U.S. Department of Energy

Albuquerque Operations Office
Film Declassification Project

Video Tape Fact Sheets

Updated
September 2000

Released by

Nevada Operations Office

Coordination & Information Center
Operated by
Bechtel Nevada
Under Contract DE-AC08-96NV11718

Film Declassification Project - Video Tape Fact Sheets

Summary Information

The U.S. Department of Energy (DOE), Albuquerque Operations Office, in conjunction with the U.S. Department of Defense (DoD), is committed to making available to the public historically significant films describing various aspects of the U.S. nuclear weapons development program. The process of declassifying these films is an ongoing task.

The film footage is available on video tape in three formats: VHS ($10.00 each plus shipping and handling); beta ($80-$100 each plus shipping and handling); and VHS PAL ($40.00 each plus shipping and handling). All payment must be made by check or money order in U.S. dollars, payable to Bechtel Nevada. The enclosed fact sheets provide information on each video. The video listing and fact sheets can also be found on the Internet at: http//www.nv.doe.gov under "News & Publications" and the subheading "Historical Nuclear Weapons Test Films."

To purchase these videos or obtain additional information, please contact:

U.S. DOE/Nevada Operations Office - Public Reading Facility
Bechtel Nevada
P. O. Box 98521 M/S NLV040
Las Vegas, NV 89193-8521

Telephone: 1-877-DOE-FILM (1-877-363-3456) (Toll Free) or (702) 295-1628
Facsimile: (702) 295-1624
E-mail: cic@nv.doe.gov

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Operation Wigwam, Commander's Report	35:45	0800018	1955, Color
Operation Redwing	25:45	0800019	1956, Black & White, Sanitized
Military Effects on Operation Redwing	31:30	0800020	1956, Color, Sanitized
Operation Plumbbob	22:00	0800021	1957, Black & White, Sanitized
Operation Plumbbob, Military Effects Studies	31:45	0800022	1957, Black & White, Sanitized
Operation Hardtack, Military Effects Studies, Part One - Basic Effects, Structures and Material	26:00	0800023	1958, Black & White
Operation Hardtack, Military Effects Studies, Part Two - High Altitude Studies	24:45	0800024	1958, Black & White, Sanitized
Operation Hardtack, Military Effects Studies, Part Three - Underwater Tests	18:40	0800025	1958, Black & White, Sanitized
Operation Hardtack, Military Effects Studies, Part Four - Sub-Kiloton Effects	23:50	0800026	1958, Black & White, Sanitized, Silent
Report of Chief, AFSWP to ARPA - Operation Argus	44:40	0800027	1958, South Atlantic, Color, Sanitized
Vela Uniform Participation in Operation Nougat and Gnome	21:30	0800028	1961-1962, Black & White
Dominic Fireballs, Pacific Testing 1962, Christmas Island Area	43:40	0800029	1962, Color, Silent, (long-distance aerial views only)
Project Sedan	7:00	0800030	1962, Color, poor original, great film
SADM Delivery by Parachutist/ Swimmer (Special Atomic Demolition Munition)	9:45	0800031	No date given, Black & White, no explosions
The U.S. Army Present MF20 9811, Ivy Flats Film Report	17:35	0800032	1962, Black & White

Title	Time	Accession Number	Notes
Operation Doorstep (10:00) and Operation Cue (16:00)	26:00	0800033	1953 Annie Event and 1955 Apple-2 Event, Color, Civil Defense Films, Nevada (two films on one video)
Project Gnome	29:13	0800034	1961, New Mexico, Color
Nuclear Excavation, Excavating with Nuclear Explosives (8:45) and Plowshare (28:22)	37:07	0800035	1968 and 1973, Nevada, Black & White/Color (two films on one video)
Project Rulison	7:28	0800036	1969, Colorado, Color
The Warm Coat	14:00	0800037	1968-1969, Black & White, Otter relocation from Amchitka, AK, no explosions
The Amchitka Program	24:11	0800038	1970, Alaska, Color
Project Long Shot	13:15	0800039	1965, Alaska, Black & White
The Milrow Event	27:30	0800040	1969, Alaska, Color
Project Cannikin Review	13:00	0800041	1971, Alaska, Color, Sanitized
Atomic Blasts - Operations Greenhouse Through Upshot-Knothole	29:22	0800042	1951-1953, Color, Silent
1962 Pacific Nuclear Tests	21:15	0800043	1962, Color
U.S. Navy Training Film - ASROC Weapons System - Introduction	20:30	0800044	1963, Black & White
Naval Atomic Weapons Vulnerability Program	21:15	0800045	Late 1950s, Black & White/ Color, Sanitized, no nuclear explosions
Composite No. 1 - Swordfish, Sailor Hat (Conventional Test), AFROC, SUBROC	17:45	0800046	Various dates, Color, Sanitized
U.S. Navy Training Film - Delivery of Atomic Weapons by Light Carrier Aircraft	18:20	0800047	No date given, Black & White, Sanitized
U.S. Navy Presents Nuclear Effects at Sea	20:30	0800048	1976, Black & White, Sanitized

Title	Time	Accession Number	Notes
The Defense Atomic Support Agency Presents Technical Training Film Bulletin Number 45, Part II - Talos Missile Handling, Cruiser Installation	13:00	0800049	No date given, Black & White/Color
U.S. Navy Training Film - Torpedo MK 45 (Nuclear) Systems Description	13:00	0800050	1962, Black & White/Color
Armed Forces Special Weapons Project Presents United States Air Force Atomic Bomb Delivery Aircraft (Piloted)	17:30	0800051	1950-1957, Black & White/ Color, Sanitized
Armed Forces Special Weapons Project Presents Atomic Guided Missiles	11:50	0800052	1955, Black & White/Color, Sanitized
Produced by the Defense Nuclear Agency, Meeting the Terrorist Threat	7:30	0800053	Early 1970s, Color
Hybla Fair	15:15	0800054	1974, Black & White/Color, Sanitized
Federal Civil Defense Administration Presents Let's Face It	13:25	0800055	No date given, Color
Produced by the Defense Nuclear Agency, Enewetak Cleanup	13:15	0800056	No date given, Color
Excerpts from Operation Hardtack	17:30	0800057	1958, Color, Silent
U.S. Navy Training Film - Mark 43 and Mark 57 Weapons - Shipboard Handling, Including Aircraft Loading	20:25	0800058	1963, Black & White, Sanitized
The United States Army Presents TF93370, Technical Proficiency Inspection	23:50	0800059	1963, Black & White, Sanitized
Exercise Desert Rock	27:51	0800060	1951, Black & White
Operation Dominic Nuclear Tests	26:23	0800061	1962, Black & White, Sanitized
Starfish Prime Event Interim Report by Commander JTF-8 (7:45); Fishbowl Auroral Sequences (7:50); Dominic on Fishbowl Phenomenon (11:13); and Fishbowl XR Summary (34:38)	1:01:26	0800062	1962, Black &White/Color, Sanitized (one sound and three silent; four films on one video)

Title	Time	Accession Number	Notes
Operation Fishbowl - High Altitude Weapons Effects	28:10	0800063	1962, Black & White, Sanitized
JTF-8 Presents Operation Dominic, Christmas Island (12:29) and EG&G Operation Dominic Scientific Photography, Bluestone Event (10:00)	22:29	0800064	1962, Black & White, Sanitized, Silent (two films on one video)
JTF-8 Presents Operation Dominic: Johnston Island	19:23	0800065	1962, Black & White, Sanitized
High-Altitude Nuclear Weapon Effects Part One - Phenomenology	20:53	0800066	1963, Color, Sanitized
High-Altitude Nuclear Weapon Effects Part Two - Systems Interference	16:29	0800067	1963, Color, Sanitized
Atomic Weapons Orientation Part One - Organization for Atomic Energy (17:45) and Atomic Weapons Orientation Part Two - Basic Atomic Weapons (6:11)	23:56	0800068	1961 and 1965, Black & White/Color, Sanitized (two films on one video)
Atomic Weapons Orientation Part Three - A Special Weapons Orientation: Weapons Family (6:32) and Atomic Weapons Orientation Part Four - Atomic Weapons Support Operations (12:22)	18:54	0800069	1961, Black & White/Color, Sanitized (two films on one video)
Atomic Weapons Orientation Part Five - Effects of Atomic Weapons (15:23) and Atomic Weapons Orientation Part Six - A Special Weapon Orientation: The Thermonuclear Weapon (29:12)	44:35	0800070	No date given, Black & White/Color, Sanitized (two films on one video)
Tonopah Test Range: An Outdoor Laboratory Facility	12:27	0800071	1964, Color
Developing and Producing the B-61	26:29	0800072	1970's, Color, Sanitized
Trinity Historical Footage	11:15	0800073	1945, Color, Sanitized, Silent
Atomic Proving Ground, The Story of Operation Sandstone	1:13:50	0800074	1948, Black & White

Title	Time	Accession Number	Notes
Radiological Safety on Operation Sandstone	25:45	0800075	1948, Black & White
The Armed Forces Special Weapons Project Presents Technical Report: Tumbler-Snapper	12:50	0800076	1953, Black & White, Sanitized
Operation Tumbler: A Photographic Study of Blast and Thermal Effects	22:20	0800077	1952, Color
Atomic Weapons Tests: Tumbler-Snapper through Upshot-Knothole	30:30	0800078	1952-1953, Color, Sanitized
Operation Teapot - Military Effects Studies	31:00	0800079	1955, Color
The First Twenty-Five Years (Los Alamos)	28:00	0800080	1973, Black & White/Color (unclassified original)
U.S. Air Force Training Film TF5793, Broken Arrow Procedures for an EOD Detachment	17:00	0800081	1967, Color (unclassified original)
B-52 Accident, Yuba City, CA, (Broken Arrow)	14:55	0800082	1961, Black & White, Sanitized, Silent.
Nuclear Weapon Accident Responses - Thule, Greenland (33:00) and Palomares, Spain (Broken Arrow) (7:24)	40:24	0800083	1968 and 1966, Color, Sanitized, Silent (two films on one video)
Atomic Explosion, The Story of Five Atomic Bombs (Reels 1-6)	59:17	0800084	1945-1946, Black & White
Atomic Explosion, The Story of Five Atomic Bombs (Reels 7-12)	59:52	0800085	1945-1946, Black & White
Atomic Explosion, The Story of Five Atomic Bombs (Reels 13-18)	1:01:44	0800086	1945-1946, Black & White
Dominic Sunset	3:30	0800087	1962, Color, Silent
Joint Task Force Three Presents Operation Greenhouse	1:19:30	0800088	1951, Color, Sanitized
Atomic Weapons Tests, Trinity through Buster-Jangle	22:59	0800089	1945-1951, Color, Sanitized
Edward Teller - An Early Time	28:00	0800090	1979, Black & White/Color

Title	Time	Accession Number	Notes
The Basic Physics of an Atomic Bomb	19:45	0800091	No date given, Color
Nuclear Effects During SAC Delivery Missions	30:50	0800092	1960, Color, Sanitized
Atomic Weapons Orientation Part One - Organization for Atomic Energy (17:50) and Atomic Weapons Orientation Part Two - Basic Atomic Weapons (12:10) (expanded version of 0800068)	30:00	0800093	1961 and 1965, Black & White/Color, Sanitized (two films on one video)
Atomic Weapons Orientation Part Three - A Special Weapons Orientation: Weapons Family (7:30) and Atomic Weapons Orientation Part Four - Atomic Weapons Support Operations (12:20) (expanded version of 0800069)	19:50	0800094	1961, Black & White/Color, Sanitized (two films on one video)
Atomic Weapons Orientation Part Five - Effects of Atomic Weapons (15:25) and Atomic Weapons Orientation Part Six - A Special Weapon Orientation: The Thermonuclear Weapon (29:50) (expanded version of 0800070)	45:15	0800095	1964, Black & White/Color, Sanitized (two films on one video)
Target Nevada	13:30	0800096	1953, Color

FACT SHEET

0800001 - TRINITY 1945
1945 Color Sanitized Silent 12:00

The TRINITY test was part of the secret Manhattan Project - the atomic bomb project charged with designing, developing, testing, and firing a weaponization of the newly discovered phenomenon, fission, the splitting of nuclei of heavy particles to release energy. Nicknamed "Gadget," the 21-kiloton device was exploded on a tower at the Trinity Site in southeastern New Mexico, near Alamogordo as the first proof test of the concept of implosion. This involved taking a critical mass of plutonium and using detonators to set off high explosives to cause the mass of radioactive material to squeeze in upon itself until it reached a super critical mass. This implosion resulted in the splitting of the nuclei in the plutonium atoms, which produced heat, blast, and radiation.

This silent video shows the preliminary processes of raising the "Gadget" to the top of the tower, the final preparation for detonation, and the blast and after effects.

FACT SHEET

0800002 - PROJECT CROSSROADS
1946 Black & White 41:30

Operation Crossroads was a series of two nuclear tests, ABLE and BAKER, the first tests conducted at the Pacific Proving Ground, near the Bikini Atoll in the Marshall Islands. These were the fourth and fifth nuclear detonations in history, following the TRINITY test in July 1945 and the two weapons dropped on Japan to end World War II.

The two bombs used in Crossroads were of the Fat Man configuration, very similar to the implosion-type weapons tested at Trinity and dropped on Nagasaki, Japan. It had a plutonium pit. The only other nuclear weapon available at the time was the uranium gun-type Little Boy, which was dropped on Hiroshima, Japan. The Fat Man was a more complex weapon than Little Boy, thus needing more testing to gain experimental data.

The first test, ABLE, dropped from an aircraft, was detonated on June 30, 1946. On July 24, 1946, the BAKER test was detonated in the Bikini lagoon at a depth of about 90 feet. Two million tons of water were contained in the eruption, and two million yards of sediment were removed from the lagoon floor. Nine ships were sunk. Both tests were weapon-effects tests, and each had a yield of 21 kilotons.

FACT SHEET

0800010 - OPERATION BUSTER/JANGLE
1951 Color Sanitized 1:17:00

Operation Buster/Jangle was the second series of tests conducted at what was then the Nevada Proving Ground, now the Nevada Test Site. This series, conducted October and November 1951, consisted of five tests under Buster and two under Jangle. The four Buster airdrop tests ranged in height of burst from 1,118 to 1,417 feet. The Los Alamos Scientific Laboratory sponsored all of the Buster tests, while the Department of Defense (DoD) sponsored the first Jangle test, and DoD and the Laboratory jointly sponsored the second test.

The objectives of the Buster tests were to evaluate new devices developed by the Laboratory and to obtain data on the basic phenomena associated with these devices. The DoD Weapons Effects Test Unit evaluated the utility of the five devices for military application, while the AEC Weapons Development Test Unit performed diagnostic tests of the nuclear devices.

The two Jangle tests provided the first experimental data on the military effects of surface and underground nuclear detonations, determining response of structures to nuclear bursts, gamma radiation versus time and distance, and residual contamination from surface and underground bursts.

The video mentions the first continental test series, Operation Ranger, conducted from January 27 through February 6, 1951. The five airdrop, weapons-related tests were designed to test trigger devices for weapons to be tested in Operation Greenhouse scheduled for Spring 1951. Because of the low yields of the Ranger tests, the military conducted many tactical nuclear effects tests for the entire operation. Foxholes, textiles, plastics and wood were placed at various intervals to measure the effects of thermal radiation.

The tests comprising the 1951 Operation Buster/Jangle were as follows:

- ABLE, October 22, tower, weapons related, less than 0.1 kiloton (kt)
- BAKER, October 28, airdrop, weapons related, 3.5 kt
- CHARLIE, October 30, airdrop, weapons related, 14 kt
- DOG, November 1, airdrop, weapons related, 21 kt
- EASY, November 5, airdrop, weapons related, 31 kt
- SUGAR, November 19, surface, weapons effects, 1.2 kt
- UNCLE, November 29, crater, weapons effects, 1.2 kt

FACT SHEET

0800011 - OPERATION TUMBLER/SNAPPER
1952 Color Sanitized 47:00

Operation Tumbler-Snapper consisted of eight nuclear tests in two phases. The Tumbler phase was the airdrop nuclear weapons tests that were of primary concern to the Department of Defense. The Snapper phase was a set of experiments conducted by the Atomic Energy Commission and the Los Alamos Scientific Laboratory to help improve effects of nuclear weapons.

Tests ABLE and BAKER produced weapons effects data. CHARLIE test was the first Nevada Proving Ground test to be observed by the news media who viewed the activities from "News Nob," about seven miles away. Also, approximately 2,000 Army personnel, including paratroopers, conducted maneuvers beneath the mushroom cloud. DOG test had Marines participating in the nuclear exercise. They loaded into their trucks and drove toward ground zero until intolerable radiation levels forced them to abort the mission. The EASY test provided scientists the opportunity to record photographically the birth of the blast measured in milliseconds. That is all the time scientists had before entire top of the tower was consumed by the fireball. The FOX test was observed by approximately 1,000 military observers from a distance of 7,000 yards. The soldiers were conducting radiation monitor training. A military display area filled with jeeps, tanks, machine guns, and artillery pieces was established almost under the detonation tower, and all of the hardware was demolished.

The tests comprising the 1952 Operation Tumbler-Snapper were as follows:

- ABLE, April 1, airdrop, weapons effects, 1 kiloton (kt)
- BAKER, April 15, airdrop, weapons effects, 1 kt
- CHARLIE, April 22, airdrop, weapons related, 31 kt
- DOG, May 1, airdrop, weapons related, 19 kt
- EASY, May 7, tower, weapons related, 12 kt
- FOX, May 25, tower, weapons related, 11 kt
- GEORGE, June 1, tower, weapons related, 15 kt
- HOW, June 5, tower, weapons related, 14 kt

FACT SHEET

0800012 - OPERATION IVY
1952 Color Sanitized 1:02:30

Operation Ivy, Parts 1 and 2 - "The island of Elugelab is missing!" President Eisenhower heard this short report on the MIKE test in Operation Ivy from Gordon Dean, Chairman of the Atomic Energy Commission. MIKE was the first full-fledged hydrogen bomb to be tested.

The island where the device was detonated was vaporized. The hole MIKE left was big enough to accommodate several pentagon-size buildings and deep enough to hold the Empire State Building. MIKE's yield was an incredible 10.4 megatons, signaling the expansion of the nuclear arsenal from fission to fusion, the same process that occurs in the Sun.

The detonation of the MIKE device was the climax of an intense debate over what would be the nation's correct response to the startling news in 1949 that the Soviet Union had detonated a nuclear weapon. Many wanted the U.S. to develop the means to produce and field a large number of fission bombs of varying yields which could be used for tactical purposes. Others believed that the country should institute a crash program like the Manhattan Project to develop a "super weapon" based on the idea of forcing together or fusing light atoms with a fissile device to produce enormous amounts of energy.

