

# Fact Sheet

## Defense Threat Reduction Agency



### Operation BUSTER-JANGLE

**Note:** For information related to claims, call the Department of Veterans Affairs (VA) at 800-827-1000 or the Department of Justice (DOJ) at 800-729-7327. For all other information, call the Nuclear Test Personnel Review (NTPR) Program at 800-462-3683.

Operation BUSTER-JANGLE, the second series of atmospheric nuclear weapon tests conducted at the Nevada Proving Ground (NPG), consisted of seven nuclear detonations. Four of the detonations were airdrops. The other three shots consisted of one tower, one surface, and one underground detonation. The surface and underground detonations were the first of either type at the NPG. Operation BUSTER-JANGLE lasted from October 22 to December 20, 1951, and involved an estimated 11,000 Department of Defense (DOD) personnel in observer programs, tactical maneuvers, damage effects tests, scientific and diagnostic studies, and support activities. The series was intended to test nuclear devices for possible inclusion in the weapons arsenal and to improve military tactics, equipment, and training.

#### Historical Background

Approximately 6,500 DOD personnel at Operation BUSTER-JANGLE took part in Exercises Desert Rock I, II, and III. Desert Rock exercises were Army programs involving members of all four armed services. The remaining DOD personnel provided support for the Desert Rock exercises or participated in scientific activities.

Exercises Desert Rock I, II and III were conducted at Shots DOG, SUGAR and UNCLE, respectively. The troop exercises were the first staged by the Armed Forces during continental nuclear weapons testing. The Desert Rock exercises included observer programs, tactical maneuvers, and damage effects tests. Observer programs, conducted at Shots DOG, SUGAR, and UNCLE, generally involved lectures and briefings on the effects of nuclear weapons, observation of a nuclear detonation, and a subsequent tour of a display of military equipment exposed to the detonation. Tactical maneuvers, conducted after Shot DOG, were designed both to train troops and to test military tactics. Damage effects tests, conducted at Shots DOG, SUGAR, and UNCLE, were performed to determine the effects of a nuclear detonation on military equipment and field fortifications. Support for Exercises Desert Rock I, II, and III included radiological safety, security, transportation, communications, construction, and logistics services. During BUSTER-JANGLE, approximately 2,500 support troops, primarily from units of the Sixth Army, were present at Camp Desert Rock to provide such services.

The Atomic Energy Commission (AEC) and the DOD conducted scientific studies to assess the effects of the nuclear detonations. Scientists and technicians from these agencies placed gauges, detectors, and other equipment around the point of detonation in the weeks before each scheduled nuclear test. After each detonation, when the Test Director had determined that the area was radiologically safe for limited access, these participants returned to the test area to recover equipment and gather data. The Air Force Special Weapons Command (AFSWC) provided military support, including weather and air support activities, for the test organization.

## Summaries of Operation BUSTER-JANGLE Nuclear Weapons Tests

The seven BUSTER-JANGLE tests are summarized in the accompanying table. The accompanying figure shows the ground zeros of the seven shots. The three shots involving the largest numbers of DOD participants were Shots DOG, SUGAR, and UNCLE.

**Shot DOG**, an airdropped nuclear device, was detonated at 7:30 a.m. on November 1, 1951. The shot was fired 1,417 feet above the terrain of Area 7, Yucca Flat. As part of Exercise Desert Rock I, the armed services fielded a troop observer program with approximately 2,800 participants, a tactical troop maneuver with approximately 880 participants, and damage effects tests with approximately 60 participants. All troops observed the shot from a location 11 kilometers south of ground zero.

The following Army units conducted the tactical maneuver at Shot DOG:

Unit	Home Station
1st Battalion, 188th Airborne Infantry Regiment, 11th Airborne Division	Camp Campbell, Kentucky
3rd Medical Platoon, 188th Airborne Medical Company	Camp Campbell
Platoon, Company A, 127th Engineer Battalion	Camp Campbell
Battery C, 546th Field Artillery Battalion	Fort Lewis, Washington

The Army units formed a Battalion Combat Team (BCT) for the maneuver. During the weeks preceding the shot, BCT personnel dug foxholes and built gun emplacements and bunkers in a tactical defensive position southwest of ground zero. Several hours before the shot, the BCT and observers went by truck and bus convoy into the forward area. They proceeded to the observation point about 11 kilometers from ground zero, where they witnessed Shot DOG. After the detonation, the troops moved by convoy to their tactical defensive position, where they viewed the effects of the nuclear detonation on the fortifications. The BCT then proceeded in an attack formation to its objective. The objective was southwest of ground zero; at its closest point, it was 460 meters from ground zero. The BCT was accompanied by radiological safety monitors and was preceded by radiation survey teams who determined the limits of safe advance. After reaching the objective, the troops toured two equipment displays 900 and 1,350 meters south of ground zero. The troops were then trucked to a display position over 6 kilometers south of ground zero. During these activities, Human Resources Research Office personnel tested the troops to determine their psychological reactions to the detonation.

