Fact Sheet

dna

Defense Nuclear Agency
Public Affairs Office
Washington, D.C. 20305

Subject: GREENHOUSE Fact Sheet

GREENHOUSE, the fourth postwar atmospheric nuclear weapon test series, was conducted by the United States during April and May 1951. CROSSROADS took place at Bikini in 1946; SANDSTONE was held at Enewetak in 1948; and RANGER was conducted at the Nevada Test Site in early 1951. In GREENHOUSE, four nuclear devices were detonated on the islands of Enjebi, Eleleron, and Runit on Enewetak Atoll. All four were detonated on towers, and resulted in significant downwind fallout.

GREENHOUSE detonations, Enewetak, 1951

Detonation	Date	Time	Location	Type Burst
DOG	8 April	0634	Runit	300-foot (91.4-meter) tower shot
EASY	21 April	0627	Enjebi	300-foot (91.4-meter) tower shot
GEORGE	9 May	0930	Eleleron	200-foot (61.5-meter) tower shot
ITEM	25 May	0617	Enjebi	200-foot (61.5-meter) tower shot

Remarks: Dates and times are local dates and times at Enewetak. Only the yield of Shot EASY, 47 kilotons (KT), have been announced. One kiloton equals the approximate energy release of the explosion of one thousand tons of TNT.

Tests were conducted by a joint military-civilian organization designated Joint Task Force Three (JTF 3). JTF 3 was patterned generally after military organizations and was made up of military personnel from the Army, Navy, Air Force and Marine Corps, as well as civilians from the Department of Defense (DOD), Atomic Energy Commission (AEC), and contractors. The commander, an Air Force general, was an appointed representative of the AEC but reported to the Joint Chiefs of Staff as well as to the AEC. This appointment was important because, by law, development of atomic weapons was vested in the AEC.

Army, Navy, and Air Force were about equally represented in numbers of personnel during GREENHOUSE. The Navy had provided the bulk of personnel for the earlier Pacific nuclear test series. During GREENHOUSE, the Army provided an estimated 1,615 men, the Navy 2,952, the Air Force 2,621, and the Marine Corps 134. Civilians numbered 2,049. Most of the civilians were affiliated with the AEC.

The purpose of the four tests in the GREENHOUSE series was to continue development of nuclear weapons for defense. Work was proceeding at this time on development of thermonuclear weapons, and the GREENHOUSE tests were part of this process. DOD was interested in the physical and biological effects of nuclear weapons, so its various services participated in several experimental programs to measure them. One of the important programs used unmanned, radio-controlled drone aircraft to measure blast and thermal effects and to collect radioactive cloud samples.

A separate organization within JTF 3 provided radiological safety (radsafe) expertise and services to the task force. This organization was responsible for defining radioactive areas after each shot, accompanying reentry parties to radioactive areas to retrieve experimental data, monitoring removal, packaging, and shipment of radioactive cloud samples, and other radiation monitoring duties. It also procured all radiation detection film badges, developed and interpreted exposed film badges, and kept cumulative radiation exposure records on each person who was badged.

Film badges were issued to individuals who possibly could have been exposed to radiation while performing their duties; such as those visiting any of the islands made radioactive by the shots, boat pool crews, radiation monitors, aircrews, aircraft decontamination personnel, and runway crash crews. In addition, over 75 film badges for each test were distributed among the six participating ships, to be worn from the day of the test and 7 days thereafter. Of the approximately 9,350 men in the test area during all or part of the testing operations, 2,416 were badged one or more times. Film badges for personnel entering radioactive areas normally were issued and turned in daily. Boat pool, air crew, and ship badges generally were issued for a week.

The overall average exposure recorded by these badges was less than 0.5 roentgen (R). A number of individuals, however, had recorded exposures between 5 and 8 R. Some with these higher exposures were affiliated with the AEC and some were involved with the Air Force long-range radioactive cloud-tracking and sampling program. Most of these Air Force personnel were in the Experimental Aircraft Unit. This unit flew the B-17s used as drones and drone controllers and operated the personnel and aircraft decontamination stations on Enewetak Island. The following table summarizes the recorded film badge exposures.

GREENHOUSE Badge Exposures (R)

	Number Badged	0	0-1	1-3	3-5	Over 5	High (R)
U.S. Army	195	6	143	35	10	1	5.430
U.S. Navy	813	134	458	187	27	7	8.080
U.S. Air Force	849	86	516	146	64	37	8.475
U.S. Marine Corps	8	3	3	0	2	0	3.805
Other Participants	551	110	325	82	20	14	8.575
TOTALS	2416	339	1445	450	123	59	

Fallout occurred on the islands of Japtan, Parry, and Enewetak and the six task force ships after three of the four shots in this series. The fallout from the first two shots was heaviest on Japtan and lightest on Enewetak. Enewetak was a base island where personnel from JTF 3 lived throughout the series. Japtan was an island used for recreation, but it also had an Army communication station and a Navy medical research unit. The fallout from shot ITEM, the last shot in this series, was much heavier than the first two. Enewetak Island received heavier fallout from ITEM than Japtan and Parry. Personnel who remained on Enewetak Island for 4 days after ITEM received over 2.45 R. Those who remained for 14 days received over 2.8 R. Most people, however, departed the test area within a week after the shot.

The amount of fallout received by the six ships varied with their locations and decontamination procedures. Nearly all crewmembers on five of these ships were assigned a fallout exposure immediately after GREENHOUSE, and these exposures were recorded in Navy medical records. The assigned exposures were:

USS CURTISS (AV-4)	1.043 R
USS CABILDO (LSD-16)	0.7 R to 1.1 R
USS SPROSTON (DDE-577)	1.0 R
USS WALKER (DDE-517)	0.433 R
USS LST - 859	0.334 R
CTG 3.3 STAFF	1.043R
BOAT POOL	0.7 to 2.1 R

The fallout exposure was lower for shipboard personnel than island based personnel because of the use of water washdown systems during fallout, and the subsequent decontamination of the ships' external surfaces.

The fallout exposure is in addition to those film badge exposure readings accrued by individuals during daily missions. Fallout exposure can be calculated for all individuals based upon their location and length of stay at Enewetak Atoll.