After a bitter fight among scientific, government and military officials, the President opted for a crash program to demonstrate the "super bomb," now called a hydrogen or thermonuclear weapon. Many designs were evaluated and rejected until the MIKE proposal developed. This concept involved the cooling of hydrogen fuel to a liquid form, near absolute zero, and fusing the hydrogen nuclei into helium using the atomic bomb as a trigger.

The 20-foot, 4 inch-high MIKE device was housed in a 5-foot-diameter cylinder that included a canister of liquid hydrogen fuel. The canister was positioned below the atomic trigger. The MIKE test was detonated on October 31, 1952, and as scientists watched from 40 miles away as the mushroom cloud rose into the stratosphere, the second generation of nuclear weapons was born.

Following MIKE, the KING test, the largest fission device ever tested was detonated. It was an implosion bomb, but with an advanced warhead that enabled it to produce 500 kilotons of power.

The tests comprising the 1952 Operation Ivy were as follows:

- MIKE, October 31, Enewetak (Elugelab Island), surface, weapons related, 10.4 megatons
- KING, November 15, Enewetak (near Runit Island), airdrop, weapons related, 500 kilotons

FACT SHEET

0800013 - OPERATION CASTLE
1954 Color Sanitized 20:20

Operation Castle was a six-test series conducted at the Pacific Proving Ground in the northwestern Marshall Islands from February 28 to May 13, 1954. These tests were the proof tests of large-yield thermonuclear devices.

Castle represented the end of a drive for a workable thermonuclear weapon and the beginning of the refinement of large thermonuclear weapons into smaller and more efficient weapons. After Castle, the U.S. could choose from a range of small tactical weapons to large strategic weapons. From this point, weapons development programs concentrated on producing bombs of specific nuclear weapons effects -- heat, blast, and radiation.

The BRAVO test was the largest in yield of any atmospheric test ever exploded in the U.S. testing program. A scientific miscalculation caused the yield to be about double what was expected. Also, reports indicate that BRAVO was the single worst incident of fallout exposure in all of the U.S. atmospheric testing program. Fallout was scattered over more than 7,000 square miles of ocean and islands, resulting in the contamination and exposure of military, civilian U.S. personnel working on the test, and people of the islands who were earlier moved to a supposedly "safe" island but received large amounts of radiation exposure. Acute radiation effects were observed among some of these people.

The tests comprising the 1954 Operation Castle were as follows:

- BRAVO, February 28, Bikini (sandpit off Nam Island), surface, weapons related, 15 megatons (Mt)
- ROMEO, March 26, Bikini (in BRAVO crater), barge, weapons related, 11 Mt
- KOON, April 6, Bikini (Eneman Island), surface, weapons related, 110 kilotons
- UNION, April 25, Bikini (off Iroij Island), barge, weapons related, 6.9 Mt
- YANKEE, May 4, Bikini (in UNION crater), barge, weapons related, 13.5 Mt
- NECTAR, May 13, Enewetak (in MIKE crater), barge, weapons related, 1.69 Mt

FACT SHEET

0800014 - DAMAGE AND DESTRUCTION - DASIAC
Various dates Black & White/Color Sanitized Silent 17:00

"Damage and Destruction" video is a collage of scenes from the first several nuclear weapons testing operations which graphically show the destructive forces of nuclear weapons and the damages they can inflict. Specific military and civilian effects tests were conducted in these operations to gain experimental data on objects placed various distances from ground zero.

For the military effects tests, jeeps, trucks, aircraft, tanks, artillery pieces, and fuel tanks were placed in the destructive paths of nuclear tests, that produced vast amounts of heat, blast, and radiation. Of a more controversial nature, thousands of military personnel were placed in foxholes and trenches about six miles from the center of the blast. The soldiers were there to help determine if military tactics and techniques at the time were adequate for the new environment created by a nuclear blast. Also, military leaders wanted to see if servicemen could function and withstand the psychological stress while participating in a nuclear weapons exercise.

To gain experimental data for the civilian Civil Defense Agency, houses, rows of trees, wood and plastic products, warehouses, railroad tracks and cars, and bridges were placed in harm's way. The information gained from these tests was used to help develop the nation's strategies for protecting the civilian population, industries, businesses, schools, and hospitals in case of a nuclear attack. At that time, the U.S. and its allies were engaged in a Cold War with the Soviet Union, and an all-out nuclear attack on America was regarded by most as a distinct possibility.

FACT SHEET

0800015 - OPERATION UPSHOT-KNOTHOLE
1953 Color Sanitized 35:45

0800016 - OPERATION UPSHOT-KNOTHOLE, PROJECT 5.2, ATOMIC WEAPONS EFFECTS ON B-50 AIRCRAFT
1953 Black & White Sanitized Silent 19:00

This continental operation conducted at the Nevada Test Site consisted of 11 atmospheric tests. There were three airdrops, seven tower tests, and one airburst. Conducted between March 17 and June 4, 1953, this operation involved the testing of new theories, using both fission and fusion devices. A new and revolutionary method of producing deliverable thermonuclear weapons was successfully tested. Approximately 21,000 Department of Defense military and civilian personnel participated in Upshot-Knothole as part of the Desert Rock V Exercise.

Unfortunately, Upshot-Knothole, particularly the HARRY test, drew a great deal of criticism as resultant fallout levels produced increased offsite radiation exposures.

The tests comprising the 1953 Operation Upshot-Knothole were as follows:

- ANNIE, March 17, tower, weapons related, 16 kilotons (kt)
- NANCY, March 24, tower, weapons related, 24 kt
- RUTH, March 31, tower, weapons related, 200 tons
- DIXIE, April 6, airdrop, weapons related, 11 kt
- RAY, April 11, tower, weapons related, 200 tons
- BADGER, April 18, tower, weapons related, 23 kt
- SIMON, April 25, tower, weapons related, 43 kt
- ENCORE, May 8, airdrop, weapons effects, 27 kt
- HARRY, May 19, tower, weapons related, 32 kt
- GRABLE, May 25, fired from 280 mm gun, airburst, weapons related, 15 kt
- CLIMAX, June 4, airdrop, weapons related, 61 kt

FACT SHEET

0800017 - OPERATION TEAPOT, MILITARY EFFECTS STUDIES
1955 Color Sanitized 30:20

Operation Teapot consisted of 14 nuclear tests detonated from February 18 to May 15, 1955, at the Nevada Test Site. The goal of the series was to test nuclear devices for possible inclusion in the nuclear weapons stockpile; improve military tactics, equipment and training; and study civil defense requirements. With Operation Teapot, the Atomic Energy Commission intensified its technical effort for "clean" or reduced fallout weapons and missile warheads. This effort led to significant advances in both reduced fallout and in miniaturization necessary for warhead delivery on missiles.

Approximately 11,000 scientific and military personnel participated in the entire test series. Approximately 7,700 Army personnel and 1,300 Marines participated in the Desert Rock VI exercises that included the WASP, MOTH, TESLA, TURK, BEE, ESS, APPLE-1, MET, and APPLE-2 tests. The troops observed nuclear blasts to familiarize themselves with weapons effects and battlefield tactics. After observing a blast, they would tour a display area of military equipment exposed to the blast. Both officers and enlisted personnel practiced nuclear age battlefield tactics and combat techniques.

In addition to studying the psychological effects of nuclear weapons on ground soldiers, scientists and military leaders wanted to learn the effects of the detonations on different types of military equipment and structures. One test, APPLE-2, involved a specially constructed "Doom Town," complete with houses, automobiles, paved streets, and mannequins. This village allowed scientists to assess the effects of nuclear detonations on civilian populations, products, and food supplies, and to evaluate Civil Defense emergency preparedness plans.

At that time, U.S. leaders and the public were acutely aware of the Cold War between the United States and the Soviet Union, and there was a general fear of an all-out nuclear attack by the Soviets. Hence, a great emphasis was placed on Civil Defense.

The tests comprising the 1955 Operation Teapot were as follows:

- WASP, February 18, airdrop, weapons effects, 1 kiloton (kt)
- MOTH, February 22, tower, weapons related, 2 kt
- TESLA, March 1, tower, weapons related, 7 kt
- TURK, March 7, tower, weapons related, 43 kt
- HORNET, March 12, tower, weapons related, 4 kt
  (scientists sought to determine if smog attenuated the heat of a nuclear fireball)
- BEE, March 22, tower, weapons related, 8 kt
- ESS, March 23, crater, weapons effects, 1 kt
- APPLE-1, March 29, tower, weapons related, 14 kt
- WASP PRIME, March 29, airdrop, weapons related, 3 kt
- HA (high altitude), April 6, airdrop, weapons effects, 3 kt
- POST, April 9, tower, weapons related, 2 kt
- MET, April 15, tower, weapons effects, 22 kt

(scientists gathered data from 38 experiments placed around ground zero)

- APPLE-2, May 5, tower, weapons related, 29 kt
- ZUCCHINI, May 15, tower, weapons related, 28 kt

FACT SHEET

0800018 - OPERATION WIGWAM, COMMANDER'S REPORT
1955 Color 35:45

The U.S. Navy, envisioning a war in which atomic depth charges would be used, wanted to learn how much of a nuclear blast a well-built submarine could take. The submarine Skate had not withstood the BAKER explosion of Operation Crossroads.

At a location listed as "N 29 degrees, W 126 degrees," about 500 miles southwest of San Diego, a deep underwater, weapons effects nuclear test, WIGWAM, rumbled through the ocean. A model submarine experiment submerged beneath a floating barge vanished after the 30-kiloton burst of power from Operation Wigwam on May 14, 1955.

A combination of high winds and rough seas prevented recovery of much of the test data. Approximately 6,500 personnel took part in this operation.

FACT SHEET

0800019 - OPERATION REDWING
1956 Black & White Sanitized 25:45

0800020 - MILITARY EFFECTS ON OPERATION REDWING
1956 Color Sanitized 31:30

Operation Redwing, a 17-test nuclear weapons series, was conducted at the Pacific Proving Ground between May 4 and July 21, 1956. The Atomic Energy Commission (AEC) tested high-yield thermonuclear devices that could not be tested at the Nevada Test Site.

Over 10,000 military personnel and civilian employees of the AEC and the Department of Defense participated in these nuclear tests. The LACROSSE and CHEROKEE tests were observed from aboard the USS Mt. McKinley by 15 American press, radio and television reporters. These were the first uncleared U.S. civilians in ten years to observe an American nuclear test in the Pacific.

The AEC's progress in miniaturization of warheads had accelerated to where the equivalent of the 90-ton weight of the MIKE device in Operation Ivy could now be dropped from a bomber. Redwing also further advanced the AEC's designs of nuclear weapons that would produce reduced fallout and provided new information for the design of nuclear warheads for missiles.

Complete weapons systems were exposed to blast effects in Redwing, and a fallout computer was successfully used for the first time. The series included the CHEROKEE test, the first U.S. high-altitude test of a thermonuclear weapon.

Tests comprising the 1956 Operation Redwing were as follows:

- LACROSSE, May 4, Enewetak (Runit Island), surface, weapons related, 40 kilotons (kt)
- CHEROKEE, May 20, Bikini (near Nam Island), airdrop, weapons related, 3.8 megatons (Mt) (allowed scientists to make some unique measurements)
- ZUNI, May 27, Bikini (Eneman Island), surface, weapons related, 3.5 Mt
- YUMA, May 27, Enewetak (Aomon Island), tower, weapons related, 190 tons.
- ERIE, May 30, Enewetak (Runit Island), tower, weapons related, 14.9 kt
- SEMINOLE, June 6, Enewetak (Boken Island), surface, 13.7 kt.
- FLATHEAD, June 11, Bikini (off Iroij Island), barge, weapons related, 365 kt.
- BLACKFOOT, June 11, Enewetak (Runit Island), tower, weapons related, 8 kt
- KICKAPOO, June 13, Enewetak (Aomon Island), tower, weapons related, 1.49 kt.
- OSAGE, June 16, Enewetak (near Runit Island), airdrop, weapons related, 1.7 kt
- INCA, June 21, Enewetak (Lujor Island), tower, weapons related, 15.2 kt
- DAKOTA, June 25, Bikini (off Iroij Island), barge, weapons related, 1.1 Mt
- MOHAWK, July 2, Enewetak (Eleleron Island), tower, weapons related, 360 kt
- APACHE, July 8, Enewetak (off Dridrilbwij Island), barge, weapons related, 1.85 Mt
- NAVAJO, July 10, Bikini (off Iroij Island), barge, weapons related, 4.5 Mt
- TEWA, July 20, Bikini (off Nam Island), barge, weapons related, 5 Mt
- HURON, July 21, Enewetak (off Dridrilbwij Island), barge, weapons related, 250 kt

FACT SHEET

0800021 - OPERATION PLUMBBOB
1957 Black & White Sanitized 22:00

0800022 - OPERATION PLUMBBOB, MILITARY EFFECTS STUDIES
1957 Black & White Sanitized 31:45

Operation Plumbbob, conducted between May 28 and October 7, 1957, represented the biggest, longest, and most controversial test series in the history of the Nevada Test Site (NTS). While most Operation Plumbbob tests contributed to the development of warheads for intercontinental and intermediate range missiles, they also tested air defense and antisubmarine warheads with small yields. Operation Plumbbob had the tallest tower tests to date in the U.S. testing program, as well as high-altitude balloon tests. One test involved the largest troop maneuver ever associated with U.S. testing.

Approximately 18,000 members of the U.S. armed forces participated in exercises Desert Rock VII and VIII during Plumbbob. Their leaders were interested in knowing how the average foot-soldier would stand up, physically and psychologically, to the rigors of the tactical nuclear battlefield.

Studies were conducted of radiation contamination and fallout from a simulated accidental detonation of a weapon; and projects concerning earth motion, blast loading and neutron output were carried out.

Nuclear weapons safety experiments were conducted to study the possibility of a nuclear weapon detonation during an accident. On July 26, 1957, a safety experiment, "PASCAL-A" was detonated in an unstemmed hole at NTS, becoming the first underground shaft nuclear test. The knowledge gained here would provide data to prevent any nuclear yields in accidents that actually did occur. Weapons were designed so they could not give a nuclear yield even in the event of a plane crash.

The first underground tunnel test, RAINIER, was conducted on September 19, 1957, containing all radioactive products underground, thus producing no fallout. This test of 1.7 kilotons could be detected around the world by seismologists using ordinary seismic instruments. The RAINIER test became the prototype for larger and more powerful underground tests. The test also subjected toughened weapons to the fireball underground.

The tests comprising the 1957 Operation Plumbbob were as follows:

- BOLTZMANN, May 28, tower, weapons related, 12 kilotons (kt)
- FRANKLIN, June 2, tower, weapons related, 140 tons
- LASSEN, June 5, balloon, weapons related, 0.5 tons
- WILSON, June 18, balloon, weapons related, 10 kt
- PRISCILLA, June 24, balloon, weapons related, 37 kt
- COULOMB-A, July 1, surface, safety experiment, zero yield
- HOOD, July 5, balloon, weapons related, 74 kt
- DIABLO, July 15, tower, weapons related, 17 kt
- JOHN, July 19, rocket, weapons effects, about 2 kt

- KEPLER, July 24, tower, weapons related, 10 kt
- OWENS, July 25, balloon, weapons related, 9.7 kt
- PASCAL-A, July 26, shaft, safety experiment, slight yield
- STOKES, August 7, balloon, weapons related, 19 kt
- SATURN, August 10, tunnel, safety experiment, zero yield
- SHASTA, August 18, tower, weapons related, 17 kt
- DOPPLER, August 23, balloon, weapons related, 11 kt
- PASCAL-B, August 27, shaft, safety experiment, slight yield
- FRANKLIN PRIME, August 30, balloon, weapons related, 4.7 kilotons
- SMOKY, August 31, tower, weapons related, 44 kt
- GALILEO, September 2, tower, weapons related, 11 kt
- WHEELER, September 6, balloon, weapons related, 197 tons
- COULOMB-B, September 6, surface, safety experiment, 300 tons
- LAPLACE, September 8, balloon, weapons related, 1 kt
- FIZEAU, September 14, tower, weapons related, 11 kt
- NEWTON, September 16, balloon, weapons related, 12 kt
- RAINIER, September 19, tunnel, weapons related, 1.7 kt
- WHITNEY, September 23, tower, weapons related, 19 kt
- CHARLESTON, September 28, balloon, weapons related, 12 kt
- MORGAN, October 7, balloon, weapons related, 8 kt

FACT SHEET

0800023 - OPERATION HARDTACK, MILITARY EFFECTS STUDIES, PART ONE - BASIC EFFECTS, STRUCTURES AND MATERIEL (Operation Hardtack I)
1958 Black & White 26:00

0800024 - OPERATION HARDTACK, MILITARY EFFECTS STUDIES, PART TWO - HIGH ALTITUDE STUDIES (Operation Hardtack I)
1958 Black & White Sanitized 24:45

0800025 - OPERATION HARDTACK, MILITARY EFFECTS STUDIES, PART THREE - UNDERWATER TESTS (Operation Hardtack I)
1958 Black & White Sanitized 18:40

Operation Hardtack I consisted of 35 nuclear tests conducted at the Pacific Proving Ground between April 28 and August 18, 1958. These tests included balloon, surface, barge, underwater, and rocket-borne high-altitude tests. The first test, YUCCA, was a nuclear device attached to a helium balloon launched from the USS Boxer near Enewetak Atoll.

Hardtack I consisted of three portions; the first was the development of nuclear weapons. This was a continuation of the type of testing conducted at Enewetak and Bikini during the early and mid-1950s. In these tests, the weapons development laboratories, Los Alamos Scientific Laboratory and the University of California Radiation Laboratory, detonated their experimental devices, while the Department of Defense (DoD) provided support and conducted experiments that did not interfere with Atomic Energy Commission activities.

The second portion, sponsored by DoD, consisted of the underwater tests WAHOO and UMBRELLA. WAHOO was detonated in the open ocean and UMBRELLA in the lagoon at Enewetak. The purpose of these tests was to improve the understanding of the effects of underwater explosions on Navy ships and material. These were continuations of earlier underwater testing that included BAKER in Crossroads at Bikini in 1946 and WIGWAM off the U.S. West Coast in 1955.

The DoD also sponsored the third portion, addressing the military problems of air-borne nuclear weapon defense. Three high-altitude tests featured rocket-borne TEAK and ORANGE at Johnston Island and balloon-hoisted YUCCA between Enewetak and Bikini.