In addition to Desert Rock I participants, about 300 DOD personnel participated in scientific projects coordinated by the test organization at Shot DOG. Approximately 300 AFSWC personnel from the 4925th Test Group (Atomic) and the 4901st Support Wing (Atomic) performed support missions.

**Shot SUGAR**, the first surface detonation at the NPG, occurred at 9 a.m. on November 19, 1951. The SUGAR device was detonated 3.5 feet above the ground in Area 9, Yucca Flat. The initial survey detected onsite fallout to the north of ground zero.

As part of Exercise Desert Rock II, the armed services conducted a troop observer program and damage effects tests. The observers, who were from the Army, witnessed the shot from a location 9 kilometers south of ground zero. At least one day after the shot, the observers toured the display areas in a bus convoy. Five 10-man evaluation teams also toured the equipment displays on November 20. One team came from each of the following Camp Desert Rock sections: Chemical, Signal, Engineer, Ordnance, and Quartermaster. The teams reentered the forward area during the next 5 days to retrieve test equipment.

About 550 DOD personnel participated in scientific projects conducted by the two test units at Shot SUGAR. Approximately 450 AFSWC participants performed support missions. Perhaps an additional 100 DOD personnel worked for various units coordinated by the test organization.

**Shot UNCLE**, the first underground nuclear detonation at the NPG, was fired at noon on November 29, 1951. The nuclear device was detonated 17 feet beneath the ground in Area 10 of Yucca Flat. The initial survey showed onsite fallout north of ground zero.

Exercise Desert Rock III activities were similar to those of Exercise Desert Rock II. The armed services conducted a troop observer program at UNCLE with approximately 200 Army participants. The observers witnessed the shot from a location 9.5 kilometers southwest of ground zero. Two days after the shot, they viewed display areas from buses. About 60 participants from the same Camp Desert Rock sections that had participated at Shot SUGAR conducted damage effects tests.

In addition to Desert Rock participants, approximately 650 DOD personnel participated in scientific projects conducted by the two test units at Shot UNCLE. About 550 AFSWC participants performed support activities, including cloud sampling, courier, cloud tracking, and aerial survey missions. Perhaps another 125 DOD personnel worked for various units coordinated by the test organization.

### **Radiation Protection Standards**

The AEC established safety criteria to minimize individual exposure to ionizing radiation while allowing participants to accomplish their missions. The AEC established a limit of 1 roentgen (R) of whole body gamma exposure for participants in Exercise Desert Rock I and a limit of 3 R for participants in Exercises Desert Rock II and III, test organization, and AFSWC activities. AFSWC sampling pilots and crews were authorized to receive up to 3.9 R because their mission required them to penetrate the clouds resulting from the detonations.

Although the Test Manager was responsible for the radiological safety of all participants at BUSTER-JANGLE, Exercises Desert Rock I, II, and III, the test organization, and AFSWC each had responsibility for implementing radiological safety procedures for its personnel. The AEC assisted with radiological safety activities for the Desert Rock exercises. The Test Manager was responsible for the safety of test organization personnel at the NPG and for the radiological safety of individuals residing within a 320-kilometer radius of the NPG. The Radiological Safety and Health Unit, composed of personnel from the Los Alamos Scientific Laboratory (LASL), the armed services, and various civilian groups performed onsite and offsite radiological safety operations. The Radiological Safety Officer, who was appointed by the Test Director, was from LASL and headed this unit. Radiological safety procedures for AFSWC personnel at Indian Springs Air Force Base, Nevada, were implemented by the 4925th Test Group (Atomic). The 4901st Support Wing (Atomic) handled these procedures for AFSWC personnel at Kirtland Air Force Base, New Mexico.

Although the missions of each organization required different activities and separate radiation protection plans and staffs, the general procedures were similar.

- Orientation and training - preparing radiological monitors for their work and familiarizing participants with radiological safety procedures
- Personnel dosimetry - issuing, exchanging, developing, and evaluating film badges to determine gamma exposure
- Use of protective equipment - providing clothing, respirators, and other protective equipment
- Monitoring - performing radiological surveys and controlling access to radiation areas
- Briefing - informing observers and project personnel of radiation characteristics and the current radiation intensities in the test area
- Decontamination - detecting and removing contamination from personnel and equipment to prevent its spread to uncontrolled areas.

