N A A V

National Association of Atomic Veterans, Inc.

"Assisting America's Atomic Veterans Since 1979"

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R. J. RITTER - Editor **April**, 2012

United States Atmospheric & Underwater Atomic Weapon Activities

1945 "TRINITY" ***ALAMOGORDO, N. M.***

1945 "LITTLE BOY" ***HIROSHIMA, JAPAN***

1945 "FAT MAN" ***NAGASAKI, JAPAN***

1946 "CROSSROADS" ***BIKINI ISLAND***

1948 "SANDSTONE" ***ENEWETAK ATOLL***

1951 "RANGER" ***NEVADA TEST SITE***

1951 "GREENHOUSE" ***ENEWETAK ATOLL***

1951 "BUSTER – JANGLE" ***NEVADA TEST SITE***

1952 "TUMBLER - SNAPPER" ***NEVADA TEST SITE***

1952 "IVY" ***ENEWETAK ATOLL***

1953 "UPSHOT - KNOTHOLE" ***NEVADA TEST SITE***

1954 "CASTLE" ***BIKINI ISLAND***

1955 "TEAPOT" ***NEVADA TEST SITE***

1955 "WIGWAM" ***OFFSHORE SAN DIEGO***

1955 "PROJECT 56" ***NEVADA TEST SITE***

1956 "REDWING" ***ENEWETAK & BIKINI***

1957 "PLUMBOB" ***NEVADA TEST SITE***

1958 "HARDTACK-I" ***ENEWETAK & BIKINI***

1958 "NEWSREEL" ***JOHNSTON ISLAND***

1958 "ARGUS" ***SOUTH ATLANTIC***

1958 "HARDTACK-II" ***NEVADA TEST SITE***

1961 "NOUGAT" ***NEVADA TEST SITE***

1962 "DOMINIC-I" ***CHRISTMAS ISLAND***
JOHNSTON ISLAND

1965 "FLINTLOCK" ***AMCHITKA, ALASKA***

1969 "MANDREL" ***AMCHITKA, ALASKA***

1971 "GROMMET" ***AMCHITKA, ALASKA***

1974 "POST TEST EVENTS" ***ENEWETAK CLEANUP***

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" IF YOU WERE THERE, YOU ARE AN ATOMIC VETERAN "

The Newsletter for America's Atomic Veterans

COMMANDER'S COMMENTS

Outreach Update: First, let me extend our thanks to the membership and friends of **NAAV** for supporting our "outreach" efforts over the past several years. It is that firm dedication to our Mission-Statement that has driven our efforts and purpose to those ends, and the resulting rewards have been many, indeed. As an example, we have been contacted by many Atomic Veterans, and more than 50 widows (of deceased Atomic-Vet's) who just wanted to let us know that they were now receiving compensation that they were not (previously) aware of prior to our "outreach" communication efforts. Moreover; unusual happenings, and activities during fiscal years 2010 and 2011 have also been most interesting. . . . .

They began with a short article in the (Jan, 2010) **VFW Magazine**, and ended with an article in the (Nov. 11, 2011) **AARP Bulletin**. Both articles were centered around the 30+ years of ***NAAV's*** dedicated service to surviving Atomic-Veterans and the families of deceased Atomic-Vet's. These articles were in keeping with the "A-Vet-Outreach" efforts of both ***NAAV*** and the Veterans Advisory Board on (radiation) Dose Reconstruction (***VBDR***). . . .

In the case of the **VFW** article, we received more than 10,000 requests, over a 12 month period, for information required to enter a claim for a radiogenic illness with the **DVA**, or the **DOJ**. This included a mix of phone calls, e-mails and "snail-mails." In all cases, we responded accordingly with the required information. Most of the respondents were either already in the **VA** medical system, or were experiencing an illness that did not qualify as a being "presumptive," as specified in **Title 38 CFR – Section 3.309** and would thus require an ***RDA*** and ***PC*** rating. . .

In the case of the **AARP** article, the response was overwhelming during the first three months. The article listed the phone number for the Dept. of Justice (Civil Div.). This is the group who administers compensation claims governed by the Radiation Exposure Compensation Act (**RECA**). Given the flood of calls, they had to increase the voice-mail (capacity) of the **12** claims examiners to **135** messages each. Additionally, they had to assign **4** (outside) Contractors to the task of sending out claim information and forms so as to adequately satisfy the flood requests. . . . .

Most of those requests were from Veterans (or the Spouse of deceased Veteran) who was assigned to the Japanese Occupational Forces, shortly after the end of **WW-II**. Unfortunately, the **RECA** program **only includes** Atomic-Veterans who were assigned to participate in any of the atmospheric (or underwater) nuclear weapons tests, from the (June, 1946) ***"Crossroads"*** series, to the (November, 1962) ***"Dominic-I"*** and ***"Sunbeam"*** series. . . . .