Two major aspects of Hardtack I's experimental program were the development of the weapons themselves and the measurement of the explosive and radiation effects. Also, since the development of a nuclear armed fleet ballistic missile was on a fast track, a portion of Hardtack I was devoted to testing the warhead for the Polaris missile.

The tests comprising the 1958 Operation Hardtack I were as follows:

- YUCCA, April 28, Pacific (between Enewetak and Bikini), balloon, weapons effects, 1.7 kilotons (kt)
- CACTUS, May 5, Enewetak, surface, weapons related, 18 kt
- FIR, May 11, near Bikini, barge, weapons related, 1.36 megatons (Mt)
- BUTTERNUT, May 11, near Enewetak, barge, weapons related, 81 kt
- KOA, May 12, Enewetak, surface, weapons related, 1.37 Mt
- WAHOO, May 16, near Enewetak, underwater, weapons effects, 9 kt
- HOLLY, May 20, near Enewetak, barge, weapons related, 5.9 kt
- NUTMEG, May 21, near Bikini, barge, weapons related, 25.1 kt
- YELLOWWOOD, May 26, near Enewetak, barge, weapons related, 330 kt
- MAGNOLIA, May 26, near Enewetak, barge, weapons related, 57 kt
- TOBACCO, May 30, near Enewetak, barge, weapons related, 11.6 kt
- SYCAMORE, May 31, near Bikini, barge, weapons related, 92 kt
- ROSE, June 2, near Enewetak, barge, weapons related, 15 kt
- UMBRELLA, June 8, near Enewetak, underwater, weapons effects, 8 kt
- MAPLE, June 10, near Bikini, barge, weapons related, 213 kt
- ASPEN, June 14, near Bikini, barge, weapons related, 319 kt
- WALNUT, June 14, near Enewetak, barge, weapons related, 1.45 Mt
- LINDEN, June 18, near Enewetak, barge, weapons related, 11 kt
- REDWOOD, June 27, near Bikini, barge, weapons related, 412 kt
- ELDER, June 27, near Enewetak, barge, weapons related, 880 kt
- OAK, June 28, near Enewetak, barge, weapons related, 8.9 Mt
- HICKORY, June 29, near Bikini, barge, weapons related, 14 kt
- SEQUOIA, July 1, near Enewetak, barge, weapons related, 5.2 kt
- CEDAR, July 2, near Bikini, barge, weapons related, 220 kt
- DOGWOOD, July 5, near Enewetak, barge, weapons related, 397 kt
- POPLAR, July 12, near Bikini, barge, weapons related, 9.3 Mt
- SCAEVOLA, July 14, near Enewetak, barge, safety experiment, zero yield
- PISONIA, July 17, near Enewetak, barge, weapons related, 255 kt
- JUNIPER, July 22, near Bikini, barge, weapons related, 65 kt
- OLIVE, July 22, near Enewetak, barge, weapons related, 202 kt
- PINE, July 26, near Enewetak, barge, weapons related, 2 Mt
- TEAK, August 1, off Johnston Island area, rocket, weapons effects, 3.8 Mt
- QUINCE, August 6, Enewetak, surface, weapons related, zero yield
- ORANGE, August 12, off Johnston Island area, rocket, weapons effects, 3.8 Mt
- FIG, August 18, Enewetak, surface, weapons related, 20 tons

FACT SHEET

0800026 - OPERATION HARDTACK, MILITARY EFFECTS STUDIES, PART FOUR - SUB-KILOTON EFFECTS (Operation Hardtack II)
1958 Black & White Sanitized Silent 23:50

Operation Hardtack II was a 37-test continental series conducted from September 12 to October 30, 1958, at the Nevada Test Site. Addressing the concerns about fallout from atmospheric tests, more than a third of the Hardtack II tests were conducted underground and had yields that did not exceed 22 kilotons.

When the Hardtack series concluded, test ban negotiations between the United States and the Soviet Union were underway in Geneva. These negotiations resulted in a testing moratorium from late 1958 until September 1961.

Hardtack II personnel tested nuclear devices for possible inclusion in the nuclear stockpile; evaluated safety features of nuclear devices; and evaluated containment techniques for underground detonations. The safety experiments were designed to determine the stability of nuclear devices during transportation and storage.

The tests comprising the 1958 Operation Hardtack II were as follows:

- OTERO, September 12, shaft, safety experiment, 38 tons
- BERNALILLO, September 17, shaft, safety experiment, 15 tons
- EDDY, September 19, balloon, weapons related, 83 tons
- LUNA, September 21, shaft, safety experiment, 1.5 tons
- MERCURY, September 23, tunnel, safety experiment, slight yield
- VALENCIA, September 26, shaft, safety experiment, 2 tons
- MARS, September 28, tunnel, safety experiment, 13 tons
- MORA, September 29, balloon, weapons related, 2 kilotons (kt)
- COLFAX, October 5, shaft, safety experiment, 5.5 tons
- HIDALGO, October 5, balloon, safety experiment, 77 tons
- TAMALPAIS, October 8, tunnel, weapons related, 72 tons
- QUAY, October 10, tower, weapons related, 79 tons
- LEA, October 13, balloon, weapons related, 1.4 kt
- NEPTUNE, October 14, tunnel, safety experiment, 115 tons
- HAMILTON, October 15, tower, weapons related, 1.2 tons
- LOGAN, October 16, tunnel, weapons related, 5 kt
- DONA ANA, October 16, balloon, weapons related, 37 tons
- VESTA, October 17, surface, safety experiment, 24 tons
- RIO ARRIBA, October 18, tower, weapons related, 90 tons
- SAN JUAN, October 20, shaft, safety experiment, zero yield
- SOCORRO, October 22, balloon, weapons related, 6 kt
- WRANGELL, October 22, balloon , weapons related, 115 tons
- RUSHMORE, October 22, balloon, weapons related, 188 tons
- OBERON, October 22, tower, safety experiment, zero yield

- CATRON, October 24, tower, safety experiment, 21 tons
- JUNO, October 24, surface, safety experiment, 1.7 tons
- CERES, October 26, tower, safety experiment, 0.7 tons
- SANFORD, October 26, balloon, weapons related, 4.9 kt
- DE BACA, October 26, balloon, weapons related, 2.2 kt
- CHAVEZ, October 27, tower, safety experiment, 0.6 tons
- EVANS, October 29, tunnel, weapons related, 55 tons
- HUMBOLDT, October 29, tower, weapons related, 7.8 tons
- MAZAMA, October 29, tower, weapons related, zero yield
- SANTA FE, October 30, balloon, weapons related, 1.3 kt
- BLANCA, October 30, tunnel, weapons related, 22 kt
- GANYMEDE, October 30, surface, safety experiment, zero yield
- TITANIA, October 30, tower, safety experiment, 0.2 tons

FACT SHEET

0800027 - REPORT OF CHIEF, AFSWP TO ARPA - OPERATION ARGUS
1958 Color Sanitized 44:40

Operation Argus was a series of three high-altitude nuclear tests conducted by the Atomic Energy Commission in the South Atlantic Ocean in August and September 1958. The results of Operation Argus proved the validity of the Christofilos theory.

This theory proposed that a radiation belt is created in the upper regions of the Earth's atmosphere by high-altitude detonations. The radiation belt affects radio and radar transmissions, damages or destroys the arming and fuzing mechanisms of Intercontinental Ballistic Missile warheads, and endangers crews of orbiting space vehicles that might enter the belt.

The tests, conducted in complete secrecy, were not announced until the following year. Low-yield devices were carried to an altitude of approximately 300 miles by rockets before being detonated.

More than 4,500 military personnel and civilian scientists participated in the test operation.

The tests comprising 1958 Operation Argus were as follows:

- ARGUS I, August 27, South 38.5 degrees, West 11.5 degrees, South Atlantic, rocket, weapons effects, 1-2 kilotons (kt)
- ARGUS II, August 30, South 49.5 degrees, West 8.2 degrees, South Atlantic, rocket, weapons effects, 1-2 kt
- ARGUS III, September 6, South 48.5 degrees, West 9.7 degrees, South Atlantic, rocket, weapons effects, 1-2 kt

FACT SHEET

0800028 - VELA UNIFORM PARTICIPATION IN OPERATION NOUGAT AND GNOME
1961 - 1962 Black & White 21:30

The majority of Operation Nougat's nuclear tests were shaft or tunnel tests conducted at the Nevada Test Site (NTS) for weapons development purposes. However, this series also included the beginning of the Plowshare Program nuclear tests - a program to determine how nuclear energy could be used for civilian or peaceful purposes, and for the Vela Uniform Program nuclear tests - a program for detecting nuclear explosions underground, using ground-based instruments for detecting explosions in outer space, and establishing satellite-based instruments for the detection of explosions in outer space.

Specifically, these scientists and engineers working on the GNOME test evaluated new seismic detectors which they hoped would lead to an underground test detection system. Earlier, different seismic measurement programs were conducted at the NTS by the Atomic Energy Commission and the U.S. Air Force before becoming part of the Vela Uniform Program.

The GNOME test was fired 1200 feet underground in a salt bed formation near Carlsbad, NM, on December 10, 1961. There were 48 subsurface experiments involved, making GNOME the most heavily instrumented seismic test in history. This testing provided valuable data for both the Plowshare and Vela Uniform Programs.

Although GNOME was a Plowshare test, the Vela Uniform objective was to determine how the signals and effects of a 3-kiloton device detonated underground in salt beds differed from the outputs of detonations of different yields in other geologic formations. Scientists also wanted to compare the seismic signals from underground tests with that of earthquakes.

The Vela Uniform Program included seven tests conducted at several locations in the continental U.S. and Alaska between October 1963 and July 1971. These tests were SHOAL, SALMON, LONG SHOT, STERLING, SCROLL, DIAMOND DUST, and DIAMOND MINE.

Operation Nougat, conducted from September 15, 1961, to June 30, 1962, consisted of 45 underground tests, and all but GNOME were conducted at the NTS. The video discusses only some of the Nougat tests, however the complete listing is provided for additional information.

The tests comprising the 1961-1962 Operation Nougat were as follows:

- ANTLER, September 15, 1961, tunnel, weapons related, 2.6 kilotons (kt)
- SHREW, September 16, shaft, weapons related, low yield (low yield = less than 20 kt)
- BOOMER, October 1, shaft, weapons related, low yield
- CHENA, October 10, tunnel, weapons related, low yield
- MINK, October 29, shaft, weapons related, low yield
- FISHER December 3, shaft, weapons related, 13.4 kt
- GNOME, December 10, shaft, Plowshare, 3 kt
- MAD, December 13, shaft, weapons related, 500 tons

- RINGTAIL, December 17, shaft, weapons related, low yield
- FEATHER, December 22, tunnel, weapons related, 150 tons
- STOAT, January 9, 1962, shaft, weapons related, 5.1 kt
- AGOUTI, January 18, shaft, weapons related, 6.4 kt
- DORMOUSE, January 30, shaft, weapons related, low yield
- STILLWATER, February 8, shaft, weapons related, 3.07 kt
- ARMADILLO, February 9, shaft, weapons related, 7.1 kt
- HARD HAT, February 15, shaft, weapons effects, 5.7 kt
- CHINCHILLA, February 19, shaft, weapons related, 1.9 kt
- CODSAW, February 19, shaft, weapons related, low yield
- CIMARRON, February 23, shaft, weapons related, 11.9 kt
- PLATYPUS, February 24, shaft, weapons related, low yield
- PAMPAS, March 1, shaft, joint US-UK, 9.5 kt
- DANNY BOY, March 5, crater, weapons effects, 430 tons
- ERMINE, March 6, shaft, safety experiment, low yield
- BRAZOS, March 8, shaft, weapons related, 8.4 kt
- HOGNOSE, March 15, shaft, weapons related, low yield
- HOOSIC, March 28, shaft, weapons related, 3.4 kt
- CHINCHILLA II, March 31, shaft, weapons related, low yield
- DORMOUSE PRIME, April 5, shaft, weapons related, 10.6 kt
- PASSAIC, April 6, shaft, weapons related, low yield
- HUDSON, April 12, shaft, weapons related, low yield
- PLATTE, April 14, tunnel, weapons related, 1.85 kt
- DEAD, April 21, shaft, weapons related, low yield
- BLACK, April 27, shaft, weapons related, low yield
- PACA, May 7, shaft, weapons related, low yield
- ARIKAREE, May 10, shaft, weapons related, low yield
- AARDVARK, May 12, shaft, weapons related, 40 kt
- EEL, May 19, shaft, weapons related, 4.5 kt
- WHITE, May 25, shaft, weapons related, low yield
- RACCOON, June 1, shaft, weapons related, low yield
- PACKRAT, June 6, shaft, weapons related, low yield
- DES MOINES, June 13, tunnel, weapons related, 2.9 kt
- DAMAN I, June 21, shaft, weapons related, low yield
- HAYMAKER, June 27, shaft, weapons related, 67 kt
- MARSHMALLOW, June 28, tunnel, weapons effects, low yield
- SACRAMENTO, June 30, shaft, weapons related, low yield

FACT SHEET

0800029 - DOMINIC FIREBALLS, PACIFIC TESTING 1962, CHRISTMAS ISLAND AREA

1962 Color Silent 43:40 Long distance aerial views only.

Sixteen of the Operation Dominic spectacular airdrop nuclear bursts that were detonated near Christmas Island in the Pacific Ocean are shown in this video. These weapons-related devices were dropped from B-52's staged out of Hawaii from April 27 to July 11, 1962. After the Soviet Union resumed atmospheric testing in violation of a treaty with the United States, President Kennedy authorized the U.S. to resume atmospheric testing on March 2, 1962.

The video, comprised of small rolls of film that had never been released, shows the fireballs of 16 nuclear devices being fired off the southern end of Christmas Island, which had been used earlier by the British for nuclear testing. The United States was striving to increase the yield-to-weight ratio of weapons so they could be delivered by existing aircraft.

The tests shown from the 1962 Operation Dominic were as follows:

- AZTEC, April 27, 410 kilotons (kt)
- QUESTA, May 4, 670 kt
- YUKON, May 8, 100 kt
- MESILLA, May 9, 100 kt
- ENCINO, May 12, 500 kt
- SWANEE, May 14, 97 kt
- YESO, June 10, 3 megatons (Mt)
- HARLEM, June 12, 1.2 Mt
- RINCONADA, June 15, 800 kt
- DULCE, June 17, 52 kt
- PETIT, June 19, 2.2 kt
- OTOWI, June 22, 81.5 kt
- BIGHORN, June 27, 7.65 Mt
- BLUE STONE, June 30, 1.27 Mt
- SUNSET, July 10, 1 Mt
- PAMLICO, July 11, 3.88 Mt

FACT SHEET

0800030 - PROJECT SEDAN
1962 Color 7:00

Project Sedan, a Plowshare Program test, that promoted the application of nuclear explosives to develop peaceful uses for atomic energy, was conducted at the Nevada Test Site on July 6, 1962. This cratering explosion, with a yield of 104 kilotons, displaced 12 million tons of earth and formed a 1,280-foot-diameter by 320-foot-deep crater in the desert floor, releasing seismic energy equivalent to 4.75 on the Richter Scale. The purpose of the Sedan explosion was to determine if nuclear devices could be used as cratering or earth moving mechanisms.

FACT SHEET

0800031 - SADM DELIVERY BY PARACHUTIST/SWIMMER (SPECIAL ATOMIC DEMOLITION MUNITION)
No date Black & White 9:45

The Special Atomic Demolition Munition (SADM) was a Navy and Marines project that was demonstrated as feasible in the mid-to-late 1960s, but was never used. The project, which involved a small nuclear weapon, was designed to allow one individual to parachute from any type of aircraft carrying the weapon package that would be placed in a harbor or other strategic location that could be accessed from the sea. Another parachutist without a weapon package would follow the first parachutist to provide support as needed.

The two-man team would place the weapon package in an acceptable location, set the timer, and swim out into the ocean where they would be retrieved by a submarine or other high-speed water craft. The parachute jumps and the retrieval procedures were practiced extensively.

The video shows a man in a wet suit donning his parachute, the weapon package, and a reserve parachute. After he jumps from the aircraft and is nearing the water, he drops the weapon package down on a 17-foot line to lessen the impact of his landing. He then floats the weapon package to the desired location.

FACT SHEET

0800032 - THE U.S. ARMY PRESENTS MF20 9811, IVY FLATS FILM REPORT
1962 Black & White 17:35

Ivy Flats, a 1962 tactical military exercise at the Nevada Test Site, involved the detonation of live nuclear rounds fired from the Davy Crockett artillery piece. The Davy Crockett was developed to give U.S. Army units an effective nuclear capability against potentially larger units of Soviet armored forces.

The Davy Crockett, a recoilless launcher, was the third artillery piece deployed, those earlier being a 155 mm piece designed to fire a nuclear round and a 288 mm mobile piece, commonly called an "atomic cannon." Nuclear-capable ground artillery pieces were gradually replaced by increasingly accurate, nuclear carrying missiles and aircraft.

The Ivy Flats video shows an Army exercise that was observed by visiting dignitaries, including U.S. Attorney General Robert Kennedy and General Maxwell Taylor, a Presidential military adviser. Participating in the exercise were members of the 4th Mechanized Infantry Division from Ft. Lewis, Washington.

Ivy Flats was a "battle" between a large simulated enemy armored force and a smaller U.S. force consisting of conventional artillery pieces, which couldn't stop the pending onslaught. U.S. Army squads then arrive in armored personnel carriers and set up the heavy (155 mm) and light (120 mm) versions of recoilless launchers. The Davy Crockett fired a nuclear round that decimated the mock opposing force.

The Davy Crockett was deployed from 1961 to 1971. The heavy version was transported by either an armored personnel carrier or a large truck. The light version was generally carried on and fired from an Army jeep, but could be carried for a short distance and fired by a 3-man team.

The W-54 nuclear warhead in a projectile was launched by the Davy Crockett and had a subkiloton yield. The projectile was 30 inches long, 11 inches in diameter, and weighed 76 pounds. The 155 mm launcher had a maximum range of 13,000 feet, and the 120 mm could reach a distance of 6,561 feet.

FACT SHEET

0800033 - OPERATION DOORSTEP (10:00) AND OPERATION CUE (16:00)
1953 and 1955 Color 26:00 total

This video shows Federal Civil Defense Administration film footage of the March 17, 1953, 16-kiloton ANNIE test and the May 5, 1955, 29-kiloton APPLE-2 test. Both tests were conducted at the Nevada Test Site; ANNIE being part of Operation Upshot-Knothole, and APPLE-2 being part of Operation Teapot. The titles, Operation Doorstep and Cue, were Civil Defense Program names.

