B-47s and B-36s.

Camera shutters were opened just before bomb impact to record images of a flash bulb on the bomb that was set to fire when the contact fuze operated.

After camera shutters closed, the crew set up small lights at the impact site and opened the camera shutters again. This created a double exposure on the photographic plates, allowing determination of the height above the ground at which the contact fuze operated. They learned the fuzes operated before the bombs hit the ground because a falling bomb generates a bow - or shock wave - sufficient to crush the contact fuze before actual impact.

The end of fuze testing at Yucca Lake

For two years, as the Salton Sea crew traveled back and forth to Yucca Flat as needed, several problems with Sandia's use of Yucca Flat as a test range became apparent. Sandia's testing came second to the use of Nevada Test Site for atmospheric and underground nuclear testing. While Yucca Flat was adequate for high-altitude drops, mountains on three sides obstructed aircraft approaches for low-altitude drop tests. Sandia also needed a hard concrete target to test low-altitude bomb drops onto enemy aircraft runways and concrete structures, and there was no such structure at Yucca Lake.



Bomb targets stand in Yucca Lake awaiting impact.

During testing at Yucca Flat, a Sandia crew discovered the possibilities of fuze testing at Cactus Flats - the northwest sector of the Air Force's Las Vegas Bombing Range, now the Nevada Test and Training Range. Cactus Flats was open, dry, and barren - excellent for camera coverage of bomb drops. It was on U.S. Air Force property, bordered on the north by lands of the U.S. Bureau of Land Management, and Sandia use of the range would not require crews to relocate. It was so remote that commercial aircraft, highway traffic, and urban development were insignificant. In fact, even radio signals that might interfere with telemetry were at a minimum. As a result, Sandia abandoned Yucca Lake in favor of Cactus Flats for future fuze testing.

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