In addition to the inquiry load experienced by the **DOJ**, we also had a repeat flood of inquiries from Atomic-Veterans, or their family members, who were given our (***NAAV***) phone number after contacting either their local **VA**, **DOJ**, **American-Legion**, **VFW**, and in several cases, the **AARP**. Unfortunately, we do not have the luxury of 12 operators and a few contractors to assist us in fielding all of those inquiries. . . .

And, of course, **NAAV** is bearing all of the costs, on our end of those activities. To date, those costs (for response to both the VFW and AARP articles) are approx. ***$15,000*** ! ! ! Given the number of phone calls we received, to date, I think my lovely wife (Alice) is due a medal of some sort for her dedicated service under such trying conditions. But, she is a real trooper, and knowing the seriousness of the situation, did not register any discomfort, or dissatisfaction on her part. As a matter of fact, it was kind of nice to have some of those callers express their thanks for her kind attention and assistance. We will continue to insure that all inquires, along these lines, are fully and adequately addressed. . . . .

Given the fact that the Directors & Officers of ***NAAV*** are all volunteers, without compensation; and given the current average age of surviving Atomic-Veterans is now approaching **85**; and given that we **do not have** a sustainable stream of operating income; we sure could use a little monetary assistance from any **"Good-Samaritans"** who would like to actively support our dedicated efforts, at least for the next few years . . . . . .

Final Muster

Members of the Atomic-Veteran community are dying off at the rate of 1,600 per month. . . . We are not privy to all of their names, or place of residence. To properly bestow our respects and to share the grief experienced by their respective families, we ask our members to observe a special moment of silence so as to properly recognize & give thanks for their dedication and honorable service, to their God, their Families and their Country. . .

"Rest in peace, our Atomic-Veteran friends."

ARE YOUR DUES UP TO DATE ? ? ? ?

To insure that you receive your periodic newsletters, we must remind you to keep your dues current. You can do this my looking at the mailing label on your newsletter. The numbers following your name, is your **dues expiration date**. Be sure to send you dues (**$25.00**) before this expiration date, if at all possible. Our operating income is diminishing rapidly, as no one over the age of **80** really wants to pay dues to any organization. So, we absolutely are dependant upon your continued support. . .

LETTER TO THE EDITOR

Dear **NAAV**: I was piloting an Air Force model **H-21** Helicopter in 1958, during the ***"Hardtack-II"*** test series at the Nevada Test Site, when I accidentally managed to fly smack-dab into one of those "atomic-clouds." Our mission was to fly into the "ground-zero" area a few minutes after a nuclear weapon detonation. We would than hover, at 600 ft., while scientists (in the back of the chopper) dropped a (radiation measuring) probe into circles of sandbags that were located at various distances from the hot-zone. . . .

All went well through several of those tests, until one of the clouds stayed on the ground, rather than rising into the atmosphere, as would be expected. When we flew over the hills from Mercury (NV), we were into the cloud before we realized what was happening. We immediately reversed course and headed back to the Mercury landing area. Our dosimeters were maxed out, and we were told that our career's in atomic energy activities had just ended, and our helicopters were towed to an isolated remote area to "cool-off". . . . . .

Many years later, I developed cancer of the larynx and had 33 radiation treatments for this issue. I filed for compensation and after nearly14 years of study, dose assessments, appeals, etc., my claims were always turned down. If I had developed cancer of the pharynx, instead of cancer of the larynx, or cancer of most any other place in my throat or mouth, the radiation health issue would have been a "presumptive" cause. Why cancer of the larynx was not included, especially for a non-smoker like myself, is hard to understand. . . . Regards: **Fred P. Clark** (Capt. USAF)

U.S. NUCLEAR WEAPON PROGRAM OVERVIEW PART - 1

The U.S. Nuclear Weapons Program (**NWP**) is, first and foremost, a deterrent that minimizes the possibility that the United States will be attacked by another nation with nuclear weapons, or any other Weapon of Mass Destruction (**WMD**). The U.S. **NWP** represents the totality of all activities, processes, and procedures associated with the design, development, production, and, finally, dismantlement, disposal and replacement of those nuclear weapons stockpiled by the Dept. of Defense (**DOD**) . . . .

The U.S. **NWP** also includes the various organizations and key offices within the Administration and the Congress that are a part of the approval and funding process. Finally, the U.S. **NWP** encompasses the infrastructure and resources – human and material – necessary to support the U.S. policy of (global) nuclear deterrence. . . . .

Brief History: The various mix of nuclear weapons, developed and stockpiled by the United States, have constituted an essential element of the U.S. (military) capability since their initial development. The potential to harness nuclear energy for military use was first described in a letter, signed by Albert Einstein, forwarded to President Franklin D. Roosevelt in August, 1939. Einstein's letter described the possibility of setting up a nuclear chain reaction in a large mass of Uranium – a phenomenon that could lead to the construction of bombs – and concluded with the ominous statement that experimental work, in this area, was currently on-going in Berlin, Germany. . . . .