In the Operation Doorstep portion, footage shows blast and thermal effects on mannequins, automobiles, and wooden frame houses. Testing of simple basement shelters and complex underground, reinforced-concrete shelters is shown. Soldiers involved in the Desert Rock V exercise are seen in their foxholes with Civil Defense leaders. Observers on "News Nob" are shown illuminated by the explosion. Stop-motion views are shown of a house blown apart by the blast wave.

The Operation Cue portion is narrated by reporter Joan Collin, who shares the sights she witnesses first-hand while observing the APPLE-2 test. From the planning phase through an actual visit to the site after the detonation, she shows viewers the potential results of the explosion and effective ways of sheltering people from the effects of a nuclear blast.

Electrical power experiments included setting up poles, lines, transformers, and a complete substation and observing the thermal and blast effects. Effects are studied on two radio towers and transmitters, a liquefied petroleum and natural gas facility with propane storage tanks, five types of completely furnished houses, rows of mannequins with standard clothing, and canned and packaged food. Spectacular footage shows the awesome destructive power of a nuclear explosion.

FACT SHEET

0800034 - PROJECT GNOME
1961 Color 29:13

Project GNOME was part of Operation Nougat, a 45-test series conducted at the Nevada Test Site from September 15, 1961 through June 30, 1962, except for the GNOME test. The 3-kiloton GNOME test was detonated 1200 feet underground in a salt bed formation on December 10, 1961, near Carlsbad, New Mexico. There were 48 subsurface experiments involved, making GNOME the most heavily instrumented seismic nuclear test in history. This testing provided valuable data for both the Plowshare and Vela Uniform Programs.

GNOME was the first nuclear test in the Plowshare Program. The Plowshare Program objectives were to determine how energy produced from nuclear explosions could be used for peaceful or civilian purposes. The Vela Uniform Program studied seismic detection, identification, and location of nuclear explosions. Studies were conducted underground with ground-based instruments for detecting explosions in outer space and with established satellite-based instruments for detecting explosions in outer space.

Although GNOME was a Plowshare test, the Vela Uniform objective was to determine how the signals and effects of a 3-kiloton device detonated underground in salt beds differed from the outputs of detonations of different yields in other geologic formations such as tuff and granite. Scientists also wanted to compare the seismic signals from underground tests with that of earthquakes.

This video contains footage different from that shown in video number 0800028, and includes an introduction by Dr. Edward Teller, one of the few times he was captured on film. Several long-range and close-up views of surface effects from the detonation are shown as well as people reentering the detonation cavity approximately 6 months after the test when the underground cavity was opened to both official observers and members of the press. No other Operation Nougat footage is shown in this video.

FACT SHEET

0800035 - NUCLEAR EXCAVATION, EXCAVATING WITH NUCLEAR EXPLOSIVES (8:45) AND PLOWSHARE (28:22)
1968 and 1973 Black & White and Color 37:07 total

This video discusses the Plowshare Program - a program that promoted using the energy produced from nuclear explosions for peaceful uses and applications. The Atomic Energy Commission established the program in 1958, and Lawrence Radiation Laboratory (now Lawrence Livermore National Laboratory) developed and implemented the projects and tests. Under this program 27 nuclear tests comprising 35 individual detonations were conducted.

The video describes the objectives of the Plowshare Program tests that include: stimulation of natural gas production; creation of underground zones of fractured oil shale; earth breaking and moving projects; neutron irradiation of targets to create new elements; copper and other metal extraction from the earth; breaking and crushing mineral deposits; and rapid excavation for large-scale construction projects such as harbors, canals, or mountain passes.

Comparisons between conventional and nuclear explosives in terms of cost, volume, and practical uses are discussed. Nuclear explosions are shown in schematic animation format in addition to actual film footage. Footage of people entering the underground GNOME cavity is shown, as well as close-ups of the five simultaneous, BUGGY row detonations. Conventional explosive comparisons are also shown, including one of almost 1400 tons of chemical explosives that decapitated the submerged pinnacles of Ripple Rock. The Rock had imperiled ships using the Inland Passage north of Vancouver, British Columbia.

The Plowshare cratering tests shown in the "Nuclear Excavation" portion of the video include:

- SEDAN, NTS, July 6, 1962, 104 kilotons (kt)
- SULKY, NTS, December 18, 1964, 92 tons
- CABRIOLET, NTS, January 26, 1968, 2.3 kt
- BUGGY-A, BUGGY–B, BUGGY–C, BUGGY–D, and BUGGY-E, NTS, March 12, 1968, five simultaneous detonations, separate holes, 1.08 kt (each)
- SCHOONER, NTS, December 8, 1968, 30 kt

FACT SHEET

0800036 - PROJECT RULISON
1969 Color 7:28

Project RULISON was a gas stimulation Plowshare Program nuclear test. Plowshare was a program that promoted using the energy produced from nuclear explosions for peaceful uses and applications. The 40-kiloton RULISON test was detonated 6 miles west of Grand Valley, Colorado, on September 10, 1969. Its purpose was to release natural gas reserves locked tightly in the sandstone and shale Mesa Verde formation. The estimated cost for the RULISON project was 6.5 million dollars, funded primarily by the Austral Oil Company of Houston, Texas.

The video shows the explosion, underground rock fracturing, gas release, and underground well operations in schematic animation. Footage of the site, including the actual nuclear explosive package, is shown before the test explosion, but not during or after the test.

FACT SHEET

0800037 - THE WARM COAT
1968 Black & White 14:00

Follow the adventures of "Harvey," the wily otter, as he and other sea otters are relocated from Amchitka Island, Alaska, to other Alaskan sites with no otter colonies. This video shows the planning and execution of "Project Sea Otter Transplant." No nuclear explosions are shown in this video.

Several state and federal entities combined efforts to help repopulate the otters at new sites in Alaska. The state of Alaska, along with the Atomic Energy Commission (AEC) and the U.S. Department of the Interior, worked on this project. In summer 1968, an Alaska Department of Fish and Game biologist supervised Aleut fisherman who captured about 50 otters each week; took them to a shore installation; and safely fed and cleaned the otters until transported to their new homes. Seven sea-otter transplants were performed using AEC's C-130 cargo aircraft. In all, 359 sea otters were transported to new homes off the Alaskan coast.

FACT SHEET

0800038 - THE AMCHITKA PROGRAM
1970 Color 24:11

This video discusses the MILROW nuclear test, a seismic calibration test to determine whether larger nuclear tests could be conducted on Amchitka Island, Alaska. The approximately one megaton MILROW device, buried 4000 feet underground, was detonated on October 2, 1969.

The video shows scenic views of the Amchitka Island and discusses its participation in World War II activities and in a previous nuclear test - LONG SHOT. Footage also shows preparations and activities before, during, and after the MILROW test, including environmental protection studies and activities conducted by Atomic Energy Commission, Department of the Interior, and State of Alaska personnel. Surface effects during and after the test detonation are shown, including the surface subsidence crater.

The three underground nuclear tests conducted on Amchitka Island, Alaska, were as follows:

- LONG SHOT, October 29, 1965, shaft, Vela Uniform Project, approximately 80 kilotons
- MILROW, October 2, 1969, shaft, weapons related, approximately 1 megaton (Mt)
- CANNIKIN, November 6, 1971, shaft, weapons related, less than 5 Mt

FACT SHEET

0800039 - PROJECT LONG SHOT
1965 Black & White 13:15

This video discusses Project LONG SHOT, a Department of Defense, Defense Atomic Support Agency- sponsored test, with participation of the Atomic Energy Commission, the Department of the Interior, the U.S. Coast and Geodetic Survey, and numerous university scientists and engineers.

The approximately 80-kiloton LONG SHOT device, buried 2300 feet underground, was detonated on October 29, 1965. As part of the Vela Uniform Program, LONG SHOT's primary purpose was to find ways to detect nuclear explosions underground using ground-based seismic instruments.

This video discusses geological studies conducted on the island prior to the detonation; test preparations including construction milestones; an overview of experiments conducted during the project; and environmental and safety activities before and after the test. The canister holding the nuclear explosive is shown being lowered into the shaft. Surface effects during and after the detonation are also shown.

The three underground nuclear tests conducted on Amchitka Island, Alaska, were as follows:

- LONG SHOT, October 29, 1965, shaft, Vela Uniform Project, approximately 80 kilotons
- MILROW, October 2, 1969, shaft, weapons related, approximately 1 megaton (Mt)
- CANNIKIN, November 6, 1971, shaft, weapons related, less than 5 Mt

FACT SHEET

0800040 - THE MILROW EVENT
1969 Color 27:30

This video discusses the MILROW detonation, as presented by the Los Alamos Scientific Laboratory. The narrator sums up the reason for the test when he states, "The purpose of the MILROW event was to test an island, not a weapon." The device, detonated on October 2, 1969, on Amchitka Island, Alaska, was buried 4000 feet underground and had a yield of approximately one megaton. MILROW demonstrated that a larger nuclear test could be safely conducted on the island.

As seen in video number 0800038, scenic views of the island and additional World War II activities on Amchitka Island are shown. Additional footage shows environmental and safety activities before and after the test. The nuclear explosive package is shown being lowered into the shaft. An extensive overview of the unique shaft stemming and backfill operations is also shown along with a summary of diagnostic tests and their equipment. Surface effects during and after the detonation are shown, including subsidence crater results that differed from standard subsidences after nuclear explosions at the Nevada Test Site.

FACT SHEET

0800041 - PROJECT CANNIKIN REVIEW
1971 Color 13:00

This video reviews Project CANNIKIN, a nuclear test conducted on Amchitka Island, Alaska, at 11:00 a.m., Bering Standard Time, on November 6, 1971. CANNIKIN, a slightly less-than-five-megaton device, was the largest underground nuclear test conducted in the United States. CANNIKIN was conducted to proof test a warhead for the Spartan missile, a Safeguard Ballistic Missile Defense Program.

The video shows the nuclear device and instrumentation canister being lowered into the shaft, detonation sequences, and test effects. A long-range view of water turbulence after the detonation is shown, but no tsunami or large ocean wave was observed or recorded. Numerous ground shock waves are shown at normal speed and as seen by high-speed, slow-motion cameras located at various sites on the island. Surface effects at ground zero and other island locations were filmed one day after the test. Approximately 38 hours after the test, a subsidence crater, approximately 1.5 miles in diameter and 55 feet deep, began to form. Many scenes in the video have no sound intentionally; no material was deleted.

The three underground nuclear tests conducted on Amchitka Island, Alaska, were as follows:

- LONG SHOT, October 29, 1965, shaft, Vela Uniform Project, approximately 80 kilotons
- MILROW, October 2, 1969, shaft, weapons related, approximately 1 megaton (Mt)
- CANNIKIN, November 6, 1971, shaft, weapons related, less than 5 Mt

FACT SHEET

0800042 - ATOMIC BLASTS- OPERATIONS GREENHOUSE THROUGH UPSHOT-KNOTHOLE
1951 - 1953 Color Silent 29:22

This video shows a compilation of early atomic blasts taken from individual short films of the tests. These formerly classified films have never before been seen by the public. The video shows close up footage of boiling, tumbling, rolling fireballs of great destructive force as the nuclear power from the splitting of nuclei of atoms is unleashed. The blinding fury released by these early atomic devices demonstrates the show of power that was used by the United States to end World War II and establish a power base for the Cold War to follow.

The term "atomic" designated them as fission devices, as opposed to the later much more powerful thermonuclear devices, which used a fission test to start a fusion process. Eventually, the word "atomic" was replaced by the term "nuclear."

By the time Operation Greenhouse was conducted, the Atomic Energy Commission began testing devices of higher yields than those detonated in the TRINITY test or in Operations Crossroads, Sandstone or Ranger. Laboratory scientists were using the data gained from the early operations to build more sophisticated devices that delivered more power.

The three "atomic" tests in four-test Greenhouse Operation (DOG, EASY, and ITEM) had respective yields of 81, 47 and 45.5 kilotons (kt) compared with the 21 kt yield of the earlier devices of the Fat Man (i.e., TRINITY) design. These tests, fired from 300-foot towers on Enewetak Atoll in the Pacific Ocean between April 7 and May 24, 1951, provided weapons design/development data.

In Operation Buster/Jangle, the five tests conducted under Operation Buster series, ABLE, BAKER, CHARLIE, DOG, and EASY, evaluated new devices developed by the Los Alamos Scientific Laboratory and provided data on the basic phenomena associated with these devices.

The two Jangle Operation tests, SUGAR and UNCLE, provided the first experimental data on the military effects of surface and underground nuclear detonations, including the response of structures to nuclear bursts, the effects of gamma radiation versus time and distance, and the level of residual contamination from surface and underground bursts. The Buster/Jangle Operation was conducted at the Nevada Test Site (NTS) between October 22 and November 29, 1951.

The eight-test Operation Tumbler/Snapper was conducted at the NTS between April 1 and June 5, 1952. The first two, ABLE and BAKER, were 1-kt air drop weapons-effects tests, while the second pair of air drop devices, CHARLIE and DOG, had yields of 31 and 19 kt, respectively, and were weapons-related tests. The last four, EASY, FOX, GEORGE, and HOW had yields of 12, 11, 15 and 14 kt, respectively, and were weapons-related tests. The U.S. military conducted exercises in conjunction with the CHARLIE, DOG, and FOX tests.

Only one "atomic" test, KING, was fired in Operation Ivy. At 500 kt, it was the largest fission device ever tested. Regrettably, this series of short films did not have a fireball view of the KING detonation, but only footage showing its blast effects. KING was a weapons-related airdrop test of an advanced warhead design made possible by earlier tests and research efforts. The other test in Operation Ivy was MIKE, the first full-fledged thermonuclear device.

There were 11 tests fired in Operation Upshot/Knothole, 3 airdrops, 7 tower tests and 1 fired from an atomic cannon. Approximately 21,000 military personnel participated in Upshot/Knothole as part of the Desert Rock V Exercise. The tests, all weapons related, were conducted between March 17 and June 4, 1953. The Upshot/Knothole tests and their yields were as follows: ANNIE, 16 kt; NANCY, 24 kt; RUTH, 200 tons; DIXIE, 11 kt; RAY, 200 tons; BADGER, 23 kt; SIMON, 43 kt; ENCORE, 27 kt; HARRY, 32 kt; GRABLE, fired from cannon, 15 kt; and CLIMAX, 61 kt.

FACT SHEET

0800043 - 1962 PACIFIC NUCLEAR TESTS
1962 Color Sanitized 21:15

"Polaris underway with a nuclear warhead," is the narrator's description of the first of a two-part video. Joint Task Force Eight, consisting of representatives primarily from the Department of Defense and Atomic Energy Commission, was responsible for the upcoming test.

The video shows the preparations, installation of safety monitoring and diagnostic equipment, placement of test and observation vessels, and the actual nuclear test of a Fleet Ballistic Missile. Participating in the test were personnel aboard the aircraft carrier Yorktown, the destroyer Norton Sound, and the submarine Carbonero.

The May 6, 1962, date loomed for the nuclear detonation FRIGATE BIRD, part of the Operation Dominic/Nougat test series. The test was conducted approximately 525 miles from Christmas Island, the nearest land mass, at coordinates for ground zero of North 4 degrees 50 minutes, West 149 degrees 25 minutes. The submerged submarine Ethan Allen, carrying 16 Polaris missiles, launched the missile, and the warhead detonated on target, giving the cameras and viewers a spectacular scene. The narrator closes: "Polaris on target. . .with design yield and full service." The yield has not been announced, but it was enough to shake the crew of the submarine Carbonero for several seconds.

The second part of the video shows an antisubmarine rocket (ASROC) underwater nuclear weapons-effects test, described as another proof test of a Navy nuclear weapon system. It was configured as a nuclear depth charge. The video shows the preparations, placement of diagnostic devices, safety precautions, and other activities performed in readiness for the test. The SWORDFISH test was conducted approximately 370 miles southwest of San Diego at North 31 degrees 14 minutes, West 124 degrees 13 minutes.

The ASROC was launched from the destroyer Agerholmn on May 11, 1962. Its target was a raft circled by diagnostic devices. The ASROC is shown flying for a short time before entering the water and detonating at a predetermined depth. The explosive force created a one-mile radius radioactive base surge, and it engulfed a target ship. Once the initial base surge subsided, a second plume was created from the detonation bubble, plummeting tons of water. The cameras captured sensational footage of the blast effects. The submarine Razorback, submerged at periscope level 2.5 miles from ground zero, is shown being tossed around. The full sequence of the nuclear depth bomb deployment is shown.

FACT SHEET

0800044 - U.S. NAVY TRAINING FILM - ASROC WEAPONS SYSTEM - INTRODUCTION
1963 Black & White 20:30

This was a 1963 Navy training film featuring the antisubmarine rocket (ASROC) and its shipboard launcher. ASROC was an integrated, surface-to-underwater nuclear weapon system designed primarily for use against fast-attack enemy submarines.

In a real-life battle situation, a ship's special sonar would pick up signals from the submarine. There was a computer-driven attack console manned by Navy specialists. As soon as the submarine was located, the specialists would determine whether to use a nuclear-tipped torpedo or a nuclear depth charge with the ASROC. The film details how to load and fire the weapon from the eight-rocket launcher.

In peacetime, the ships carrying the ASROCs provided extensive training using simulators, which gave the trainees a realistic feeling on how to respond when sonar detects an enemy submarine.

FACT SHEET

0800045 - NAVAL ATOMIC WEAPONS VULNERABILITY PROGRAM
Late 1950s Black & White/Color Sanitized 21:15

The Navy realized that any implosion-type nuclear weapon would be extremely hazardous to personnel in the area should the conventional high explosives (HE) contained in the weapon detonate prematurely. A particular threat to firemen and rescue personnel stationed on a carrier was the possibility that a plane carrying an implosion weapon could crash and burn on the deck, setting off the HE and dispersing radioactive materials. Other threats were from explosions on ships carrying rockets or missiles.

Three tests were carried out in this program at the fire test area at the Navy's China Lake facility in California. The first fire test involved a Mark 7 dummy nuclear warhead with live HE, where the fire caused the HE to detonate. The second test involved a Mark 7 dummy warhead and a Boar solid rocket motor, which were both destroyed by the fire. In the third test, a Mark 34 warhead in a sealed dummy pit was placed in the fire, but the HE did not detonate.