## Radiation Doses at Operation BUSTER-JANGLE

Film badges were issued to individuals at BUSTER-JANGLE for their activities in Yucca Flat. Most of these readings are available except for Desert Rock II and III. Doses have been reconstructed for the remainder and where film badge coverage was incomplete. Approximately 335 DOD personnel received doses over 3 rem\*. Sixteen DOD personnel accrued more than 3.9 rem, up to about 6 rem; these personnel included Army officers who received about 5 rem from staying too long in the UNCLE fallout field, 5 days after the shot; Air Force cloud sampling personnel from the 4925th Test Group; and scientific personnel making project recoveries in the fallout fields.

The totals of reconstructed and film badge doses for BUSTER-JANGLE participants are depicted below.

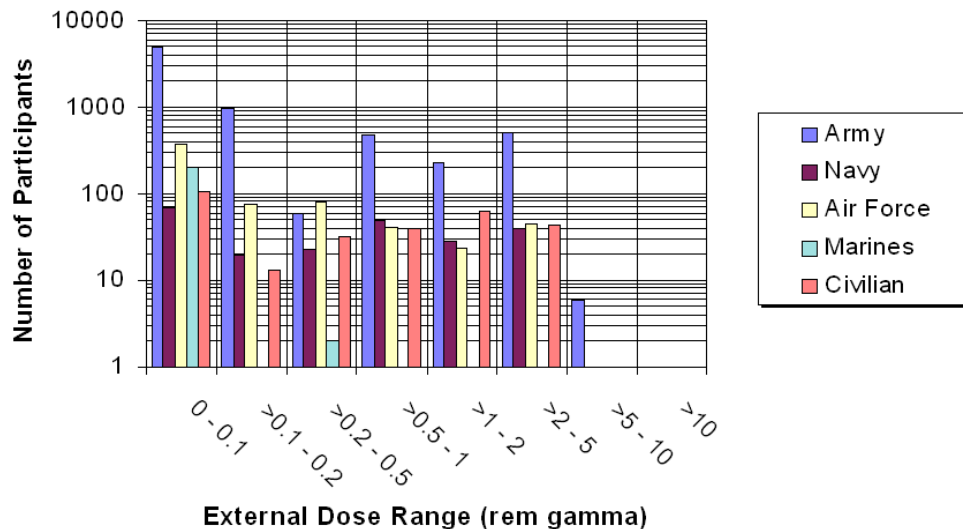


Figure 1. Doses accrued by BUSTER-JANGLE personnel

For more information on reconstructed doses, see the report “Analysis of Radiation Exposure for Military Participants, Exercises Desert Rock I, II, and III – Operation BUSTER-JANGLE” (DNA-TR-87-116). Also see the report “Operation BUSTER JANGLE 1951” (DNA 6023F). These reports are available online at <https://www.dtra.mil/DTRA-Mission/Reference-Documents/NTPR-Info/>.

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\* A rem is a radiation protection unit of measure that quantifies the risk of biological effects resulting from exposure to ionizing radiation. Ionizing radiation is any radiation (gamma, x-ray, beta, neutron, or alpha) capable of displacing electrons from atoms or molecules, thereby producing ions. According to the National Council on Radiation Protection and Measurements (NCRP, Report No. 160, Table 1.1), the general U.S. population receives about 0.62 rem per year from natural background radiation sources (radon, cosmic rays, and rocks) and man-made radiation sources (medical diagnostic x-rays and consumer products). As a basis of comparison, a standard diagnostic chest x-ray delivers a radiation dose of about 0.02 rem.