Einstein's assertion that a device employing this principle would be too heavy to be carried by an aircraft was of some comfort, but this was short lived, when in early 1940, Otto Frisch and Rudolph Peierls, working at Birmingham University (England) concluded that, if the fissile isotope **U-235** could be separated from natural Uranium, it would only take approx. 1 lb. to build a bomb of huge destructive capacity. This proposition was quickly endorsed by the Government-appointed **MAUD** Committee in 1941, and shortly after Prime Minister Winston Churchill authorized work to begin on Britain's Atomic-Bomb project, code named **"Tube-Alloys"** . . . . .

Note: This project was never completed, however the U.K. joint ventured 27 nuclear weapon test & development projects with the U.S., in addition to their own (independent) tests at various locations, including the Nevada Test Site, and in the Pacific Ocean, from 1952 to 1992.

The first **MAUD** Report was sent from Britain to the U.S. in March, 1941, but no comment was received from the U.S. A member of the **MAUD** Committee flew to the U.S. in August, 1941 to discuss the findings and to convince the U.S. that it should take the work of Frisch and Peierls very seriously. The National Academy of Sciences then proposed an all-out effort to proceed with the development and assembly of nuclear weapons. In a meeting on October 9, 1941, President Roosevelt was impressed with the need for an accelerated program, and by November had authorized the recommended "all-out" effort. . . .

A new policy committee, the Top Policy Group (**TPG**), was created to inform the President of the program's progress and development. The first meeting of the **TPG** took place on December 6, 1941, one day before the Japanese attack on Pearl Harbor, and the engagement of the United Stated into **WW-II**. . . .

Shortly thereafter, the "Manhattan-Project" was established with the goal of producing nuclear bombs in time to effect the outcome of WW-II. Then, in 1943, as outlined in the Quebec Agreement, between the United States and the United Kingdom, a team of scientists working on the British (Tube-Alloys) project was transferred to the Manhattan Project, so as to work, collaboratively with their U.S. counter-parts. On July 16, 1945, the United States "proof" tested the world's first atomic-bomb, a spherical (lens-type) device with Uranium tampers and a Plutonium (Pu-239) fission "pit." The device was code named **"Gadget"** and the detonation occurred within the current White Sands Missile Range, near the town of Alamogordo, NM. Twenty one days later, on August 6, 1945 the B-29 (**Enola-Gay**) dropped a nuclear bomb over Hiroshima, Japan. . . . . .

Otto Frisch
(1904 – 1979)

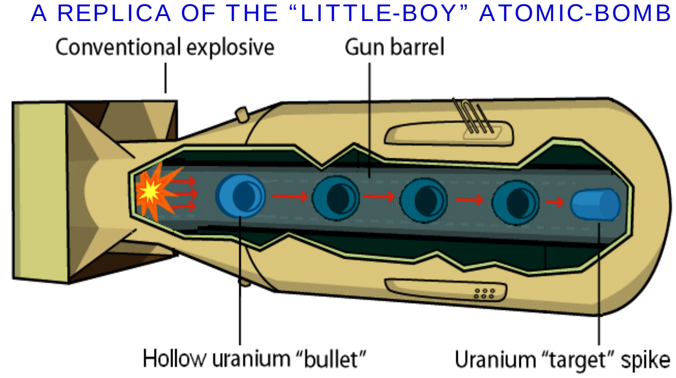
This was a "shot-gun" (**GA**) type device that rammed a Uranium-238 pellet into another Uranium-238 core pit, at high velocity and high pressure. This bomb was (code named) **"Little-Boy"** and did not require a pre-deployment "proof" test. The next day President Truman called for Japan's unconditional surrender. Given no response from Japan, Truman then authorized the use of a second Atomic-bomb against Japan, and on August 9, 1945 the B-29 (**Bockscar**) dropped a nuclear bomb over Nagasaki, Japan. This bomb was code named **"Fat-Man."** This was a spherical "lens-type" implosion (**IA**) device using external initiators, reflectors, Uranium tamper material and a Plutonium-239 core fissile "pit."' This type weapon required a "proof" test, that was successful with the **"Trinity"** experiment. . . . . .