FACT SHEET

0800046 - COMPOSITE NO. 1 - SWORDFISH, SAILOR HAT (CONVENTIONAL TEST), ASROC, SUBROC
Various dates Color Sanitized 17:45

This video is a composite of several delivery systems and nuclear and non-nuclear Navy tests. SWORDFISH was a low-yield nuclear weapon test of an antisubmarine rocket (ASROC) delivery system conducted in the Pacific. The underwater test produced a spectacular eruption on the ocean surface. Operation Sailor Hat involved using numerous conventional explosives to simulate nuclear blasts. Delta, the last Sailor Hat test in the ship evaluation program, was conducted to study seismological data, underwater acoustics, radio communications, cratering, air blast effects, cloud growth, fire ball generation, and electromagnetic data. There is dramatic video footage of the effects of this simulated nuclear blast on the test ships.

There is footage of a depth bomb deployment from an aircraft. At water entry, the parachute is jettisoned. A ship-fired, ASROC-delivered Mark 45 torpedo was parachute deployed before entering the water and searching for and finding the submarine target. The torpedo, moving at 40 knots until reaching the proper depth in the water, then began a horizontal movement toward the target. Once in place, the warhead detonated. A submarine rocket (SUBROC) is shown ejecting from a nuclear submarine's torpedo tube, coming out of the water, flying up to 25 miles, reentering the water, and finally finding its target. A 39-inch long Mark 55 thermonuclear warhead, weighing approximately 460 pounds, was then detonated.

FACT SHEET

0800048 - U.S. NAVY PRESENTS NUCLEAR EFFECTS AT SEA
1976 Black & White Sanitized 20:30

This video details the effects of high-altitude nuclear tests of greater than a megaton thermonuclear yield on ships, satellites, and personnel. These blasts produce an electromagnetic pulse (EMP) that can knock out electrical components over a wide area and destroy electrical systems in planes, ships and satellites.

The blast causes flash blindness and retina damage to an individual looking at the blast and can cause damage to the eardrums. The air pressure can damage a ship, even causing a roll over. Also, the blast can destroy the outside structure of a ship. The thermal radiation weakens or melts the outside metal surface and burns the skin, similar to the resultant effects of a fire.

The nuclear radiation, consisting of x-rays and neutrons, alters and destroys cells and causes radiation sickness. The three-phase symptoms of radiation sickness are the initial reaction; the latent phase with no symptoms; and the final phase, requiring hospitalization. It was determined that the ship's crewmen must take cover in hardened spaces below the water line to escape the effects of radiation. Nuclear radiation also causes failure of the ship's electrical systems.

From underwater bursts, the shock wave travels in all directions, damaging ships in its path. A surface burst shown causing direct shock damage to the ship's hull and secondary damage to interior components.

FACT SHEET

0800049 - THE DEFENSE ATOMIC SUPPORT AGENCY PRESENTS TECHNICAL TRAINING FILM BULLETIN NUMBER 45, PART II - TALOS MISSILE HANDLING, CRUISER INSTALLATION
No Date Black & White/Color 13:00

The Talos missile, fired from a Navy Cruiser, could carry either a conventional or nuclear warhead. The Mark 30 warhead was designed specifically for Talos.

The video shows the warhead being tested and mated with the missile. The missile was then stored until it was connected with the booster. After it was checked out and the wings and fins were installed, the missile was ready to be fired. The Talos had the capability to destroy air or surface targets.

FACT SHEET

0800050 - U.S. NAVY TRAINING FILM - TORPEDO MK 45 (NUCLEAR) SYSTEMS DESCRIPTION
1962 Black & White/Color 13:00

This animated video shows an antisubmarine torpedo with a nuclear warhead maneuvering to get position on an "enemy" submarine before detonation.

The commentator describes the range control systems, the depth control functions, and the integration of other components that make the entire system work. Also shown are warhead and safety features being checked before deployment. The video shows an animated demonstration of the torpedo systems and then shows actual footage of torpedo components in a training torpedo. The final test run of the torpedo shows that it is safe for the firing ship and deadly for the target.

FACT SHEET

0800051 - ARMED FORCES SPECIAL WEAPONS PROJECT PRESENTS UNITED STATES AIR FORCE ATOMIC BOMB DELIVERY AIRCRAFT (PILOTED)
1950 - 1957 Black & White/Color Sanitized 17:30

This video highlights the United States Air Force's nuclear capable aircraft available in the early 1950s. Featured aircraft included the strategic bombers B-29, B-50, B-36, B-47 and B-52, while the tactical aircraft were the B-45, B-57, F-86, and F-84.

The video depicts a Mark-6 , or "60-inch nuclear bomb" in a nuclear test. The Mark 7 tactical nuclear weapon, or "30-inch nuclear bomb," is shown being loaded and tested by the newest delivery method, the Low Altitude Bombing System (LABS). With LABS, a tactical aircraft flies toward an "initial point," then commences a "4G" climb, and releases the bomb at a designated point in the climb. By the time the bomb detonates, the aircraft is a safe distance away.

The video shows that the Air Force had a wide choice of aircraft, bombs, and delivery methods, and could use them to protect the welfare and security of the country.

FACT SHEET

0800052 - ARMED FORCES SPECIAL WEAPONS PROJECT PRESENTS ATOMIC GUIDED MISSILES
1955 Black & White/Color Sanitized 11:50

This video features the nuclear weapons delivery systems of the late 1940s and early 1950s. The video shows spectacular launches and flights of the Corporal, Honest John, Regulus, Matador, Snark and Rascal missiles.

The U.S. Army's surface-to-surface Honest John missile, fitted with either the W-7 or the W-33 nuclear warhead, was designed to be field assembled under combat conditions. Honest John was 26 feet long with a diameter of 2 feet, 6 inches and a wingspan of 11 feet. The missile weighed approximately 6000 pounds and used eight spin rockets to assure accuracy. Approximately 2000 Honest John missile systems were deployed between 1953 and 1989.

Another Army missile, the Corporal, using a liquid propellant, had an 80-mile range and was fitted with the W-7 fission warhead. Deployed between 1953 and 1965, the Corporal missile was 46 feet long and weighed approximately 11,140 pounds.

Regulus I, the only Navy missile shown in the video, was a sea surface submarine launched, surface-to-surface, pilotless flying bomb. The missile, which carried a W-5 fission warhead, was in the stockpile from 1958 to 1963. Weighing approximately 14,322 pounds with a diameter of 4 feet, 6 inches, Regulus I had a range of 575 miles and could cruise at Mach 0.87.

The U.S. Air Force's Matador was another "flying bomb," or early cruise missile. While in the stockpile from 1956 to 1963, it was fitted with a W-5 warhead. With a length of 44 feet and a diameter of 4 feet, 6 inches, it had a wingspan of 22 feet, 11 inches. The Matador launch weight was approximately 15,500 pounds, and it had a range of more than 650 miles at a speed of 650 miles per hour.

In the 1950s, the Air Force's Strategic Air Command deployed several different types of guided missiles to enhance deterrent capabilities. One of the most unusual was the Snark, a subsonic, winged intercontinental missile. Essentially, the Snark was a small, turbojet-powered, unmanned aircraft that carried a W-39 thermonuclear weapon.

The Snark was fired from a short mobile launcher by two solid-fueled rocket boosters, and once airborne, it was powered by a single J-57 turbojet engine capable of cruising at 400 miles per hour. After a programmed flight of 1,500 to 5,500 nautical miles, the Snark's airframe separated from its nose cone, and the nuclear warhead followed a ballistic trajectory to its target. It was in the U.S. stockpile from 1958 to 1961.

FACT SHEET

0800053 - PRODUCED BY THE DEFENSE NUCLEAR AGENCY, MEETING THE TERRORIST THREAT
Early 1970s Color 7:30

Since the emergence of the terrorist threat, the U.S. Government's concern about the possible terrorism against nuclear facilities has intensified. This video shows how the Government has responded to this threat.

The video depicts nuclear security activities at an early nuclear storage site and how a small unarmed force of intruders easily enters under the security fence surrounding the site. The protective force subdues the intruders easily. In another scene, a well-armed terrorist team enters the base and kills a roving patrol with a well-placed sniper. Security forces finally overcome the terrorists after a superior counter-force arrives.

On a third entry, a terrorist team enters the site under the cover of a fellow terrorist, hidden in the forest, armed with a heavy machine gun. This terrorist team reaches and penetrates a storage igloo after the roving patrol is killed, and the rapid response force is destroyed. However, the terrorists do not escape. When the superior security force appears with helicopter support and an armored personnel carrier, the terrorists, including the machine gunner, are killed.

Since this film was made, the Department of Energy (DOE) has constantly improved the training and tactics of the security forces at each installation as well as the in-place security systems. With its modern day posture, it would be highly improbable that a small group of armed individuals could forcibly enter any DOE facility and escape with a nuclear weapon or any special nuclear materials.

FACT SHEET

0800054 - HYBLA FAIR
1974 Black & White/Color Sanitized 15:15

HYBLA FAIR was an underground, horizontal line-of-sight (LOS) weapons-effects test conducted at the Nevada Test Site on October 28, 1974. The test had a relatively small design yield of less than 20 kilotons. This lower yield test was thought to be appropriate because an earlier, larger yield test caused loss of valuable data when the force of the detonation through the LOS pipe destroyed experiments. However, the HYBLA FAIR test had an insufficient yield to provide the amount of radiation necessary for the LOS experiments to perform as anticipated and the desired data was not obtained.

An LOS pipe allows scientists to take measurements of the effects of heat, blast and radiation. The pipe has a diameter ranging from a few inches to as much as 30 feet. Inside the pipe, with the nuclear device at the small end, experiments are set up to be exposed to the radiation effects, but not the shock and blast effects. These effects are prevented from rushing through the pipe by fast-closing steel doors. Radiation travels faster than blast and shock waves, thus allowing the doors to close and the radiation tests to be conducted.

FACT SHEET

0800055 - FEDERAL CIVIL DEFENSE ADMINISTRATION PRESENTS LET'S FACE IT
No date Color 13:25

Civil Defense, based on the assumption that a nuclear attack from the former Soviet Union was imminent, ranked high on the list of U.S. priorities in the 1960s. The Federal Civil Defense Administration was in charge of this Cold War activity. A key point emphasized in the video is that for citizens to survive a nuclear attack, they must be prepared. This meant they must know the locations of approved Civil Defense shelters or have their own shelter at their home, or both.

In the opening scenes, an Air Raid Warden is blowing his whistle while air raid sirens are blaring, and citizens are heading toward the shelters. The narrator extols citizens to prepare a fallout shelter with adequate food and emergency supplies. He warns that the usual emergency services such as fire, police and hospitals may not be available after a nuclear attack. He also urges citizens to know the sanctioned evacuation routes from potentially targeted cities. Citizens were expected to evacuate in an orderly manner, free from panic and driving mishaps.

The video shows that many nuclear tests were conducted at the Nevada Test Site (NTS) to gain data that would help in Civil Defense preparedness. As part of Operation Cue, the video depicts many unidentified atmospheric tests fired to learn potential effects of detonations on citizens and cities and to test the effectiveness of Civil Defense organizations.

At the NTS, entire cities or "doomtowns," including houses containing furniture, appliances, food, and mannequins representing people, were built. Utility stations and automobiles were also located in the town. The houses were constructed with various exteriors. Inside each house was an array of instruments to gather the pertinent data on blast, heat and radiation effects. The majority of the houses were destroyed by the blasts. Industrial-type buildings and transportation structures, such as railways, bridges and freeways were also subjected to nuclear blasts.

The video shows military troops participating in Camp Desert Rock Exercises and witnessing the power and fury of an atomic blast. The underlying message given is that if citizens remain calm and "face it," they can survive the bomb.

FACT SHEET

0800056 - PRODUCED BY THE DEFENSE NUCLEAR AGENCY, ENEWETAK CLEANUP
No date Color 13:15

This video shows the actions being taken to cleanup the islands comprising Enewetak Atoll so that the previous inhabitants could return to live on some of them. The inhabitants were forced to relocate to other islands in 1948 when the United States began atmospheric testing of nuclear devices at the Pacific Proving Ground. Over the 1948-1958 time period, 43 tests were conducted on or near Enewetak Atoll.

Numerous decaying, abandoned buildings are shown that had to be demolished, while others were still suitable for use by the returning people. Homes, schools and government buildings had to be built.

The film details the radiation studies conducted to determine the extent of contamination and the uptake of radioactive particles by plants. Some parts of the Atoll would never be suitable for habitation because of the extent of contamination. One of the decontamination activities planned was removing the contaminated soil, transporting it to craters on one of the highly contaminated islands, and encasing it in concrete.

Those organizations cooperating in the cleanup effort included the Atomic Energy Commission, the Coast Guard, the Defense Nuclear Agency, and a marine biology firm.

FACT SHEET

0800057 - EXCERPTS FROM OPERATION HARDTACK
1958 Color Silent 17:30

The awesome force of even small atomic blasts was clearly demonstrated in the first two of six tests shown in this silent montage of films taken during Operation Hardtack I. The tests WAHOO, UMBRELLA, TEAK, QUINCE, ORANGE, and FIG were conducted in the Pacific Proving Ground between May and August 1958.

WAHOO (9 kilotons) and UMBRELLA (8 kilotons) were underwater tests conducted near Enewetak Atoll on May 16 and June 8, respectively. Target arrays of ships and submarines were moored nearby to test the effects of the blasts. Each test resulted in spectacular plumes of water rising upwards of 1,000 feet. The radioactive clouds produced by the explosions engulfed the target ships. The ships appeared tiny when compared with the giant clouds. The force of the blasts sent violent waves crashing onto the Atoll, leaving debris-strewn beaches.

"Are you still there?" was the first radio transmission received at Johnston Island hours after the TEAK thermonuclear test on August 1, 1958. The 3.8 megaton, 77-kilometer-high blast triggered an electromagnetic pulse (EMP) which stopped radio communications throughout that large area of the Pacific. The EMP was so severe that military and civilian aircraft had to be grounded in Hawaii. The TEAK fireball could be seen as far away as Oahu Island, approximately 525 nautical miles from Johnston Island. Eyewitnesses said the colorful display rivaled the "Southern Lights," also referred to as the Aurora Australis. Several scientists viewing the test had to duck into a shelter quickly because an error with the launch vehicle, a Redstone rocket, caused it to detonate directly over Johnston Island instead of 20 miles down range.

On August 12, 1958, a second thermonuclear test of 3.8 megatons, ORANGE, was conducted in the Johnston Island area, this time at an altitude of 43 kilometers. It was less spectacular than the TEAK test and had little effect on radio communications and electrical systems in that broad area of the Pacific.

The Atomic Energy Commission's University of California Radiation Laboratory and the Department of Defense's Special Weapons Project jointly conducted a cratering experiment on Yvonne Island on Enewetak Atoll. The QUINCE test malfunctioned on August 6, 1958, resulting in a zero yield. This necessitated the execution of the 20-ton FIG test, conducted as a replacement on August 18, 1958.

FACT SHEET

0800058 - U.S. NAVY TRAINING FILM - MARK 43 AND MARK 57 WEAPONS - SHIPBOARD HANDLING, INCLUDING AIRCRAFT LOADING
1963 Black & White Sanitized 20:25

An A-4 Skyhawk aircraft rises into view on a platform aboard the aircraft carrier USS Independence. A double rigged crane transfers Mark 43 and Mark 57 nuclear weapons in a 'coffin' to the Independence from a carrier support ship. This video demonstrates how nuclear weapons and delivery aircraft function in a coordinated effort that could effectively be used against an enemy of the U.S. The weapons, one by one, are placed on an elevator and taken to a lower deck to await mating with an A-4. They are removed from the transportation cart and placed in a sturdy fixture bolted to the floor.

Reflecting the times in 1963, the narrator of the video emphasizes the importance of readiness and safety as twin components of reliability to counter any enemy threat in the Cold War. The video shows a drill in which a nuclear strike plan is created and sent to weapon assembly officers on board. They direct teams to take the weapons from storage, move them to the A-4s, and install them.

The Mark 57 was a lightweight, multipurpose nuclear depth charge for antisubmarine warfare and a bomb for land warfare. It was 118 inches long with a diameter of 14.75 inches and weighed apprtoximately 510 pounds. The fission device was in the stockpile from 1963 to 1992.

The Mark 43 was a thermonuclear strategic and tactical nuclear weapon carried by most of the nuclear capable aircraft in the U.S. inventory. It was one of the first laydown bombs, developed to minimize aircraft losses by delivering the bomb at transonic speeds, at altitudes of 100 to 200 feet. The weapon's components could withstand the ground impact shocks and then be detonated at a preset time. It also could be delivered as a parachute-retarded airburst, a surface burst, or a free-fall airburst. The Mark 43, in the stockpile from 1961 to 1991, was 12.5 feet long with a diameter of 18 inches and weighed approximately 2,100 pounds.

FACT SHEET

0800059 - THE UNITED STATES ARMY PRESENTS TF9 3370, TECHNICAL PROFICIENCY INSPECTION
1963 Black & White Sanitized 23:50

This video describes the rigorous yearly proficiency inspections that Army nuclear weapon personnel were subjected to by teams from the Office of the Inspector General (IG). The Army stated that the efficiency of nuclear weapons maintenance specialists is vital to the overall effectiveness of the readiness effort for nuclear deterrence.

Cold War era weapons such as the Honest John and Nike Hercules missiles and a Mark 33 8-inch nuclear artillery projectile are featured in inspection scenarios. Rare footage of the Atomic Demolition Munition and the Davey Crockett missile can be seen in short vignettes.

The video shows graphically how flaws in the weapon hardware could cause the missile to become unreliable. The Army unit flunks the inspection and receives an unsatisfactory rating. The unit commander directs his personnel to correct the deficiencies, and he is reminded to stay in constant contact with all members of his technical teams. Because of attrition, the IG's representative suggests that the commander retain those who are trained and are serious about making nuclear weapons handling a career choice.

FACT SHEET

0800060 - EXERCISE DESERT ROCK
1951 Black & White 27:51

In 1951, the Army, working with the Atomic Energy Commission, carried out the Desert Rock Exercises, an experiment to "dispel much of the fear and uncertainty surrounding atomic radiation and the effects of gamma and x-rays."

A tent encampment was set up about 27 miles from where the atomic explosions were detonated on the Nevada Proving Grounds. The encampment housed about 5,000 Army soldiers, civilian observers and technicians. Troops spent hours in classes receiving training in radiation and nuclear weapons effects.

The following is a recorded interview between a sergeant and a training officer prior to a blast:

Question. "How many of your men would volunteer to go up and be in the foxholes?" (one-half mile from ground zero)
Answer. "I guess about half a dozen."

Question. "It's quite a loud noise when that bomb goes off. . .would it do them any harm?"
Answer. "No sir, not the noise, no."

