

An Atomic Veteran's Experience on Nuclear Weapons Tests in 1958

John C. Taschner

2332 Arroyo Falls St. NW

Albuquerque, NM 87120

505.899.1410 (H)

505.270.3421(C)

John.taschner@comcast.net

Operation Hardtack

Hardtack I -

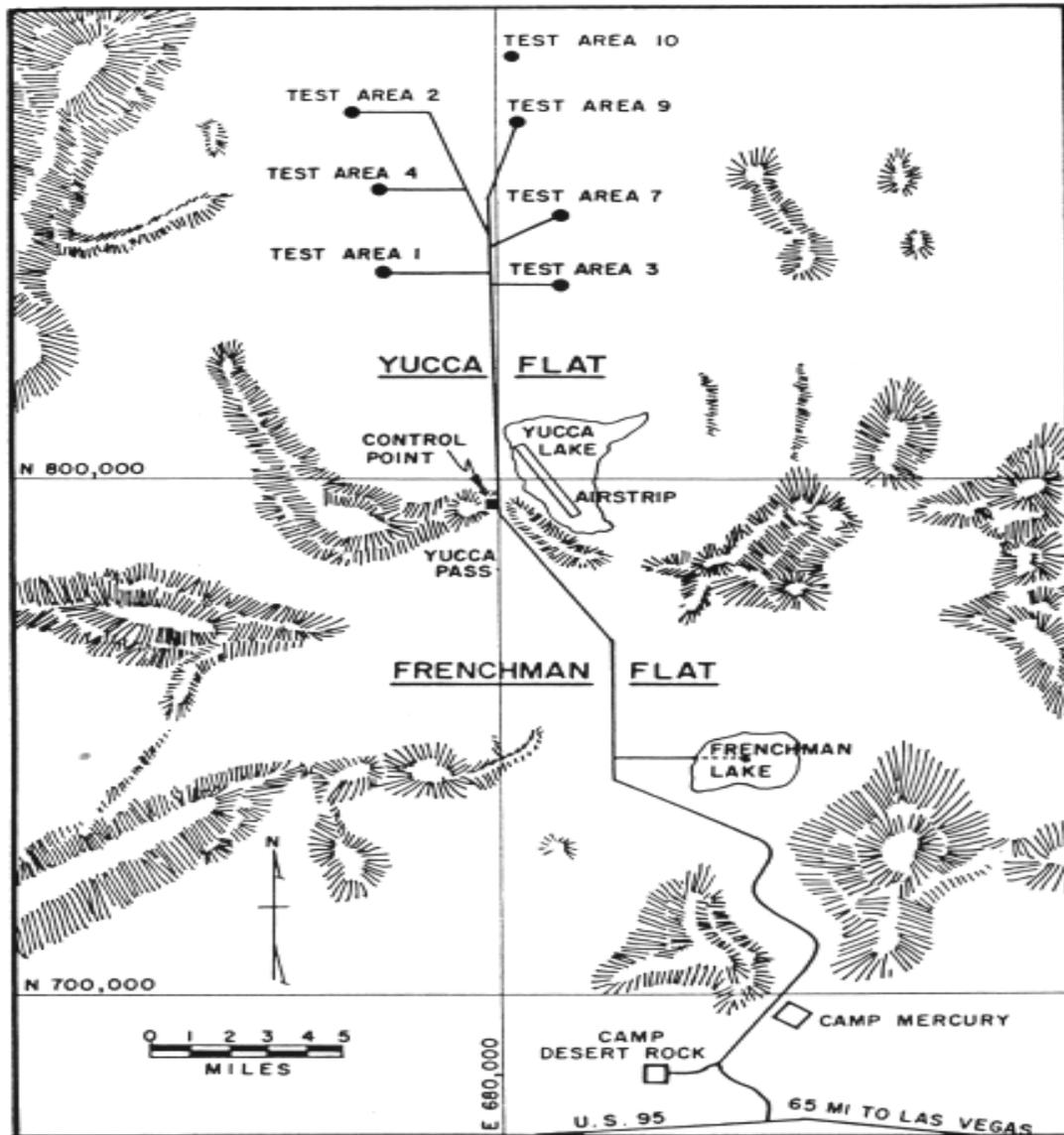
- Conducted in Pacific Ocean, April –August 1958
- High yield thermonuclear weapon tests

Hardtack II –

- Conducted at Nevada Test site, Sept. – Oct. 1958
- Low yield nuclear weapon tests
- Nuclear safety experiments (one-point safety)

A total of 77 shots were fired in Hardtack I and II. More than in the 3 previous years combined!

Moratorium on above ground testing on Oct. 31, 1958.