Sir Rudolph Peierls
(1907 – 1995)

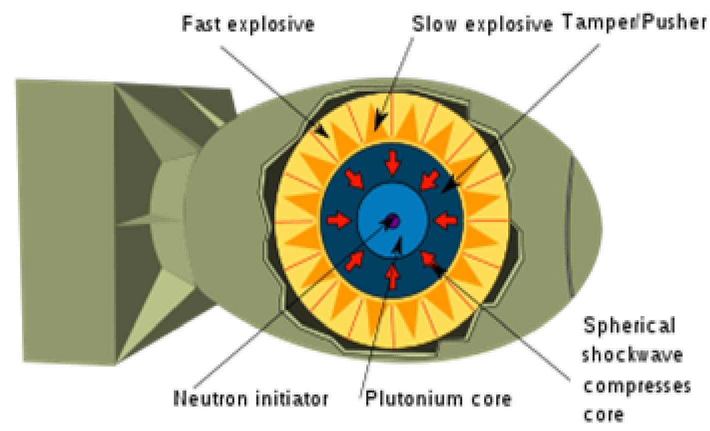
It must also be noted, that there were a total of five (5) atomic-bombs assembled at the Los Alamos Scientific Laboratory (**LASL**) prior to the (07-16-45) **"Trinity"** proof test. One was the (**Little-Boy**) "shot-gun" design, and the remaining four were the (**Fat-Man**) spherical "lens-type" design. The strategic plan was to drop a **"Fat-Man"** bomb over a select target in Germany, on the same day that Hiroshima was destroyed. The Germans, however; had surrendered prior to this scheduled mission. . . . .

If the Japanese were still determined not to surrender, after Nagasaki was destroyed, a third **"Fat-Man"** type device would have been detonated over a Japanese target. Since this was not required, the remaining two "spherical" type bombs were used for the (1946) operation **"Crossroads"** (Able & Baker) weapons effect tests at Bikini Atoll in the Marshall Islands. . . . . .

A REPLICA OF THE "LITTLE-BOY" ATOMIC-BOMB



A GUN-ASSEMBLY (GA) TYPE NUCLEAR DEVICE



This is the basic implosion assembly (IA) "Fat-Man" bomb design used for the "Trinity" test and dropped over the city of Nagasaki, Japan, in 1945. It would also serve as a platform for improved "boosted" and "staged" newer generation weapon designs. . . . .

These **"Crossroads"** tests included more than **41,000** military personnel, many of whom have since experienced a host of radiogenic health issues. . . . .

On August 14, 1945 Japan agreed to President Truman's demands for unconditional surrendered. The use of Atomic-Bomb weapon's had shortened the war and reduced the number of potential casualties on both sides by precluding a U.S. land invasion of Japan. These two Atomic-Bombs dropped on Hiroshima and Nagasaki remain the only nuclear weapons ever used in a wartime combat situation, and their use permanently altered the global balance of power. . . .

The U.S. enjoyed a nuclear monopoly until August 29, 1949 when the Soviet Union conducted it's first nuclear test. It was later discovered that the U.S.S.R. was given the full designs & details for a **"Fat-Man"** type bomb from Soviet agents & sympathizers within the "Manhattan-Project". . . . . .

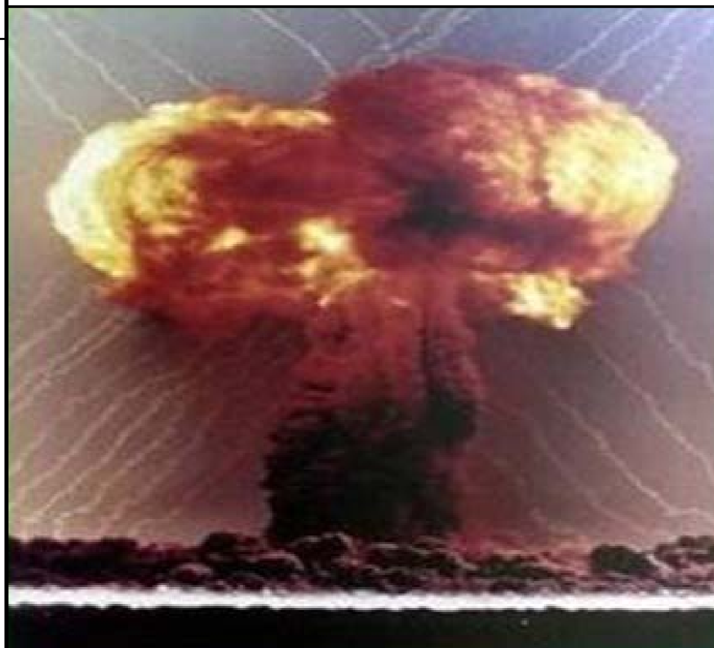
Within a relatively short time after the end of WW-II, the Soviet Union was recognized as a potential (nuclear) adversary. This geostrategic consideration, and the Soviet's development of nuclear weapons capability, caused the U.S. to give a high priority to the quantity production of nuclear weapons. . . . .

The Soviet Union tested their first nuclear weapon (code named) "Joe Stalin-1" (08-29-49) a 12 kiloton (IA) device, identical to the U.S. spherical, lens-type bomb design. The test occurred at Novoya Zembla (Ukraine) and was the first of 914 U.S.S.R. nuclear weapon development tests. . . . .