Question. "How about the radiation? Do you think there is much danger?"
Answer. "Radiation is the least of their worries that the men are thinking about."

Question. "I think most thought radiation was the greatest danger, didn't they? Where did they learn differently?"
Answer. "They were, prior to our instructions here. We received a very thorough briefing."

For the Desert Rock I Exercise, the weapon was fired as an airburst. The majority of the troops were out in the open about seven miles away. The soldiers were told to crouch down and face away from the blast. The bomb flash blanked out the troops from view, and the flash was followed by blast winds and the noise of the explosion. Interviews with soldiers were conducted after the test.

Following the test, the troops were trucked toward the stationary military equipment used for experiments. The experiments were set up one-half mile and also at three miles from the blast. At three miles, the gun emplacements and military vehicles were undamaged, but at on-half mile damage was moderate to heavy.

FACT SHEET

0800061 - OPERATION DOMINIC NUCLEAR TESTS
1962 Black & White Sanitized 26:23

This Dominic I video provides a visual overview of 36 atmospheric nuclear devices detonated in the Pacific Proving Ground from April to November, 1962. It was the last atmospheric nuclear test series conducted by the United States. Also, Dominic I was the largest and most elaborate U.S. testing operation ever conducted. In geographic terms, the diagnostic stations receiving data from the tests covering more than 15 million square miles.

According to the video, Operation Dominic I was prompted by the "Soviet resumption of testing in 1961 after a three-year moratorium." The three main purposes of the series were the "proof testing" of new weapon designs, mainly thermonuclear; obtaining weapons effects data as it related to the electromagnetic pulse phenomenon and attenuation of radar; and obtaining data related to the offensive and defensive aspects of an incoming ballistic missile in a detonation environment.

Dominic I tests were conducted in three general locations: Johnston Island, airdrop and high-altitude detonations; Christmas Island, staging area for 24 airdrop tests; and the open ocean, launch of a Polaris missile from a submarine and subsequent detonation of a device in a reentry vehicle, and the detonation of a device carried by an antisubmarine rocket (ASROC).

Approximately 28,000 military and civilian personnel participated in the test series. More than 200,000 tons of supplies, construction materials, and diagnostic equipment were shipped or airlifted to the test areas.

Most of the devices were detonated in the air after being dropped from a B-52 bomber. Five high-altitude bursts, designated as Operation Fishbowl tests, were lofted by rockets. Their purpose was to study the effects of nuclear detonations as defensive weapons against incoming ballistic missiles.

The tests comprising the 1962 Operation Dominic I were as follows:

- ADOBE, April 25, Christmas Island area, airdrop, weapons related, 190 kilotons (kt)
- AZTEC, April 27, Christmas Island area, airdrop, weapons related, 410 kt
- ARKANSAS, May 2, Christmas Island area, airdrop, weapons related, 1.09 megaton (Mt)
- QUESTA, May 4, Christmas Island area, airdrop, weapons related, 670 kt
- FRIGATE BIRD, May 5, Pacific, rocket, weapons related
- YUKON, May 8, Christmas Island area, airdrop, weapons related, 100 kt
- MESILLA, May 9, Christmas Island area, airdrop, weapons related, 100 kt
- MUSKEGON, May 11, Christmas Island area, airdrop, weapons related, 50 kt
- SWORDFISH, May 11, Pacific, underwater, weapons effects, low
- ENCINO, May 12, Christmas Island area, airdrop, weapons related, 500 kt
- SWANEE, May 14, Christmas Island area, airdrop, weapons related, 97 kt
- CHETCO, May 19, Christmas Island area, airdrop, weapons related, 73 kt
- TANANA, May 25, Christmas Island area, airdrop, weapons related, 2.6 kt
- NAMBE, May 27, Christmas Island area, airdrop, weapons related, 43 kt
- ALMA, June 8, Christmas Island area, airdrop, weapons related, 762 kt

- TRUCKEE, June 9, Christmas Island area, airdrop, weapons related, 210 kt
- YESO, June 10, Christmas Island area, airdrop, weapons related, 3 megatons (Mt)
- HARLEM, June 12, Christmas Island area, airdrop, weapons related, 1.2 Mt
- RINCONADA, June 15, Christmas Island area, airdrop, weapons related, 800 kt
- DULCE, June 17, Christmas Island area, airdrop, weapons related, 52 kt
- PETIT, June 19, Christmas Island area, airdrop, weapons related, 2.2 kt
- OTOWI, June 22, Christmas Island area, airdrop, weapons related, 81.5 kt
- BIGHORN, June 27, Christmas Island area, airdrop, weapons related, 7.65 Mt
- BLUE STONE, June 30, Christmas Island area, airdrop, weapons related, 1.27 Mt
- STARFISH PRIME, July 9, Johnston Island area, rocket, weapons effects, 1 Mt*
- SUNSET, July 10, Christmas Island area, airdrop, weapons related, 1 Mt
- PAMLICO, July 11, Christmas Island area, airdrop, weapons related, 3.88 Mt
- ANDROSCOGGIN, October 2, Johnston Island area, airdrop, weapons related, 75 kt
- BUMPING, October 6, Johnston Island area, airdrop, weapons related, 11.3 kt
- CHAMA, October 18, Johnston Island area, airdrop, weapons related, 1.59 Mt
- CHECKMATE, October 20, Johnston Island area, rocket, weapons effects, low*
- BLUEGILL 3 PRIME, October 26, Johnston Island area, rocket, weapons effects, submegaton*
- CALAMITY, October 27, Johnston Island area, airdrop, weapons related, 800 kt
- HOUSATONIC, October 30, Johnston Island area, airdrop, weapons related, 8.3Mt
- KINGFISH, November 1, Johnston Island area, rocket, weapons effects, submegaton*
- TIGHTROPE, November 4, Johnston Island area, rocket, weapons effects, low*

* Operation Fishbowl tests

FACT SHEET

0800062 - STARFISH PRIME EVENT INTERIM REPORT BY COMMANDER JTF-8; FISHBOWL AURORAL SEQUENCES (Silent); **DOMINIC ON FISHBOWL PHENOMENON** (Silent); **FISHBOWL XR SUMMARY** (Silent)
1962 Black & White/Color Sanitized 1:01:26 (Four Films on One Video)

STARFISH PRIME EVENT INTERIM REPORT BY COMMANDER JTF-8
7:45 (Sound)

STARFISH PRIME, was one of the high-altitude nuclear tests in the Operation Fishbowl series conducted in the Pacific Proving Ground in 1962. It was launched in the Johnston Island area to an altitude of about 400 kilometers by a Thor rocket and had a yield of 1.4 megatons.

The test evaluated the capabilities of an antiballistic missile to operate in a nuclear environment and the vulnerability of a U.S. reentry vehicle to survive a nearby nuclear blast. It also provided information on the ability of a U.S. radar system to detect and track reentry vehicles. Another goal was to discern the effects of a high-altitude blast on command and control systems, which were shown to be vulnerable in earlier high-altitude tests. The final goal was to obtain information on the feasibility of testing in outer space.

FISHBOWL AURORAL SEQUENCES
7:50 (Color, Silent)

BLUEGILL and STARFISH were high-altitude nuclear tests, part of Operation Fishbowl, conducted in the Johnston Island area of the Pacific Proving Ground in 1962. These tests produced auroral effects, a special feature of explosions where the extreme brightness of the fireball is visible at great distances. Within a second or two after the burst, a brilliant aurora appears from the bottom of the fireball.

The formation of the aurora is attributed to the motion, along the lines of the earth's magnetic field, of beta particles emitted by the radioactive fission fragments. About a minute after the detonation, the aurora could be observed in the Samoan Islands, 2000 miles from the detonation.
These auroras could be seen for approximately 20 minutes. The video shows footage of the auroras from Somoa, Mauna Loa (Hawaiian Islands) and Tongtapu (Tonga Islands) at various film speeds.

DOMINIC ON FISHBOWL PHENOMENON
11:13 (Color, Silent)

Operation Fishbowl was the high-altitude testing portion of a larger Operation Dominic I. This video is a compilation of footage of the five nuclear tests comprising Operation Fishbowl conducted in the Johnston Island area of the Pacific Proving Ground in 1962. A high-altitude burst is one occurring above 100,000 feet. The video does not identify the date, time or name of the tests.

When a nuclear weapon detonates at a high altitude, many of the effects are attenuated. Most of the x-ray energy is absorbed in the air, which decreases the fireball temperature. Absorption of thermal

x-ray energy also decreases the energy available for a shock wave. This all results in the development of a toroidal or donut-shaped cloud instead of the usual mushroom shape of ground or near ground explosions.

This also shows the auroral effect of high-altitude explosions where the extreme brightness of the fireball is visible at great distances. Within a second or two after the burst, a brilliant aurora appears from the bottom of the fireball. The formation of the aurora is attributed to the motion, along the lines of the earth's magnetic field, of beta particles emitted by the radioactive fission fragments. About a minute after the detonation, the aurora can be observed from as far away as 2000 miles. These auroras can be seen for approximately 20 minutes.

FISHBOWL XR SUMMARY
34:38 (Black and White, Silent)

The video shows the five, rocket-launched, Operation Fishbowl tests at various camera speeds and from different camera locations. Operation Fishbowl was the Department of Defense's high-altitude testing portion of Operation Dominic I, conducted in the Johnston Island area of the Pacific Proving Ground in 1962. In a high-altitude blast, many of the effects are attenuated, resulting in a toroidal or donut-shaped cloud instead of the mushroom cloud from a surface burst. These weapons-effects tests, launched by Strypi, Thor, and Nike Hercules rockets, were as follows:

- STARFISH PRIME, July 9, 400-kilometer altitude, 1.4 megaton
- CHECKMATE, October 20, tens of kilometers altitude, low
- BLUEGILL 3 PRIME, October 26, tens of kilometers altitude, submegaton
- KINGFISH, November 1, tens of kilometers altitude; submegaton
- TIGHTROPE, November 4, tens of kilometers altitude, low

Two goals of these tests were to determine if radiation and blast and heat effects of high-altitude detonations were capable of neutralizing an enemy reentry vehicle and capable of determining the blackout effects on radar and communications of various yields and altitudes of bursts.

FACT SHEET

0800064 - JTF-8 PRESENTS OPERATION DOMINIC, CHRISTMAS ISLAND; EG&G OPERATION DOMINIC SCIENTIFIC PHOTOGRAPHY, BLUESTONE EVENT (Silent)
1962 Black & White Sanitized 22:29 (Two Films on One Video)

JTF-8 PRESENTS OPERATION DOMINIC, CHRISTMAS ISLAND
12:29 (Sound)

A previous video release, "Dominic Fireballs," (silent with captions) featured 16 nuclear bursts conducted near Christmas Island in 1962 and presented a general visual overview of the test operation. This documentary presents a brief history of the British-owned Christmas Island and the agreement that allowed the United States to use it as a staging area for 24 atmospheric tests.

However, only three nuclear blasts are shown, each representing a different aspect of Operation Dominic I. The first test shown was ADOBE, detonated on April 25, 1962, which had a yield of 190 kilotons (kt). This was a proof test of a device prior to it going into the nuclear weapons stockpile. The second test, FRIGATE BIRD, involved a warhead (yield not given) launched on May 6, 1962, from the submarine Ethan Allen and carried to its target by a Polaris missile. It was an atmospheric test. The third test, SWORDFISH, a low-yield device, was a system proof test of an antisubmarine rocket (ASROC) conducted on May 11, 1962. The weapon, an atomic depth charge, was successfully detonated underwater after its ride on the ASROC.

EG&G OPERATION DOMINIC SCIENTIFIC PHOTOGRAPHY BLUESTONE EVENT
10:00 (Silent)

This video shows the BLUESTONE thermonuclear airdrop from several vantage points at various camera speeds and focal lengths. Conducted near Christmas Island in the Pacific, BLUESTONE had a yield of 1.27 megatons. This test does not have the familiar mushroom cloud effect, but forms a huge circular fireball and as it expands, forms a large ring.

BLUESTONE was but one of many Dominic I tests dedicated to research and development of thermonuclear devices. The Dominic I series was ordered after the Soviet Union had resumed testing nuclear weapons.

FACT SHEET

0800065 - JTF-8 PRESENTS OPERATION DOMINIC: JOHNSTON ISLAND
1962 Black & White Sanitized 19:23

The Johnston Island area segment of Operation Dominic I was divided into two parts, the Fishbowl high-altitude tests and open sea airdrop tests. Much of the film was devoted to the failures that occurred in the high-altitude program. In one test, a rocket was destroyed because it was believed to be off-course, but post flight data revealed that it was on the correct trajectory. Another rocket blew up on the launch pad because of a sticking fuel valve. This caused the high explosives in the weapon to detonate, resulting in the destruction and contamination of the launch pad and surrounding area. In another instance, a rocket had flight irregularities stemming from the wrong configuration of a flight plan. The nuclear device detonated directly over Johnston Island, instead of 26 miles away as planned.

To improve obtaining test data, the Thor launch vehicles (rockets) also carried and deployed three scientific test pods. These reentry pods contained diagnostic equipment, and shortly after they were deployed, the nuclear weapon was detonated. The pods splashed into the sea and were retrieved by helicopters.

The successful rocket-launched, weapons-effects, Operation Fishbowl high-altitude tests conducted in the Johnston Island area in 1962 were as follows:

- STARFISH PRIME, July 9, 400-kilometer altitude, 1.4 megaton
- CHECKMATE, October 20, tens of kilometers altitude, low
- BLUEGILL 3 PRIME, October 26, tens of kilometers altitude, submegaton
- KINGFISH, November 1, tens of kilometers altitude; submegaton
- TIGHTROPE, November 4, tens of kilometers altitude, low

The five open sea airdrop, weapons-related tests in the Johnston Island area were as follows:

- ANDROSCOGGIN, October 2, 75 kilotons (kt)
- BUMPING, October 6, 11.3 kt
- CHAMA, October 18, 1.59 megatons (Mt)
- CALAMITY, October 27, 800 kt
- HOUSATONIC, October 30, 8.3 Mt

FACT SHEET

0800066 - HIGH-ALTITUDE NUCLEAR WEAPON EFFECTS PART ONE - PHENOMENOLOGY
1963 Color Sanitized 20:53

When nuclear weapons are detonated at high altitudes, they cause dramatic changes in the atmosphere and ionosphere. In a very technical presentation, this video discusses such things as the interactions of electrons and positive ions and shows the electromagnetic regions and how they carry electrical charges from one hemisphere to another. The video also discusses how there is much information unknown about nuclear explosions at extremely high altitudes, especially above 250 kilometers, where there is less atmospheric resistance.

FACT SHEET

0800067 - HIGH-ALTITUDE NUCLEAR WEAPON EFFECTS PART TWO - SYSTEMS INTERFERENCE
1963 Color Sanitized 16:29

Through past nuclear testing, the Department of Defense and the Atomic Energy Commission determined that a nuclear weapon exploded at high altitude with a sufficient yield would cause adverse effects on communication and radar devices.

This technically oriented video, which uses many animated audio-visual aids to explain scientific points of interest and explores the weapons' effects on military systems. The first portion deals with a hypothetical reentry vehicle armed with a nuclear warhead. The video explains how three different nuclear detonations might be required to track and destroy the incoming vehicle. The next portion explains how a nuclear explosion would more adversely affect the low-power downlink of radio transmissions to aircraft or satellites than the more powerful uplink. Other atmospheric chemistry and infrared systems problems are discussed in the video.

FACT SHEET

0800068 - ATOMIC WEAPONS ORIENTATION PART ONE - ORGANIZATION FOR ATOMIC ENERGY; ATOMIC WEAPONS ORIENTATION PART TWO - BASIC ATOMIC WEAPONS
1961 and 1965 Black & White/Color Sanitized 23:56 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART ONE - ORGANIZATION FOR ATOMIC ENERGY
17:45

The Atomic Energy Acts of 1946 (and revised in 1954) set up a vast government (military and civilian) industrial complex for the research, development, testing, and production of nuclear weapons, as well as for other assignments in the energy field. The workings of this complex make up the subject for this video.

Shown are the coordination and liaison activities between the civilian Atomic Energy Commission and the Department of Defense. Each organization's major laboratories, facilities, and policy and planning groups active in 1961 are described. Footage of nuclear weapons storage, training and test sites is shown.

ATOMIC WEAPONS ORIENTATION PART TWO - BASIC ATOMIC WEAPONS
6:11

This animated and live action video was designed primarily as an instructional video on how nuclear weapons work. There is a simplified discussion of the two categories of nuclear weapons, fission and fusion. The video described the "gun-type" and "implosion" fission methods. Another segment details the sequence of events and devices that have to work in unison to enable fission or fusion weapons to produce a nuclear yield.

FACT SHEET

0800069 - ATOMIC WEAPONS ORIENTATION PART THREE - A SPECIAL WEAPONS ORIENTATION: WEAPONS FAMILY; ATOMIC WEAPONS ORIENTATION PART FOUR - ATOMIC WEAPONS SUPPORT OPERATIONS
1961 Black & White/Color Sanitized 18:54 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART THREE - A SPECIAL WEAPONS ORIENTATION: WEAPONS FAMILY
6:32

This video shows U.S. stockpiles nuclear weapons up to 1961. The stockpile includes early airdrop fission weapons, Mark (Mk)-3, Mk-4, Mk-5, Mk-6, Mk-6/18, Mk-7, Mk-8, Mk-12, and Mark-9, the artillery atomic projectile. A live test of the Mk-9 fired from a 280 mm cannon is shown. This was the 15-kiloton GRABLE test conducted on May 25, 1953, as part of Operation Upshot-Knothole.

ATOMIC WEAPONS ORIENTATION PART FOUR - ATOMIC WEAPONS SUPPORT OPERATIONS
12:22

The special contributions of nuclear weapons technicians are featured in this video. They inspected, maintained, modified and modernized nuclear weapons at various storage and operation field sites. The video shows training conducted at the Defense Atomic Support Agency's nuclear weapons school in Albuquerque and the U.S. Air Force's weapons school at Lowry Air Force Base in Colorado. Technicians are shown conducting "fire test set" inspections on all branches of the armed services.

The narrator explains that the storage, maintenance, inspection and modification of nuclear weapons is part of the "mine to stockpile sequence." Also, the video shows that the technicians are a vital part of the "stockpile to target sequence" as they prepare weapons for shipment, load weapons onto strike aircraft, and maintain and modify weapons at forward field sites.

Footage is shown of weapons being loaded on a B-52 and a smaller attack aircraft. The narrator explains that the major function of a technician was to "make the weapon ready for the day when by Presidential decree, nuclear weapons would be sent out on intercontinental bombers, tactical aircraft, missiles, and carrier-deployed aircraft to the target areas."