Nevada Test Site

My road to Los Alamos & Hardtack II

- Sept 1957 – Sept 1958 Armed Forces Institute of Pathology & National Naval Medical Center
 - Training in Nuclear Medicine
- Late Summer 1958
 - Called to report to USAF Surgeon General's Office
 - Reassignment to Los Alamos Scientific Laboratory. (Reported on October 5, 1958)
 - Training in Health Physics and Weapons

Hardtack II Operations

Nuclear Weapons Tests

- Tests consisted of 19 low-yield shots: 10 balloon, 4 underground & 5 tower shots.
- Weapons attached to balloons tethered 500 – 1500 feet above bunker.
- Bunker contained radiation sensitive test equipment including high-speed film for photography.
- Heavy steel door, entry to bunker.

Hardtack II Operations

Nuclear Weapons Tests

- Entry team consisted of two LASL HP personnel in full Personnel Protective Equipment.
- Drove to the site. Radiation measurements taken en route. Turn around point was 5 R/hour.
- Opened bunker door, called technicians to make entry, they removed instruments and film & exited area, followed by HP personnel who were always **“first in, last out.”**
- All entry personnel were monitored at entry/exit point for contamination. Outer PPE removed. Showers and Suit out for next mission.

Summary of Balloon Shots

Height of Burst: 500-1500 feet

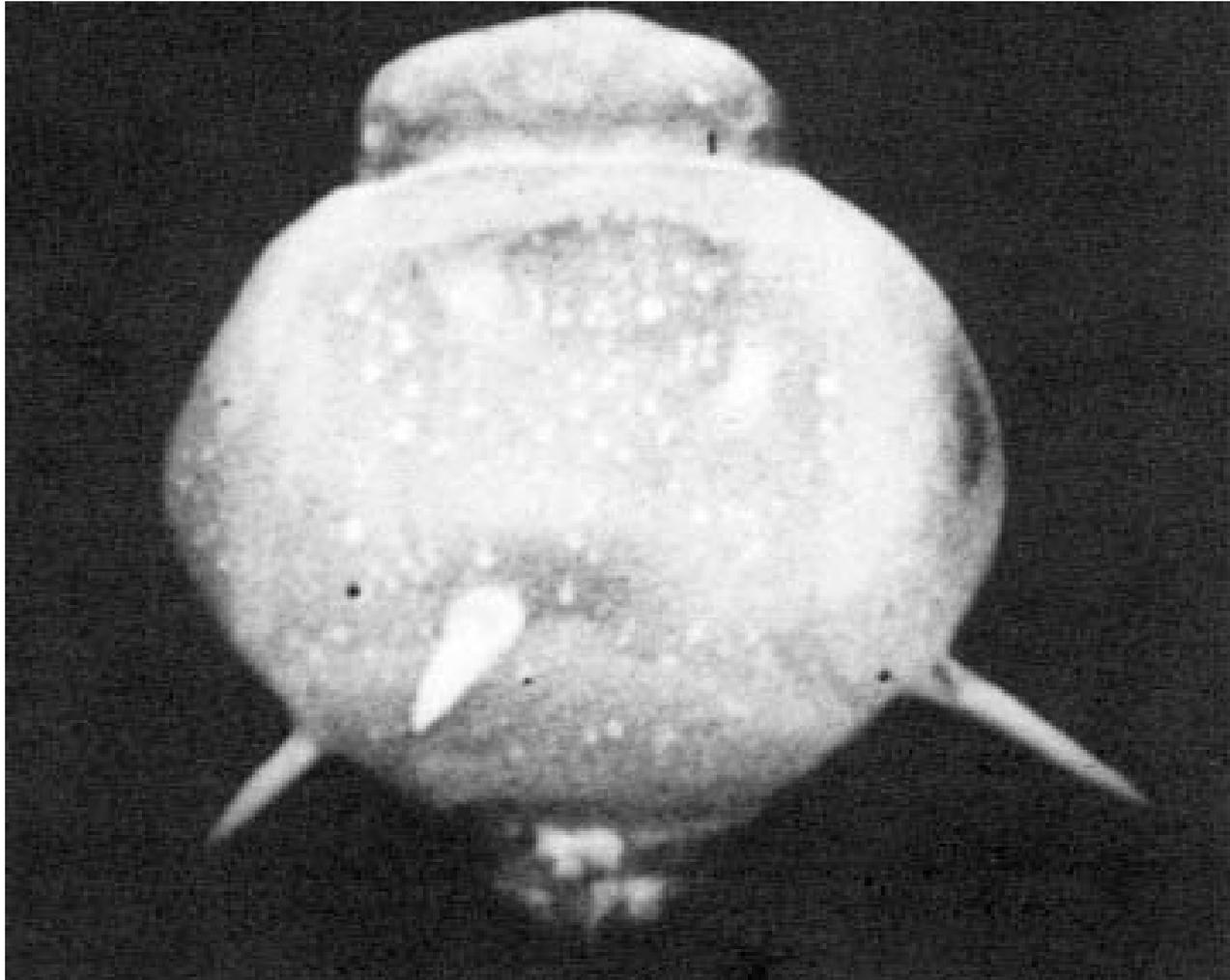
<u>Shot</u>	<u>Date</u>	<u>Sponsor</u>	<u>Yield (KT)</u>
Eddy	09/19	LASL	0.083
Mora	09/20	LASL	2
Lea	10/13	LASL	1.4
Dona Ana	10/16	LASL	0.037
Socorro	10/22	LASL	6
Wrangell	10/22	UCRL	0.115
Rushmore	10/22	UCRL	0.188
Sanford	10/26	UCRL	4.9
De Baca	10/26	LASL	2.2
Santa Fe	10/30	LASL	1.3