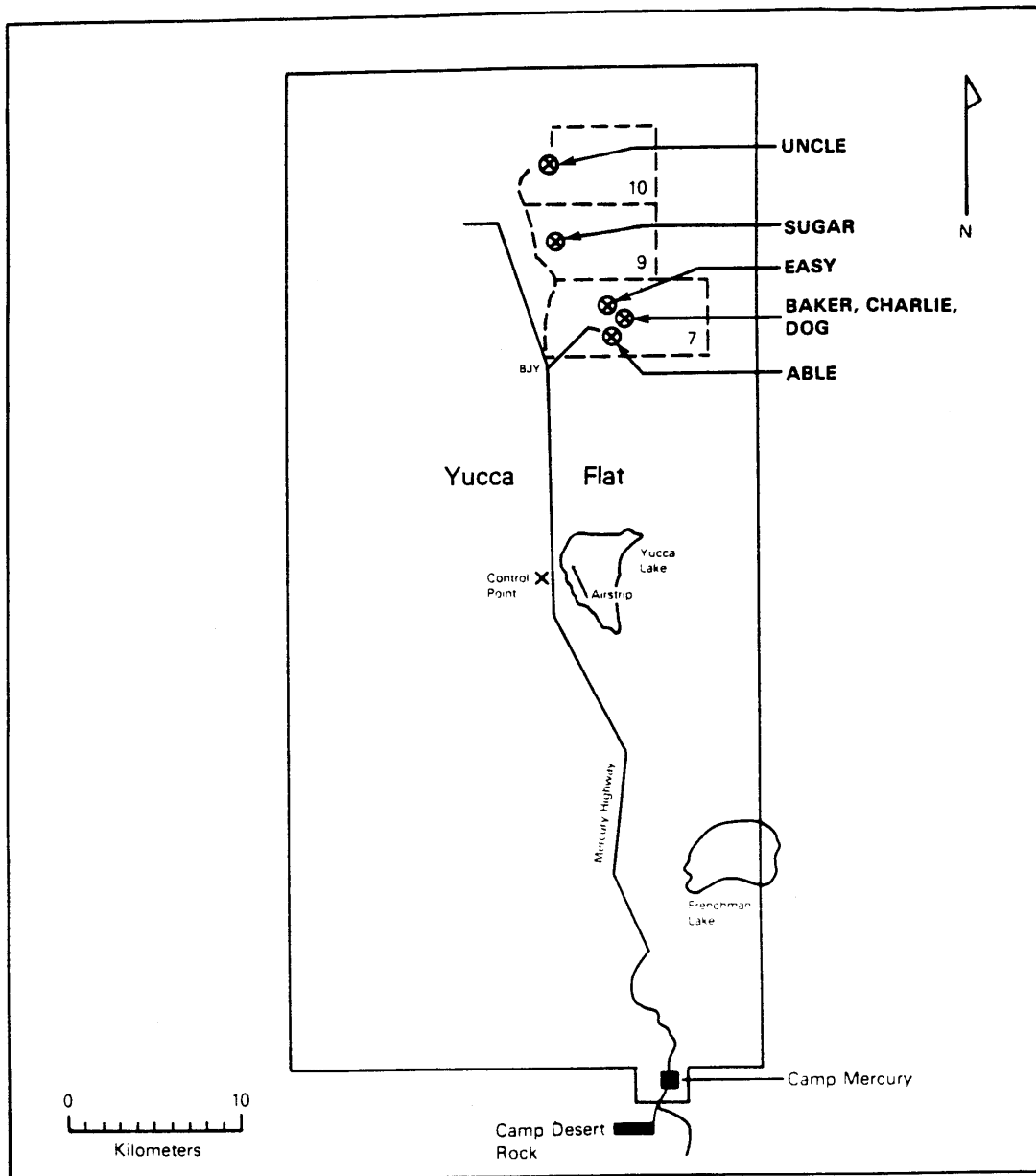
**Summary of Operation BUSTER-JANGLE Nuclear Weapons Tests (1951)<sup>a</sup>**

<b>Shot</b>	<b>ABLE</b>	<b>BAKER</b>	<b>CHARLIE</b>	<b>DOG</b>	<b>EASY</b>	<b>SUGAR</b>	<b>UNCLE</b>
Sponsor	LASL	LASL	LASL	LASL	LASL	DOD	DOD/LASL
Planned Date	Oct 19	Oct 23	Oct 26	Oct 29	Nov 1	Nov 15	Nov 29
Actual Date	Oct 22	Oct 28	Oct 30	Nov 1	Nov 5	Nov 19	Nov 29
Local Time	6 a.m.	7:20 a.m.	7 a.m.	7:30 a.m.	8:30 a.m.	9 a.m.	noon
Location	Area 7	Area 7	Area 7	Area 7	Area 7	Area 9	Area 10
Type	Tower	Airdrop	Airdrop	Airdrop	Airdrop	Surface	Underground
Height of Burst (feet) <sup>b</sup>	100	1.118	1 132	1,417	1,314	3.5	-17
Yield (kilotons) <sup>c</sup>	<0.1	3.5	14	21	31	1.2	1.2

<sup>a</sup> Source: *United States Nuclear Tests, July 1945 through September 1992*, DOE/NV-209 (Rev. 15), Dec 2000.

<sup>b</sup> Altitudes are measured from mean sea level, while heights are measured from the ground. All vertical distances are in feet.

<sup>c</sup> One kiloton equals the approximate energy release of one thousand tons of TNT.



**NEVADA PROVING GROUND SHOWING GROUND ZEROS FOR OPERATION BUSTER-JANGLE**