By the early 1950's, the U.S. and U.S.S.R. had both developed the (more powerful) Hydrogen (thermo-nuclear) bomb. . . . .

The United Kingdom, having resumed it's nuclear weapons program in 1947, successfully tested an atomic-bomb in 1952. Both the U.S. and U.S.S.R. increased their stockpile quantities until each possessed nuclear weapons in sufficient quantities to achieve a "secure, second-strike capability," so that both sides would be capable of massive retaliation, even after absorbing an all-out first strike. . . . .

All nuclear weapons in the current U.S. stockpile are designated either as a warhead, delivered by a missile (such as the **W-87** and the **W-76**), or a gravity bomb, dropped from an aircraft (such as the **B-83** and the **B-61**). The distinction between a warhead and a bomb is an important one at the engineering level because the design, engineering, and component production responsibilities between the military service and the DOE design laboratories may be different from a **"W"** versus **"B"** weapon. . .



The U. K. tested their first nuclear weapon (code named) "Hurricane" (10-03-52) at the Montebello Islands (Australia) testing ground. It was a 21 kiloton (IA) lens-type device, and was the first of a total of 45 tests, including their ("Grapple" series) thermo-nuclear (hydrogen-bomb) tests at Christmas Island.

However, at the national level, the stockpile plan and other programmatic actions must comply with approved treaties, current legislation, and national policy directives - most of which use the term warhead to mean all nuclear weapons, including both **"W"** and **"B."** For the first decade of the nuclear era, the U.S. Nuclear Weapons Program was focused on producing sufficient nuclear material to build enough weapons to support a nuclear capability for almost every type of available military delivery system. This frantic pace was driven by the need to stay ahead of the Russians in the race for nuclear stockpile weapon dominance, and the inherent possibility of other Cold War escalations. . . . .

Throughout the late 1950's, the U.S. was committed to increasing nuclear weapon quantities to enhance flexibility in the types of nuclear-capable military delivered vehicles. By 1951, the U.S. nuke stockpile had grown to more than **20,000** warheads. Most of these warheads had relatively low yields, and were for short-range, non-strategic (then termed "tactical") systems. At that time, many weapons were forward deployed within the territory of the U.S. allies, in the North Atlantic Treaty Organization (**NATO**). Beginning in the early 1960's, the U.S. shifted its stockpile priority from quantity to quality. . . .

From 1960 to 1992, the U.S. Nuclear Weapons Program was characterized by a continuous cycle of "modernization" programs that included building and subsequently replacing the weapons in the U.S. stockpile with newer, more modern (or upgraded) designs. In addition to warheads that were simpler for the military operator, modern characteristics included greater yield, smaller size, better employment (delivery) factors and more modern safety, security and control features. . . . .

These military personnel are following their orders, to advance toward Ground-Zero at the Nevada Test Site (NTS) during a 1953 "Nuclear-Warfare" exercise. Many of them would pay the ultimate price for their honorable duty to their God, their families and their Country ….. without the benefit of any proper recognition from their Government. No thanks ……no medals …… no parades …… just a host of health issue miseries and reclusive obscurity …… many decades later……. How could this be allowed to happen ? ? ?

A key part of this process was the use of nuclear testing to refine new designs within the development process, to test the yield of weapons within a year after fielding, and to define or repair certain types of technical problems related to nuclear components in weapons that were already fielded. A secondary purpose of all these tests was to evaluate the ability of "live" military troops to assimilate and react to actual conditions on a "nuclear" battlefield. The deleterious after-effects, in terms of radiogenic health issues experienced by these military participants would not be fully realized until decades after those radiation exposure events. . . . . .

As a function of simplicity, the U.S. moved away from warheads requiring in-flight-pit-insertion (configuring a warhead from **"Mod-0"** to **"Mod-1"** by inserting the fission "pit" into the warhead through a "trap-door" mechanism), to warheads that were self-contained and configured with "sealed-pit" devices without requiring the military weapons officer or operator to insert any components, or "build" the warhead. . . . .

While these warheads may have been more complex internally, this was transparent to the operator, and the pre-fire procedures were much simpler, and less complex. Smaller warhead size allowed for strategic missiles to carry a larger number of re-entry bodies (vehicles), and made nuclear capability possible for a greater number of delivery methods, including nuclear weapons being fired by cannon artillery or being human portable in "back-pack" arrays. Some of the features that provided increased operational capability included selectable yields, better fusing (for more accurate height of burst), increased range (for cannon-fired warheads) and shorter response times. . . . .