Socorro, 6KT



De Baca, 2.2 KT



Lea, 1.4 KT



Blanco, Tunnel shot at -987 feet, 22 KT

Hardtack II Operations

Nuclear Safety Experiments

- Experiments were designed to determine if the new “sealed pit” implosion type nuclear weapons were “one-point safe.”
- That the accidental firing of a few detonators would not produce a nuclear yield.
- The standard that was adopted was that the fission device would produce “zero nuclear yield” .
- There were 18 nuclear safety experiments in the Hardtack II series

Early “Open-Pit” Weapons

Prior to about 1958, nuclear weapons were designed as two main parts:

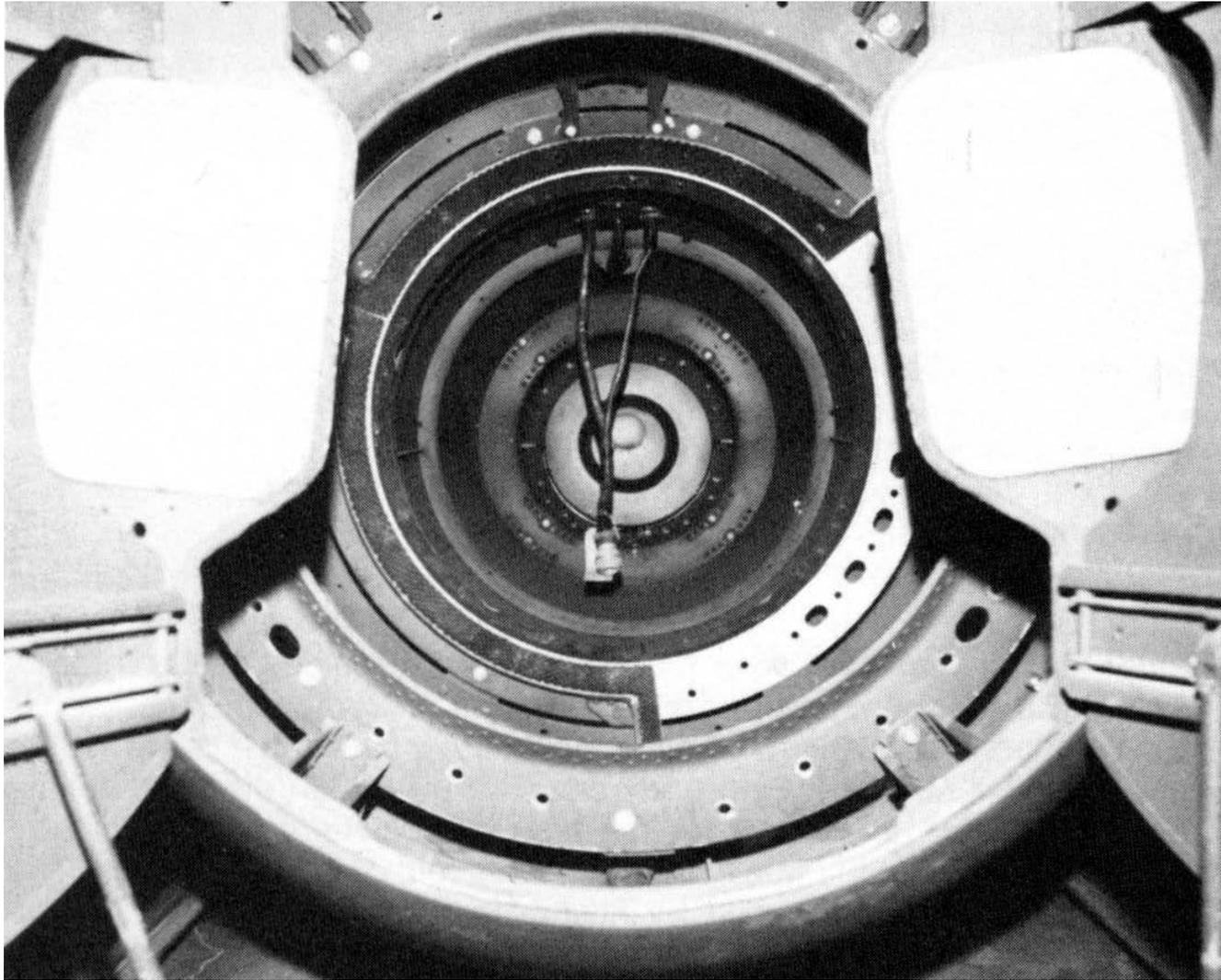
- Tamper-high explosive assembly
 - Spherical shaped tamper made of natural or depleted uranium surrounded by high explosive
 - Contained within the bomb casing
- Plutonium core
 - Carried on aircraft in a “birdcage”