FACT SHEET

0800070 - ATOMIC WEAPONS ORIENTATION PART FIVE - EFFECTS OF ATOMIC WEAPONS; ATOMIC WEAPONS ORIENTATION PART SIX - A SPECIAL WEAPON ORIENTATION: THE THERMONUCLEAR WEAPON
No date Black & White/Color Sanitized 41:34 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART FIVE - EFFECTS OF ATOMIC WEAPONS
15:23

This video shows the heat, blast, and radiation effects of a nuclear explosion on personnel (dummies), structures, and military equipment. The video is a compilation of numerous nuclear detonations in the atmospheric testing program, but does not identify each blast. All types of detonations, including underground, surface, near surface and high altitude are shown.

ATOMIC WEAPONS ORIENTATION PART SIX - A SPECIAL WEAPON ORIENTATION: THE THERMONUCLEAR WEAPON
29:12

This video provides a history and the major developmental phases of the thermonuclear program up to May 1, 1956. The test operations of Greenhouse, Ivy and Castle are highlighted. The GEORGE test in Operation Greenhouse was the first thermonuclear test explosion. It was followed by the MIKE test in Operation Ivy, which used a liquid, or "wet" fuel. A wet fuel was very expensive, as it had to be super cooled until used. The first test in Operation Castle, BRAVO, used a dry fuel successfully, and that ended the debate over wet versus dry fuel.

Two continuing goals remained: (1) determine how to reduce the size and weight of the thermonuclear weapon, and (2) gather information on the effects of high-yield weapons. Regarding size and weight, the video shows a series of weapons that gradually are reduced in these aspects. Also, it shows the air delivery capabilities of these weapons, including footage on the B-47, the B-36 and the B-52 aircraft. On the effects aspect, the video defines fallout and describes what kind of path it leaves, the dangers from it, and how to protect oneself. It shows the destructive forces of a thermonuclear weapon in many ways, including how the MIKE test destroyed the island of Elugelab. A dramatic scene develops at the end as the narrator says, "This is the detonation of a thermonuclear weapon on Enewetok Atoll. This is a man standing on Bikini Atoll, 200 miles away." The light and boiling cloud of colors illuminates the entire sky almost as if the explosion was only a few miles away.

FACT SHEET

0800072 - DEVELOPING AND PRODUCING THE B-61
1970s Color Sanitized 26:29

The B-61 thermonuclear bomb, first produced in 1966, has developed into an extremely flexible weapon. Its many different modifications has made it able to fill the multipurpose needs of the military. Major modifications were made to the B-61 in 1966, 1975, 1977, 1979, and 1991.

Designed by the Department of Energy's Los Alamos National Laboratory in northern New Mexico, the lightweight bomb could be delivered by the Air Force, Navy and NATO planes at very high altitudes and at speeds above Mach 2. The 141.6-inch long, 13.3-inch diameter bomb averaged approximately 750 pounds, but actual weight varied with each modification.

FACT SHEET

0800073 - TRINITY HISTORICAL FOOTAGE
1945 Color Sanitized Silent 11:15

This is an improved quality video that contains some duplicate footage of number 0800001 (TRINITY 1945). At the request of the National Archives and Records Administration (NARA), this video is a duplicate of the NARA film, including the leaders and trailers. The sequences shown are not in chronological order.

This video describes the final preparations for firing the TRINITY device, the first test of a nuclear weapon. The Los Alamos Laboratory scientists are seen placing the lid on the TRINITY device under the supervision of Laboratory Director, Dr. J. Robert Oppenheimer. The preparatory work prior to lifting the device to the top of the 100-foot tower is shown. The device was bolted to a metal frame with bales of cotton placed under the device to act as shock absorbers. A close-up view of the device atop the tower is shown, followed by scenes of the scientists making final preparations for detonation.

There are no views of the actual 21-kiloton nuclear explosion which took place in the early morning of July 16, 1945, near Alamogordo, New Mexico.

Additional background information - During this time frame when the United States was developing the atomic bomb, U.S. scientists decided to test an implosion device (i.e., TRINITY device) instead of the gun-type design because the implosion type was much more complex. Scientists were confident that the gun-type design would work; this device design was the type used for the first time in the nuclear explosion over Hiroshima. Three days later, an implosion bomb was detonated over Nagasaki.

FACT SHEET

0800074 - ATOMIC PROVING GROUND, THE STORY OF OPERATION SANDSTONE
1948 Black & White 1:13:50

The story of Operation Sandstone, Project 19-2, is an account of the operation which began in secrecy at the Los Alamos Scientific Laboratory in New Mexico. The three-test series of new weapon designs was conducted on three different islands of Enewetak Atoll in the Pacific Proving Ground.

The video describes the buildup and preparation for this test series. Tasks depicted include: clearing the land of coconut trees; blasting out coral reefs to create shipping lanes; stringing an underwater cable network between specific islands; constructing buildings; and placing lead bricks around the timing quarters to provide radiation protection. Also shown are the ships that served as scientific laboratories and quarters for the scientists and other personnel who supported the operation.

The goals of this series were met as scientists obtained data on improved weapon designs and more efficient devices. This series was a milestone for improving the U.S. short- and long-range military objectives.

The tests comprising the 1948 Operation Sandstone were as follows:

- X-RAY, April 14, Enewetak (Enjebi Island), tower, weapons related, 37 kilotons (kt)
- YOKE, April 30, Enewetak (Aomon Island), tower, weapons related, 49 kt
- ZEBRA, May 14, Enewetak (Runit Island), tower, weapons related, 18 kt

FACT SHEET

0800075 - RADIOLOGICAL SAFETY ON OPERATION SANDSTONE
1948 Black & White 25:45

After extensive press coverage detailing radiation exposures resulting from the ABLE and BAKER tests of Operation Crossroads conducted on Bikini Atoll in 1946, Operation Sandstone personnel were greatly concerned about radiological safety.

Despite some initial safety efforts taken for earlier tests that included TRINITY in New Mexico, and ABLE and BAKER in the Pacific, atomic safety knowledge and technology were still in their infancy. The commentator said at the beginning of the film: "We are seeking answers to unanswered questions about atomic energy." He also said that most of the radiological damage occurred in the first second of the explosion.

Two key goals of this operation were to test the effectiveness of shielding and to maintain exposure records of all personnel involved. After the detonation of X-RAY, the first test of the three-test series, radiation monitoring personnel were sent immediately to Enjebi Island, dressed in military fatigues. Safety officials became concerned when the survey instruments and dosimetric devices indicated that personnel could be approaching the exposure limit of one-tenth Roentgen per day. Safety officials then issued gas masks to the monitoring personnel.

Military personnel are shown in fatigues cleaning the contaminated drone aircraft with water hoses. The commentator concluded: "Radiation, when handled intelligently, can be handled safely."

The tests comprising the 1948 Operation Sandstone were as follows:

- X-RAY, April 14, Enewetak (Enjebi Island), tower, weapons related, 37 kilotons (kt)
- YOKE, April 30, Enewetak (Aomon Island), tower, weapons related, 49 kt
- ZEBRA, May 14, Enewetak (Runit Island), tower, weapons related, 18 kt

FACT SHEET

0800076 - THE ARMED FORCES SPECIAL WEAPONS PROJECT PRESENTS TECHNICAL REPORT: TUMBLER-SNAPPER
1953 Black & White Sanitized 12:50

The two-phase Tumbler-Snapper Operation is described in this video. The Tumbler phase tests were conducted to primarily study blast pressures under different conditions, while the Snapper portion tests were conducted to provide data for new weapons. The first four tests were airdrops, and the second four were tower explosions.

Navy, Army and Marine troops participated in blast effects tests, including psychological effects on personnel viewing the explosions. The troops also demonstrated that foxholes in the field were the best defense against the atomic blasts. Blast effects testing on vegetation, as well as effects on five different types of military aircraft are shown.

The tests comprising the 1952 Operation Tumbler-Snapper were as follows:

- ABLE, April 1, airdrop, weapons effects, 1 kiloton (kt)
- BAKER, April 15, airdrop, weapons effects, 1 kt
- CHARLIE, April 22, airdrop, weapons related, 31 kt
- DOG, May 1, airdrop, weapons related, 19 kt
- EASY, May 7, tower, weapons related, 12 kt
- FOX, May 25, tower, weapons related, 11 kt
- GEORGE, June 1, tower, weapons related, 15 kt
- HOW, June 5, tower, weapons related, 14 kt

FACT SHEET

0800077 - OPERATION TUMBLER: A PHOTOGRAPHIC STUDY OF BLAST AND THERMAL EFFECTS
1952 Color 22:20

Operation Tumbler-Snapper was comprised of two suboperations. The Tumbler phase included four tower explosions, while the Snapper phase included four airdrop explosions. This video focuses on the more intensive diagnostic photography used during the Tumbler phase.

The video uses models and diagrams to demonstrate the locations of cameras, angles of view, and the use of accessory items such as rockets, smoke pots, and other visual tools. Spectacular comparisons are made using actual footage from the four Tumbler tests. Slow- and fast-motion photography, close- and long-range views; several cameras; and various film time sequences during and after the explosions show the incredible power of photographic analysis. Techniques used by scientists and engineers to record and analyze all aspects of a nuclear explosive test are demonstrated.

The tests comprising the 1952 Operation Tumbler-Snapper were as follows:

- ABLE, April 1, airdrop, weapons effects, 1 kiloton (kt)
- BAKER, April 15, airdrop, weapons effects, 1 kt
- CHARLIE, April 22, airdrop, weapons related, 31 kt
- DOG, May 1, airdrop, weapons related, 19 kt
- EASY, May 7, tower, weapons related, 12 kt
- FOX, May 25, tower, weapons related, 11 kt
- GEORGE, June 1, tower, weapons related, 15 kt
- HOW, June 5, tower, weapons related, 14 kt

FACT SHEET

0800078 - ATOMIC WEAPONS TESTS: TUMBLER-SNAPPER THROUGH UPSHOT-KNOTHOLE
1952-1953 Color Sanitized 30:30

This improved-quality video contains duplicate footage of videos 0800011 (Operation Tumbler-Snapper), 0800012 (Operation Ivy), and 0800015 (Operation Upshot-Knothole) with only minimal new footage. While the color on the original film has faded, the sharp detail of the subjects remain.

The Operation Tumbler-Snapper test series was designed to provide data on weapons development and military effects. This series provided blast effects data on soil, vegetation, aircraft, and military vehicles. A Department of Defense military exercise, Operation Desert Rock, was active during the Operation Tumbler-Snapper series.

In Operation Ivy, a commentator aboard a ship several miles distant from the MIKE test advised observers, "You are about to see the largest explosion ever seen by mankind." Then a view of the huge, evolving MIKE fireball is shown. Where the island of Elugelab once stood on Enewetak Atoll was a deep underwater crater. "Elugelab is missing," was the report to the President. The film also describes the KING test, the largest fission device fired up to that date. Shown is the B-36 aircraft at 40,000 feet, the device descending, and a very large fireball forming.

In the Operation Upshot-Knothole segment, Dr. John Clark discusses the development of new initiators for weapons and explains how these initiators increase yields of the same weapons. Also shown is the firing of the 280-mm atomic cannon, GRABLE test. Footage of blast effects on vehicles, houses, small structures, and a forest is also shown.

The tests comprising the 1952 Operation Tumbler-Snapper were as follows:

- ABLE, April 1, airdrop, weapons effects, 1 kiloton (kt)
- BAKER, April 15, airdrop, weapons effects, 1 kt
- CHARLIE, April 22, airdrop, weapons related, 31 kt
- DOG, May 1, airdrop, weapons related, 19 kt
- EASY, May 7, tower, weapons related, 12 kt
- FOX, May 25, tower, weapons related, 11 kt
- GEORGE, June 1, tower, weapons related, 15 kt
- HOW, June 5, tower, weapons related, 14 kt

The tests comprising the 1952 Operation Ivy were as follows:

- MIKE, October 31, Enewetak (Elugelab Island), surface, weapons related, 10.4 megatons
- KING, November 15, Enewetak (near Runit Island), airdrop, weapons related, 500 kt

The tests comprising the 1953 Operation Upshot-Knothole were as follows:

FACT SHEET

0800079 - OPERATION TEAPOT - MILITARY EFFECTS STUDIES
1955 Color 31:00

This improved-quality (i.e., the color) video is a duplicate video 0800017. The video deals primarily with three of the 14 Teapot tests that show the effects of three types of explosions: underground, air burst, and tower. The resultant post-explosion cloud formations of each one are shown. The 1-kiloton ESS cratering test sent up tons of soil, which spread out over a large area. The 3-kiloton HA (high altitude) test formed a doughnut shape starting at approximately 37,000 feet. The desired burst height was 40,000 feet, but an engine failure on the drop plane forced the lower-altitude burst. A close-up view of the 22-kiloton MET tower test shows the formation of the typical mushroom cloud.

Operation Teapot was designed to gather data on destructive loads on military aircraft and blast-wave effects on military land vehicles. The video shows damage to buildings and structures, water tanks, and field fortifications. One of the carefully studied special effects was the damage caused by the precursor shock wave rushing ahead of the main blast wave.

The tests comprising the 1955 Operation Teapot were as follows:

- WASP, February 18, airdrop, weapons effects, 1 kiloton (kt)
- MOTH, February 22, tower, weapons related, 2 kt
- TESLA, March 1, tower, weapons related, 7 kt
- TURK, March 7, tower, weapons related, 43 kt
- HORNET, March 12, tower, weapons related, 4 kt
  (scientists sought to determine if smog attenuated the heat of a nuclear fireball)
- BEE, March 22, tower, weapons related, 8 kt
- ESS, March 23, crater, weapons effects, 1 kt
- APPLE-1, March 29, tower, weapons related, 14 kt
- WASP PRIME, March 29, airdrop, weapons related, 3 kt
- HA (high altitude), April 6, airdrop, weapons effects, 3 kt
- POST, April 9, tower, weapons related, 2 kt
- MET, April 15, tower, weapons effects, 22 kt
  (scientists gathered data from 38 experiments placed around ground zero)
- APPLE-2, May 5, tower, weapons related, 29 kt
- ZUCCHINI, May 15, tower, weapons related, 28 kt

FACT SHEET

0800080 - THE FIRST TWENTY-FIVE YEARS (LOS ALAMOS)
1973 Black & White/Color 28:00

This video traces the career of Norris Bradbury, a young physicist who came to Project Y in Los Alamos to help build the first atomic bombs. Bradbury, who succeeded J. Robert Oppenheimer as Director of the Los Alamos Scientific Laboratory in 1945, remained at that post until his retirement in 1970. Bradbury, who narrates the entire video, shows historical views of Los Alamos in the 1940s and pictures of the famous scientists who came to work on Project Y, and of General Leslie Groves, who directed the Manhattan Engineer District.

Bradbury states that "the War Years were very exciting," and that the activities at the Laboratory were kept secret. He discusses the development of the atomic bomb and the first test at the Trinity Site in New Mexico. He defends the U.S. decision to drop the bombs on Japan that led to the conclusion of World War II in the Pacific. He also explains how the U.S. weapon development efforts advanced from fission to fusion (hydrogen) weapons. Color views of the MIKE test, the first full-fledged hydrogen bomb experiment, are shown.

FACT SHEET

0800081 - U.S. AIR FORCE TRAINING FILM TF5793, BROKEN ARROW PROCEDURES FOR AN EOD DETACHMENT
1967 Color 17:00

This video is an Air Force training film made at Hill Air Force Base in Ogden, Utah, detailing how an Air Force Explosive Ordnance Disposal (EOD) unit responds to a Broken Arrow, code name for a nuclear weapons accident. The technology and methods used were current in 1967. The EOD unit mandate was to render safe all nuclear weapons involved in the accident and recover all parts of the weapon(s).

Also, the film provides information on a Broken Arrow involving a weapon accidentally dropped from an aircraft. The high explosive in the weapon detonated on impact with the ground, resulting in a small crater. Another Broken Arrow involved an Air Force plane that crash-landed and caught on fire. Fire fighters fought the fire until just before the calculated time for the high explosive to detonate, then they evacuated the area before the explosion. The last accident scenario involved a Genie missile.

FACT SHEET

0800082 - B-52 ACCIDENT, YUBA CITY, CA (BROKEN ARROW)
1961 Black & White Sanitized Silent 14:55

On March 14, 1961, an Air Force B-52 aircraft carrying two nuclear weapons experienced failure of the crew compartment pressurization system. The failure forced the pilot to descend to 10,000 feet. This low elevation caused the plane to quickly burn up the remaining fuel, putting the crew in grave danger. All but the pilot bailed out at 10,000 feet, and he stayed with the B-52 until it reached 4,000 feet. He carefully steered the aircraft away from a populated area and bailed out. All crew members survived.

As the plane impacted the ground, the two nuclear weapons were torn away from the body of the plane but remained intact. There was no high-explosive detonation or nuclear yield. Safety devices worked as designed for such an accident, and there was no nuclear contamination. The large bomber cut a swath through the uninhabited countryside near Yuba City, CA, about 45 miles north of Sacramento, CA. Various size pieces of the B-52 aircraft, along with the two bombs (intact), were strewn on both sides of the path cut by the plane.

Several Air Force generals arrived at the scene quickly to oversee the cleanup of debris and the rendering safe of the two weapons. This video has good footage showing the actual Broken Arrow scene.

and the other drifting out to sea. It took weeks to locate the bomb in the sea, but this was finally accomplished with the help of some fishermen who saw it drop. The four Mark-28 nuclear weapons, each weighing approximately 2,250 pounds, were torn from the B-52 bomb rack during breakup of the aircraft. The film shows search and cleanup efforts.

FACT SHEET

0800084 - ATOMIC EXPLOSION, THE STORY OF FIVE ATOMIC BOMBS (REELS 1-6)
1945-1946 Black & White 59:17

0800085 - ATOMIC EXPLOSION, THE STORY OF FIVE ATOMIC BOMBS (REELS 7-12)
1945-1946 Black & White 59:52

0800086 - ATOMIC EXPLOSION, THE STORY OF FIVE ATOMIC BOMBS (REELS 13-18)
1945-1946 Black & White 1:01:44

This set of videos comprises films that were previously compiled by the U.S. Naval Photographic Center and released by the Defense Nuclear Agency (DNA) in 1983. They provide an account of how and why the U.S. entered the atomic age. The videos also discuss the scientists who contributed to the understanding of the atom.

A highlight of the video is the excellent views of the TRINITY test, the first atomic explosion. Additionally, World War II military objectives and accomplishments of the Allied Forces in the Pacific are detailed along with the events that led to the bombing of two Japanese cities.