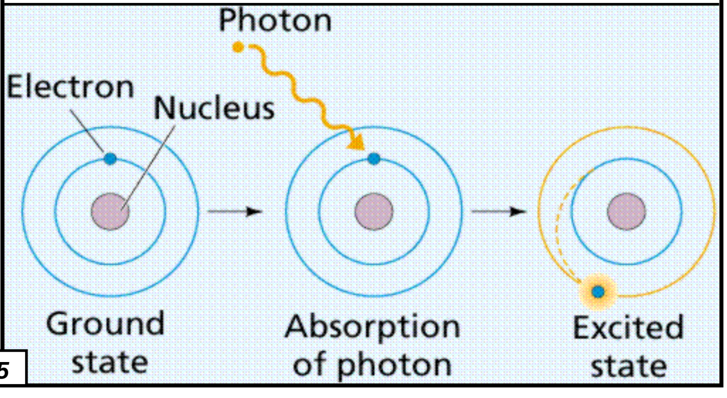
These modernization programs were achieved through continuous research and development efforts, as well as the production of new warheads to replace aging and less sophisticated weapons, usually after the older warheads had been fielded for a period of 15 to 20 years. In addition, the U.S. utilized an ongoing and consistent complementary combination of nuclear (and non-nuclear) testing to refine designs and components during the development stage. This also included weapon certification, production processes, validation of safety factors, reliability projections, defect detection and to confirm effective repair procedures. . . .

<u>Basics:</u> Before we venture further into our historical diatribe, we will present a short review of the basics involved in the development and manufacture of nukes with the following short tutorial. Matter is the material substance that makes up our universe, occupies space and contains mass. . . .

All matter, in the observable universe is made up of various combinations of separate and distinct particles. When these particles combine to form atoms, they are then called elements. An element is one of (more than 110) known chemical substances, each of which cannot be broken down further without changing it's chemical properties. Some examples are hydrogen, nitrogen, silver, gold, uranium and plutonium. The smallest unit of a given amount of an element is called an atom. Atoms are composed of electrons, protons and neutrons. For our purpose, there is no benefit in discussing a further breakout of sub-atomic particles. . . .

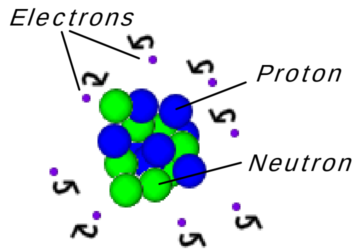
Nuclear weapons depend solely upon the potential energy that can be released from the nuclei of atoms. In the atoms of very heavy elements (that serve as fissile material in nuclear weapons) the positively-charged protons and electrically-neutral neutrons (collectively known as nucleons) cling together to form the enormously dense nucleus of the atom that is located at the center of a group of shells of orbiting, negatively-charged electrons. Electron interactions determine the chemical characteristics of matter while nuclear activities depend on the characteristics of the atom's nucleus. . . .

Examples of chemical characteristics include: the tendency of elements to combine with other elements (as with hydrogen and oxygen to form water); the ability to conduct electricity (as with copper and silver products); and the ability to undergo chemical reactions, such as oxidation (as in the manner in which iron and oxygen form oxides and rust). On the other hand, nuclear characteristics are based on an element's tendency to undergo changes at the nuclear level, regardless of the number of electrons it may contain. Examples of nuclear characteristics include; the tendency of a nucleus to split apart or to "fission" (where atoms of certain types of uranium will undergo fission more readily than atoms of iron); and the ability of a nucleus to absorb a neutron (where the nuclei of certain types of cadmium will absorb a neutron much more readily than beryllium nuclei). .

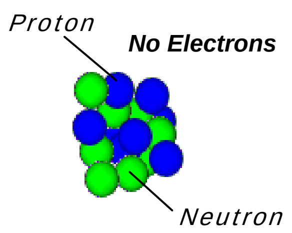


An important difference between chemical and nuclear reactions is that there can neither be a loss, nor a gain of mass during a chemical reaction, but mass can be converted to energy in a reaction at the nuclear level. In fact, it is this change of mass into energy that makes a nuclear weapon the most dangerous and destructive device on our planet ! ! ! ! !

Atoms are electrically neutral when the number of electrons is equal to the number of protons. When an atom loses an electron, or electrons, it is then "ionized" and unbalanced. That atom is now "net-positive" and is prone to combine with other imbalanced atoms to form imbalanced molecules, compounds and cells. It has been proven that when radiation particles, from the detonation of nuclear weapons, are inhaled, or ingested into the human mechanism those radiogenic particles have a tendency to "ionize" atoms within the body, before degradation. This ionizing process has been associated with a host of radiogenic health issues experienced by both military and civilian participants (at nuclear tests) and civilian populations downwind of nuclear weapon test sites. . . . .