Mark 5 “Open Pit” Weapon



Birdcage



Mark 5 "Open Pit" Weapon

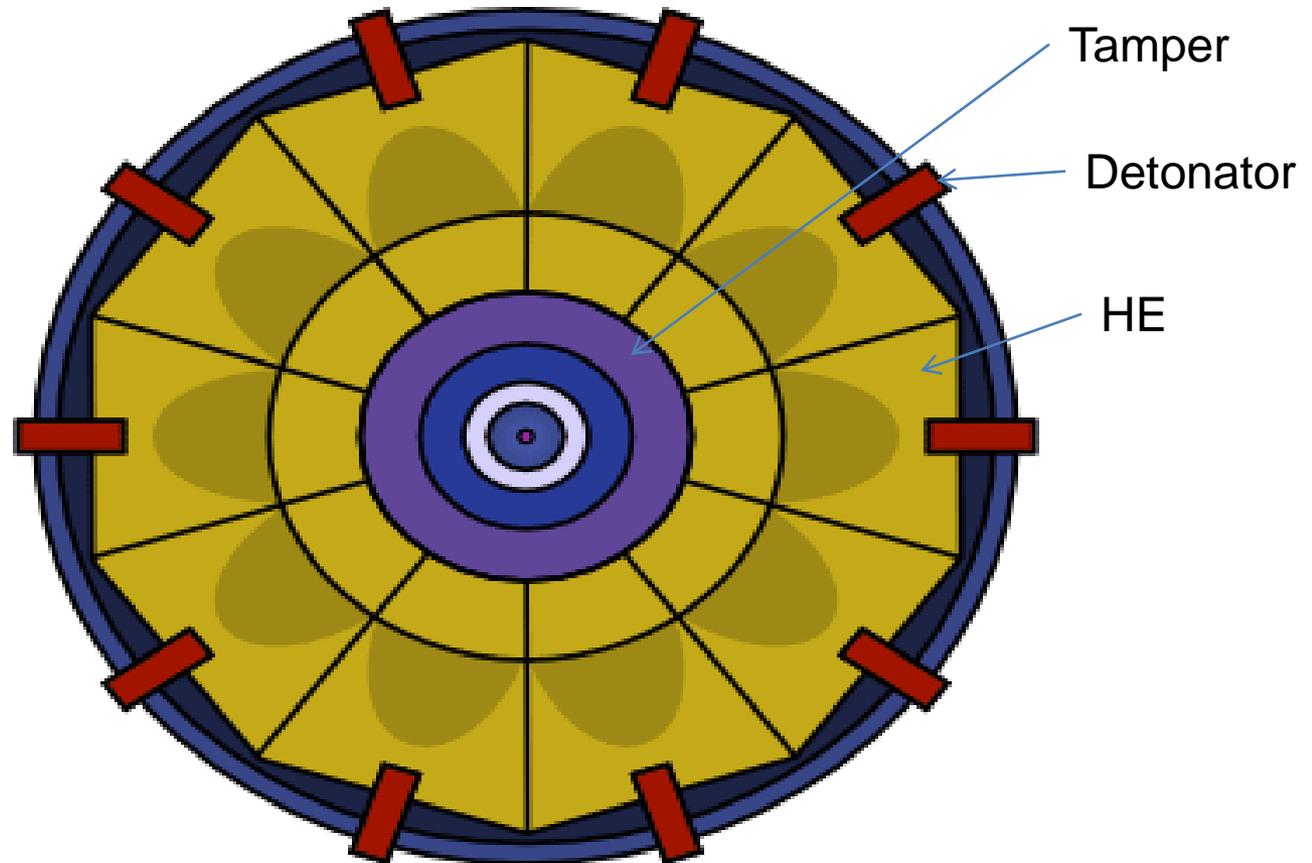
Early “Open-Pit” Weapons

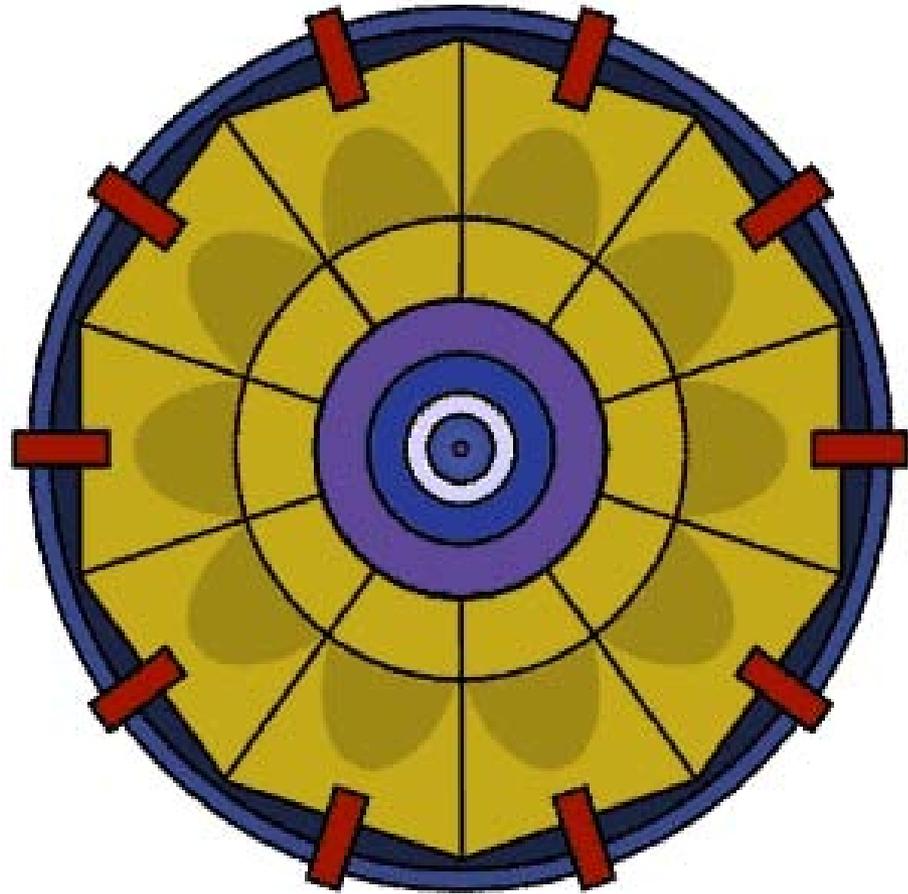
- Inherently nuclear safe since the plutonium core would only be assembled in flight when it was going to be used.
- Assembly was done either manually or by an automatic in Flight Insertion (AFI) system.

“Sealed-Pit” Implosion Weapons

- All of the parts of a fission bomb, including the fissile material (Pu or U), tamper, high explosive (HE) and detonators are assembled as a unit.
- The subcritical sphere of plutonium is surrounded by high explosive.
- When fired, the HE detonation compresses the plutonium into a supercritical mass.
- Concerns that the accidental detonation of the HE (from shock or fire) could compress the core to supercriticality.

“Sealed-pit” Implosion design





One-Point Safe

- Result is a scattering of plutonium
- Palomares, Spain accident (January 1966)
 - HE in two weapons detonated when bombs impacted with the earth.
 - 650 acres contaminated.
- Thule, Greenland accident (January 1968)
 - He in four weapons detonated when bomber crashed on ice cap
 - 3 acres contaminated . Pu trapped in jet fuel



Davy Crocket

Summary of Selected One-point Safety Experiments

<u>Shot</u>	<u>Date</u>	<u>Sponsor</u>	<u>Yield (T)</u>
Hidalgo	10/05	LASL	77
Neptune	10/14	UCRL	115 (XW-47)
Vista	10/15	UCRL	24 (XW-47)
San Juan	10/20	LASL	90
Oberon	10/22	UCRL	0 (XW-47)
Ceres	10/26	UCRL	7 (XW-48 artillery shell)
Chavez	10/27	LASL	0.6

Criteria for one-point safe – No nuclear yield