In 1946 the U.S. established the Pacific Proving Ground and conducted Operation Crossroads. The two-test operation (ABLE and BAKER) was designed to gain knowledge about the effects of atomic explosions and to determine how an atomic bomb behaves when detonated under water. The view of the water plume from the BAKER test is awesome. A great deal of information was obtained by the Navy and Army Air Force from drone aircraft that sampled the mushroom clouds from the ABLE and BAKER tests.

FACT SHEET

0800087 - DOMINIC SUNSET
1962 Color Silent 3:30

The camera angle on the July 10, 1962, Operation Dominic SUNSET test provides one of the most spectacular views of the one-megaton thermonuclear blast near Christmas Island in the Pacific Proving Ground. The brilliant fireball is seen just above a huge atomic cloud, then seconds later, ice rings begin to form above the fireball. An incredible view emerges as an ice cap forms above the ice rings. It is amazing that an explosion with such force can produce such a beautiful image. With incredible color and slow-motion intensity, this short video graphically presents the torrential growth of a megaton explosion's fireball forming into a huge mushroom cloud.

FACT SHEET

0800088 - JOINT TASK FORCE THREE PRESENTS OPERATION GREENHOUSE
1951 Color Sanitized 1:19:30

Greenhouse was a historic operation because the first thermonuclear test (GEORGE) was detonated, and a successful test (ITEM) of the boosting principle was accomplished. The 225-kiloton GEORGE proved that a mixture of deuterium and tritium (two heavy isotopes of hydrogen) could be made to fuse with energy from a fission reaction. The ITEM test verified the boosting principle for fission devices. Boosting required that deuterium and tritium be placed in the center of the device, surrounded by uranium or plutonium. When the fissioning material was imploded, the deuterium and tritium released large quantities of neutrons, which struck the special nuclear material and caused even more fissioning to take place.

Overall, Operation Greenhouse was dedicated to making lighter and more efficient weapons; obtaining offensive and defensive effects test data on animals, structures, aircraft, and tanks; and carrying out experiments on the thermonuclear challenges.

The video shows the fireballs from the four tests. Especially impressive was the GEORGE test where the mushroom cloud is seen changing from white to black, then to brown, and almost back to white again. The mushroom cloud is then shown with a huge ice cap with the stalk adorned with a white skirt coming down from the cloud.

The tests comprising the 1951 Operation Greenhouse were as follows:

- DOG, April 7, Enewetak (Runit Island), tower, weapons related, 81 kilotons (kt)
- EASY, April 20, Enewetak (Enjebi Island), tower, weapons related, 47 kt
- GEORGE, May 8, Enewetak (Eleleron Island), tower, weapons related, 225 kt
- ITEM, May 24, Enewetak (Enjebi Island), tower, weapons related, 45.5 kt

FACT SHEET

0800089 - ATOMIC WEAPONS TESTS, TRINITY THROUGH BUSTER-JANGLE
1945-1951 Color Sanitized 22:59

This good quality video describes the U.S. atomic tests conducted from 1945 through 1951 (i.e., TRINITY through Operation Buster-Jangle). The video details the progression of weapons, the atomic devices becoming smaller and smaller, and the first use of thermonuclear (or hydrogen) devices. These tests were conducted at the Pacific Proving Ground and the Nevada Test Site/Nevada Proving Ground (later permanently renamed the Nevada Test Site).

The tests described are as follows:

Trinity, July 16, 1945, tower, weapons related, 21 kilotons (kt)
(the first atomic explosion detonated near Alamogordo, New Mexico)

The tests comprising the 1946 Operation Crossroads were as follows:

- ABLE, June 30, Bikini, airdrop, weapons effects, 21 kt
- BAKER, July 24, Bikini, underwater, weapons effects, 21 kt

The tests comprising the 1948 Operation Sandstone were as follows:

- X-RAY, April 14, Enewetak (Enjebi Island), tower, weapons related, 37 kt
- YOKE, April 30, Enewetak (Aomon Island), tower, weapons related, 49 kt
- ZEBRA, May 14, Enewetak (Runit Island), tower, weapons related, 18 kt

The tests comprising the 1951 Operation Ranger at the Nevada Test Site were as follows:

- ABLE, January 27, airdrop, weapons related, 1 kt
- BAKER, January 28, airdrop, weapons related, 8 kt
- EASY, February 1, airdrop, weapons related, 1 kt
- BAKER-2, February 2, airdrop, weapons related, 8 kt
- FOX, February 6, airdrop, weapons related, 22 kt

The tests comprising the 1951 Operation Greenhouse were as follows:

- DOG, April 7, Enewetak (Runit Island), tower, weapons related, 81 kt
- EASY, April 20, Enewetak (Enjebi Island), tower, weapons related, 47 kt
- GEORGE, May 8, Enewetak (Eleleron Island), tower, weapons related, 225 kt
  (first thermonuclear test explosion)
- ITEM, May 24, Enewetak (Enjebi Island), tower, weapons related, 45.5 kt
  (first test of the boosting principle)

The tests comprising the 1951 Operation Buster/Jangle at the Nevada Proving Ground were as follows:

- ABLE, October 22, tower, weapons related, less than 0.1 kt
- BAKER, October 28, airdrop, weapons related, 3.5 kt
- CHARLIE, October 30, airdrop, weapons related, 14 kt
- DOG, November 1, airdrop, weapons related, 21 kt
- EASY, November 5, airdrop, weapons related, 31 kt
- SUGAR, November 19, surface, weapons effects, 1.2 kt
- UNCLE, November 29, crater, weapons effects, 1.2 kt

FACT SHEET

0800090 - EDWARD TELLER - AN EARLY TIME
1979 Black & White/Color 28:00

Edward Teller begins talking about his life in Germany and the scientists who influenced his career. He had wanted to study mathematics, but his father told him that he couldn't make a living that way. He wanted Edward to study chemistry. They compromised and Edward studied chemistry and mathematics.

In 1928 after hearing of the advances in atomic theory and with the discovery of quantum mechanics, he went to study under the physicist Arnold Sommerfeld in Munich. An injury to his leg kept him out of school for a term, and when he returned, Sommerfeld was lecturing out of the country. Teller then went to Leipzig for the next term to study theoretical physics under Professor Werner Heisenberg.

With the ominous political situation and Hitler's rise to power, Teller left Germany and went to England where many scientists were offered jobs. Later, he took the opportunity to come to the United States when offered a position at George Washington University in Washington, DC. There, in January 1939 at a conference, the renown physicist Niels Bohr announced the fact of the fission of uranium.

Teller describes his relationship with Leo Szilard, for whom he had a great admiration. After Niels Bohr's annoucement of the fission of uranium, Szilard knew that a massive research effort was needed to develop an atomic bomb. He planned what needed to be done to implement that work, by first convincing Albert Einstein to sign a letter to President Roosevelt describing the necessity of an atomic weapons research project and then making certain that the President read that letter.

Teller said that he had always wanted to study theoretical physics, not weapons. However, his focus changed the day after Hitler invaded Belgium and Holland. He heard President Roosevelt speak of how essential it was for scientists in the United States to work on atomic weapons development if freedom was going to survive.

Soon after that, Edward Teller decided he must work on weapons research, and he went to Los Alamos, New Mexico. There he worked with many esteemed scientists, that included J. Robert Oppenheimer, Enrico Fermi and the great mathematician, John Von Neumann, on the secret Manhattan Project to develop an atomic bomb. He witnessed the Trinity test at Alamogordo, taking all the safety precautions for viewing the explosion. The test was successful from a technical standpoint, but he realized the devastation this weapon would produce.

FACT SHEET

0800091 - THE BASIC PHYSICS OF AN ATOMIC BOMB
No date Color 19:45

This video is an animated presentation to teach how using the basic concepts of physics can create an atomic explosion. The video explains how scientists classified and arranged elements according to their atomic structure. Using the simplest element as an example, the narrator defines the components of the hydrogen atom; explains combining atoms to form chemical compounds; and illustrates the mechanism by which the addition of neutrons to the nucleus forms isotopes.

As an example of natural radioactivity, the video shows an unstable uranium atom decaying to form a more stable atom. The process of radioactive decay of an element is defined by its half-life, which is the time required for one-half of a radioactive material to decay. The half-life varies from isotope to isotope.

By using cyclotrons and accelerators to bombard elements with hydrogen and helium nuclei and other "bullets," man produced radioactive isotopes of many elements. To produce an atomic explosion, scientists had to form new isotopes which, through particle emission, would bombard another nucleus releasing additional particles and excess energy essentially simultaneously.

This work lead scientists to discover two methods to bring about an atomic explosion. The first method is nuclear fusion, where atoms are fused; weight loss occurs (i.e., the parts are heavier than the whole); and the extra mass is released as energy. The second method, which was more practical at that time, is the reverse of fusion, i.e., nuclear fission. In the fission process, heavier elements are broken into lighter ones. When an atom is bombarded by a neutron at the correct speed, the atom breaks into two lighter elements with a great release of energy, and two or three additional neutrons are produced which in turn bombard other atoms creating a chain reaction.

The release of energy through these processes is possible at the far ends of the ladder of elements. Where fusion produces energy through the combination of the lightest elements, fission splits only the heaviest elements, and the products of both processes tend toward the middle of the element ladder.

The mechanism for producing enough neutrons to produce a successful chain reaction to achieve a supercritical mass is illustrated. The problem was that this process could not be validated by a laboratory test. Only a full-scale experiment would show if, in fact, the critical components could be brought together to create a chain reaction that would result in an atomic bomb explosion. This happened on July 16, 1945, at Alamogordo, New Mexico, when the first test of a nuclear weapon was successfully conducted.

FACT SHEET

0800092 - NUCLEAR EFFECTS DURING SAC DELIVERY MISSIONS
1960 Color Sanitized 30:50

This video describes the effects of nuclear weapon detonations on aircraft and how combat planners developed the scenarios for SAC (Strategic Air Command) missions. These studies also evaluated the effects to the aircraft and personnel if that aircraft was positioned at specific distances from a nuclear weapon when it was detonated. Explanations of thermal, blast, and radiation effects on the aircraft and personnel are discussed.

Thermal light and heat radiate from the detonation in two phases. The first phase is instantaneous but causes flash blindness. Studies showed that personnel would have to be at least 80 nautical miles away when looking directly at the detonation to avoid even minor flash blindness. The second phase of thermal pulse is long and cumulative, and the heat energy builds up on the surface of the aircraft. Fortunately, the aircraft skin (i.e., outer layer) reflects most of the heat.

The blast effect, which occurs after the thermal effect, is the shockwave. This is a two-fold effect of overpressure and gust. Overpressure, which is the dominating effect at low altitudes, produces a wraparound crushing action, while gust, which is the dominating effect at medium and high altitudes, gives the aircraft a sharp jolt as it builds up on the lifting surfaces of the wing and the horizontal stabilizer.

The only radiation effects of concern to delivery aircraft is the nuclear cloud because of the aircraft's distance from the blast. During Teapot and Redwing Operations, manned flights were made through atomic clouds at specified times after the burst. These flights were made only after effects testing data was analyzed from studies conducted during previous operations.

Effects testing data on aircraft structures was conducted from Operations Crossroads through Hardtack. The video describes many of the tests and their findings from each successive operation, and how the knowledge gained was incorporated into later operations. In addition, SAC mission planners utilized this data in planning exercise mission scenarios.

FACT SHEET

0800093 -ATOMIC WEAPONS ORIENTATION PART ONE - ORGANIZATION FOR ATOMIC ENERGY; ATOMIC WEAPONS ORIENTATION PART TWO - BASIC ATOMIC WEAPONS
1961 and 1965 Black & White/Color Sanitized 30:00 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART ONE - ORGANIZATION FOR ATOMIC ENERGY
17:50

This is an improved quality version of Part One of video 0800068 that contains the same footage. The Atomic Energy Acts of 1946 (and revised in 1954) set up a vast government (military and civilian) industrial complex for the research, development, testing, and production of nuclear weapons, as well as for other assignments in the energy field. The workings of this complex make up the subject for this video.

Shown are the coordination and liaison activities between the civilian Atomic Energy Commission and the Department of Defense. Each organization's major laboratories, facilities, and policy and planning groups active in 1961 are described. Footage of nuclear weapons storage, training and test sites is shown.

ATOMIC WEAPONS ORIENTATION PART TWO - BASIC ATOMIC WEAPONS
12:10

This is an improved quality and expanded version of Part Two of video 0800068. This animated and live action video was designed primarily as an instructional video on how nuclear weapons work. There is a simplified discussion of the two categories of nuclear weapons, fission and fusion. The video described the "gun-type" and "implosion" fission methods. Another segment details the sequence of events and devices that have to work in unison to enable fission or fusion weapons to produce a nuclear yield.

An implosion weapon has a core of uranium or plutonium surrounded by high explosives, a lensing system, and detonators. Upon receipt of a firing signal, a firing set generates a high- voltage pulse that fires the detonators simultaneously. The detonation wave is focused by the lensing system into an implosion wave that compresses the core into a supercritical mass resulting in a nuclear explosion. The video also discusses radar, neutron generators, nuclear pits, and other weapon components.

FACT SHEET

0800094 -ATOMIC WEAPONS ORIENTATION PART THREE - A SPECIAL WEAPONS ORIENTATION: WEAPONS FAMILY; ATOMIC WEAPONS ORIENTATION PART FOUR - ATOMIC WEAPONS SUPPORT OPERATIONS
1961 Black & White/Color Sanitized 19:50 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART THREE - A SPECIAL WEAPONS ORIENTATION: WEAPONS FAMILY
7:30

This is a slightly expanded version of Part Three of video 0800069, which describes the capabilities and features of these weapons in more detail. This video shows U.S. stockpiles nuclear weapons up to 1961. The stockpile includes early airdrop fission weapons, Mark (Mk)-3, Mk-4, Mk-5, Mk-6, Mk-6/18, Mk-7, Mk-8, Mk-12, and Mark-9, the artillery atomic projectile. A live test of the Mk-9 fired from a 280 mm cannon is shown. This was the 15-kiloton GRABLE test conducted on May 25, 1953, as part of Operation Upshot-Knothole.

ATOMIC WEAPONS ORIENTATION PART FOUR - ATOMIC WEAPONS SUPPORT OPERATIONS
12:20

This is essentially the same version of Part Four of video 0800069. The special contributions of nuclear weapons technicians are featured in this video. They inspected, maintained, modified and modernized nuclear weapons at various storage and operation field sites. The video shows training conducted at the Defense Atomic Support Agency's nuclear weapons school in Albuquerque and the U.S. Air Force's weapons school at Lowry Air Force Base in Colorado. Technicians are shown conducting "fire test set" inspections on all branches of the armed services.

The narrator explains that the storage, maintenance, inspection and modification of nuclear weapons is part of the "mine to stockpile sequence." Also, the video shows that the technicians are a vital part of the "stockpile to target sequence" as they prepare weapons for shipment, load weapons onto strike aircraft, and maintain and modify weapons at forward field sites.

Footage is shown of weapons being loaded on a B-52 and a smaller attack aircraft. The narrator explains that the major function of a technician was to "make the weapon ready for the day when by Presidential decree, nuclear weapons would be sent out on intercontinental bombers, tactical aircraft, missiles, and carrier-deployed aircraft to the target areas."

FACT SHEET

0800095 -ATOMIC WEAPONS ORIENTATION PART FIVE - EFFECTS OF ATOMIC WEAPONS; ATOMIC WEAPONS ORIENTATION PART SIX - A SPECIAL WEAPON ORIENTATION: THE THERMONUCLEAR WEAPON
1964 Black & White/Color Sanitized 45:15 (Two Films on One Video)

ATOMIC WEAPONS ORIENTATION PART FIVE - EFFECTS OF ATOMIC WEAPONS
15:25

This is essentially the same version of Part Five of video 0800070. This video shows the heat, blast, and radiation effects of a nuclear explosion on personnel (dummies), structures, and military equipment. The problems caused by residual radiation are also discussed. The video is a compilation of numerous nuclear detonations in the atmospheric testing program, but does not identify each blast. All types of detonations, including underground, surface, near surface and high altitude are shown.

ATOMIC WEAPONS ORIENTATION PART SIX - A SPECIAL WEAPON ORIENTATION: THE THERMONUCLEAR WEAPON
29:50

This is a slightly expanded version of Part Six of video 0800070. This video provides a history and the major developmental phases of the thermonuclear program up to May 1, 1956. The test operations of Greenhouse, Ivy and Castle are highlighted. The GEORGE test in Operation Greenhouse was the first thermonuclear test explosion. It was followed by the MIKE test in Operation Ivy, which used a liquid, or "wet" fuel. A wet fuel was very expensive, as it had to be super cooled until used. The first test in Operation Castle, BRAVO, used a dry fuel successfully, and that ended the debate over wet versus dry fuel.

Two continuing goals remained: (1) determine how to reduce the size and weight of the thermonuclear weapon, and (2) gather information on the effects of high-yield weapons. Regarding size and weight, the video shows a series of weapons that gradually are reduced in these aspects. Also, it shows the air delivery capabilities of these weapons, including footage on the B-47, the B-36 and the B-52 aircraft. On the effects aspect, the video defines fallout and describes what kind of path it leaves, the dangers from it, and how to protect oneself. It shows the destructive forces of a thermonuclear weapon in many ways, including how the MIKE test destroyed the island of Elugelab. A dramatic scene develops at the end as the narrator says, "This is the detonation of a thermonuclear weapon on Enewetok Atoll. This is a man standing on Bikini Atoll, 200 miles away." The light and boiling cloud of colors illuminates the entire sky almost as if the explosion was only a few miles away.

FACT SHEET

0800096 -TARGET NEVADA
1953 Color 14:20

The video shows the U.S. Air Force participation in the Atomic Energy Commission's continental test program and the Department of Defense' nuclear weapons program. The video begins with a view of a barren space where atomic bombs had been exploded. This area was referred to as the valley where the giant mushrooms grow. An Air Force plane is shown dropping another bomb, employing the knowledge gained from previous aerial drops.

Following several dramatic views of the blast, the video explains the importance of weather and its relation to the atomic cloud; the role of the helicopter in charting super "hot" areas; how cloud sampling and tracking were accomplished; and gathering photographic and electronic data. The flash blind test was conducted by the Air Force which showed the effect of atomic light on the eyes of crew members. The results of these and other tests were given to civilian agencies.

The video concludes with a dramatic sequence showing an actual test from the final briefing sessions by the test authorities to the bomb drop and resulting blast and cloud formation.