OXYGEN-16 (normal)



OXYGEN-16 (ionized)

The splitting apart of atoms is called "fission," and the fusing together of atoms is called "fusion." They are the key examples of nuclear reactions, or reactions that can be actively induced in a nucleus. Fission occurs when an element with a very large nucleus, such as Plutonium, is split into smaller pieces. This may occur spontaneously, or it may occur when a sub-atomic particle, such as a neutron, collides with the nucleus and imparts sufficient energy to cause it to split apart (or fission). . . . .

The fission that powers both nuclear reactors and nuclear weapons is typically the neutron-induced fission of certain isotopes of Uranium or Plutonium. Fission releases a large amount of energy – millions of times more energy than the chemical reactions of conventional explosive materials . . . . .

Fusion occurs when the nuclei of two atoms, each with a small nucleus, such as hydrogen, collide with enough energy to fuse two nuclei into a single larger nucleus. Fusion occurs most readily between nuclei with just a few protons, as in the isotopes of Hydrogen. In general, fusion may be regarded as the opposite of fission. . . . .

For the fusion process to take place, two nuclei must be forced together with enough energy so as to overcome the natural electrostatic forces of repulsion. One of the most successful such reactions occurs between Deuterium & Tritium, which are two isotopes of Hydrogen. . . .

This reaction results in the production of Helium-4 plus one high-energy "free" neutron, which is un-attached to any nucleus, and (in a nuclear weapon design) is used to cause additional fission events. Fusion also releases millions of times more energy than ordinary chemical reactions. . . .

Basic Weapon Design: All current nuclear weapons use the basic approach to producing a very large number of fission events through a multiplying chain reaction, while releasing a huge amount of nuclear energy in a very short period of time (typically dozens of generations of fission events in a nuclear detonation will take only one millionth of a second for the entire event). . . . .

A variety of names are used for weapons that release energy through nuclear reactions – atomic bombs, hydrogen bombs, nuclear weapons, fission bombs, fusion bombs, thermo-nuclear weapons, dirty bombs, clean bombs, etc., etc. Some times they are also referred to as: physic-packages, warheads, and devices. Therefore; it is necessary to address terminology. . . . .

The earliest name for a nuclear weapon was "Atomic-Bomb." These names have been criticized as misnomers because all chemical explosives generate energy from reactions between atoms. So, it could be said that conventional explosives are also "atomic" in nature. Specifically, when exploded, conventional explosives release chemical molecular binding energy that had been holding atoms together as a molecule, or molecules. . . .

On the other hand, (technically), a "fission" weapon is a "nuclear-weapon" because the primary energy release comes from the nuclei of fissile atoms; it is therefore more "atomic" than any other weapon. And so, the name is firmly attached to a pure fission weapon and well-accepted by historians, the public, and some of the scientists who created the first generation of atomic (nuclear) weapons. . . . .

Fusion weapons are called "Hydrogen-Bombs" or "H-Bombs" because isotopes of Hydrogen are the principle components of the large number of fusion events that add significantly to the nuclear reactions during the detonation process. Fusion weapons are also called "thermo-nuclear" weapons because high temperatures and pressure are required for the fusion reaction process to occur. The term "thermo-nuclear" is also sometimes used to refer to a two-stage nuclear weapon. . . . . .

Note: The photo on the cover of this issue is the (05-08-51) Greenhouse **"George"** test, which was a "proof" of the "How-Double-Prime" method of "staging" reactions. This test produced **225** Kilotons of yield, and would lead to the development of the first true Hydrogen bomb. . . .

The IVY "Mike" test (10-31-52) was the first detonation of a "true" Hydrogen-Bomb device, producing a total yield of 10.4 Megatons of destructive force at Enewetak Atoll. This device weighted 82 tons, and eventually would be re-designed and up-graded to be delivered over a target from an airborne platform. The first such delivery was during the 1956 "Redwing" Series, when the "Cherokee" bomb was air-dropped (parachute-retarded) from a B-36-H "Peacemaker" (high altitude) Strategic Bomber. . . . . .

Supercritical Mass: To produce a nuclear explosion, a weapon must contain an amount of fissile material (usually highly enriched Uranium [**HEU**] or Plutonium) that exceeds the mass necessary to support a critical chain reaction. In other words; a supercritical mass of fissile material is a "must" requirement. A supercritical mass can be achieved in two fundamentally different ways. One is to have the subcritical components positioned far enough apart so that any stray neutrons that would precipitate a nuclear event would not cause such an event to happen. This distance must also not be beyond that required to be able to drive the two components together, with enough linier motion to produce the desired nuclear reaction effects. This is commonly known as the "gun-assembly" (**GA**) approach. . . .

