



BREN Tower

Introduction

At 1,527 feet, the BREN (Bare Reactor Experiment -- Nevada) Tower is the largest free-standing structure west of the Mississippi River. It is also one of the best known and most visible landmarks at the Nevada Test Site, now known at the Nevada National Security Site (NNSS). It is taller than the Empire State Building (1,454 feet, to top of lightning rod) and almost twice as tall as the Eiffel Tower (1,063 feet, with antenna).



Japanese-style houses are shown in the foreground with the BREN Tower on Yucca Flat.

It is constructed of 51 thirty-foot sections of high tensile steel, anchored with five and one-half miles of steel cables. The tower is designed to withstand winds greater than 120 miles per hour, and it is equipped with a two-man elevator which operates at a speed of 100-feet per minute.

In the Beginning

The BREN Tower got its name from the initials of a 1962 experiment for which it was constructed: Bare Reactor Experiment - Nevada. BREN was a major project within the Civil Effects Test Operation of the Atomic Energy Commission's (AEC) Division of Biology and Medicine. Its primary purpose was to provide a method for accurately estimating radiation doses received by survivors of the atomic bombings of Hiroshima and Nagasaki. The tower's height was determined by the altitude at which "Little Boy" was detonated over Hiroshima.

A small unshielded (bare) reactor was mounted on an outside hoist car to move to various levels of the tower. For realism, a mock Japanese village was built near the base of the tower (only some of the original village structures remain today) so the shielding effects of various types of housing styles and materials could be studied in estimating human radiation doses. This vast effort became a cornerstone of modern radiation estimates.

Since the 1962 experiment, the tower has been used for many other scientific purposes: to study data on shielding against radiation, neutron activation in soil, and radiation measuring techniques.

Both the U.S. Weather Bureau and Sandia National Laboratories instrumented the tower to record information on winds, temperature, and air pressures which were transmitted electronically to distant receiving stations. Additional programs and experiments using the tower were proposed, and it became apparent that its usefulness could be extended for many years. However, continued and expanded programs at BREN Tower would hinder the Nevada Test Site's primary program of underground nuclear testing. Location of the tower on Yucca Flat - the main testing area - was a limiting factor both in placement and the yield of the underground tests. It was decided to move the tower to its present location in Jackass Flats.

BREN Moves to Jackass Flats

In 1966, a \$380,000 contract was awarded to the Dresser-Ideco Company, Columbus, Ohio, to dismantle the tower and move it to its present location in Jackass Flats. This was the same company that erected the tower in 1962.



Operation HENRE

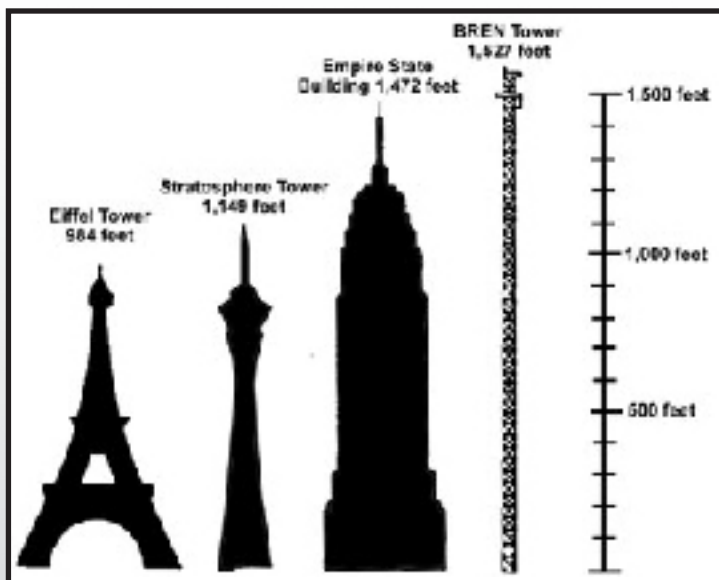
Operation HENRE (High Energy Neutron Reactions Experiment) began in September 1966. Its primary purpose was to develop information for biological research programs of the AEC and the Armed Forces Radiobiology Research Institute in Bethesda, Maryland.

A small accelerator was mounted to the tower. Instruments measured a variety of effects, including the long-term medical effects of radiation. The project was jointly funded by the AEC and the U.S. Department of Defense.

Measurements were taken many distances from the accelerator by radiation dosimetry instruments to determine the distribution of neutrons and of energetic gamma rays produced when neutrons collide with atoms in the air. In addition, scientists conducted radiation scattering and applied shielding experiments.

The linear accelerator was designed and fabricated by Oak Ridge National Laboratory in cooperation with the Armed Force Radiobiology Research Institute and the AEC's controlled thermonuclear research program. The fusion reaction was used to obtain 14 million-electron-volt neutrons. The accelerator was installed on the tower in much the same manner as was the BREN unshielded research reactor and large cobalt-60 gamma radiation source.

HENRE, as in the case of BREN, was part of a long-term Atomic Energy Commission program for evaluating the effects of radiation doses received as a result of nuclear explosions. The knowledge gained from the two dose radiation measurement research programs was correlated with the medical studies of the Atomic Bomb Casualty Commission in Japan. This commission was a research agency of the National Academy of Sciences-National Research Council which was funded by the Atomic Energy Commission and operated in conjunction with the National Institute of Health of Japan.



Glossary

Neutron: An electrically neutral particle in the nucleus of all atoms except hydrogen; a neutron is one of the three basic particles that make up the atom, the others being protons and electrons. Neutrons can be absorbed by paraffin, hydrogenous materials, or very thick layers of lead. Radiation from neutrons can be lethal to humans depending on dose and length of exposure.

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>