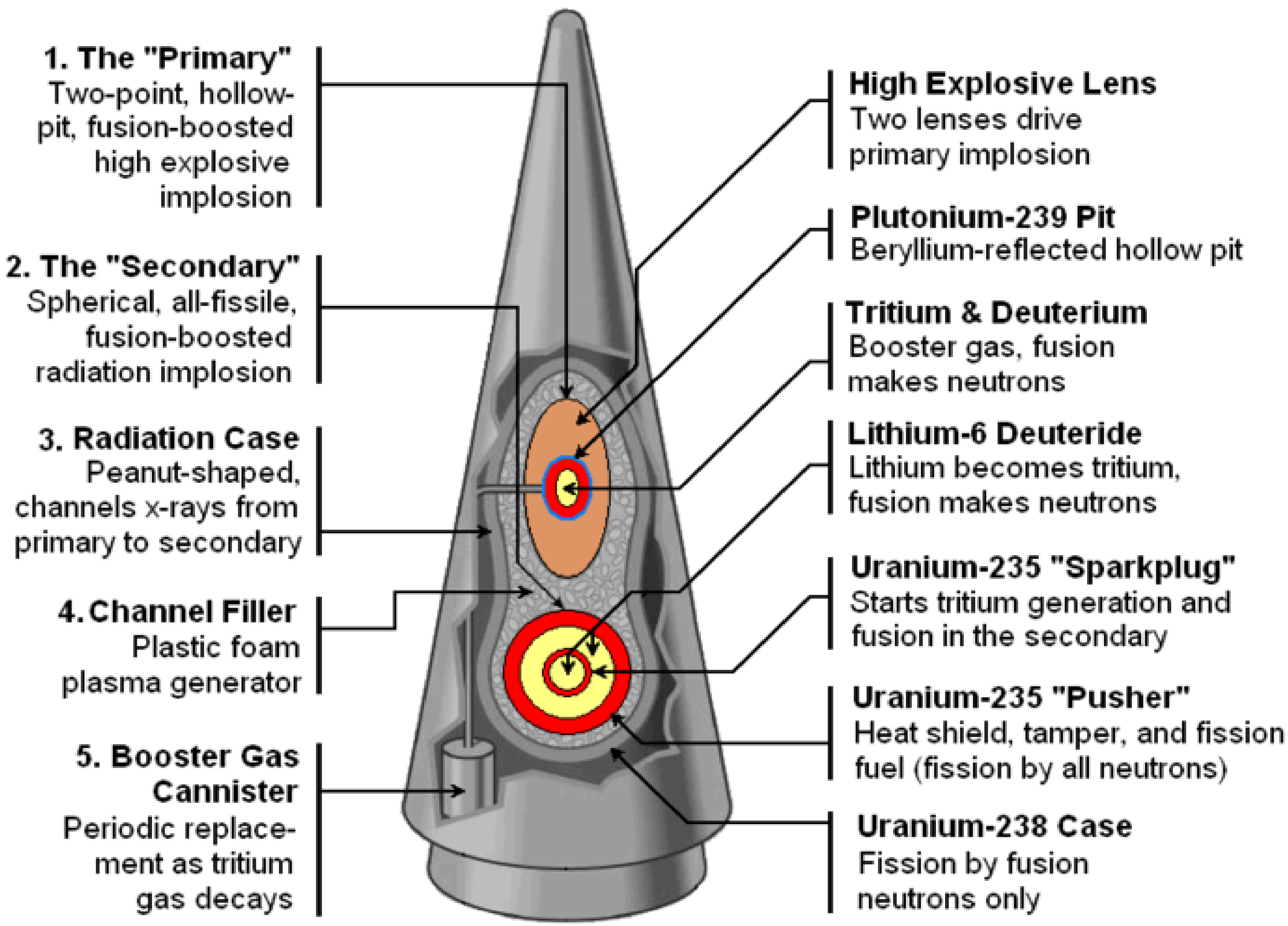
A second approach is to have one subcritical fissile component surrounded with high explosives (**HE**). When the detonation is desired, the **HE** is exploded with it's force driving inward to compress the fissile component, causing it to go from sub-critical to super critical. Each of these approaches can be enhanced by using a proper casing, as a tamper, to hold in the explosive forces, by using a neutron reflecting material around the supercritical mass, and by using a neutron generator to produce a large number of neutrons at the moment that when the fissile material reaches it's design super-criticality, the first generation of fission events, in the multiplying chain reaction, will then produce a larger number of rapidly expanding events. . . . . .

Assemblies: Current nuclear weapons use one of four basic design approaches. These are Gun Assembly (**GA**), Implosion Assembly (**IA**), Boosted Assembly (**BA**) and Staged Assembly (**SA**). The **GA** was the choice design for all atomic artillery shells & munitions. Since these weapons could not be "boosted," their total destructive force was limited. The **IA** design allowed for the creation of larger destructive yields. Both of these designs were limited to developing destructive forces in the multi-kiloton range. One **Kiloton** is equal to **1,000** tons of conventional explosives. . .

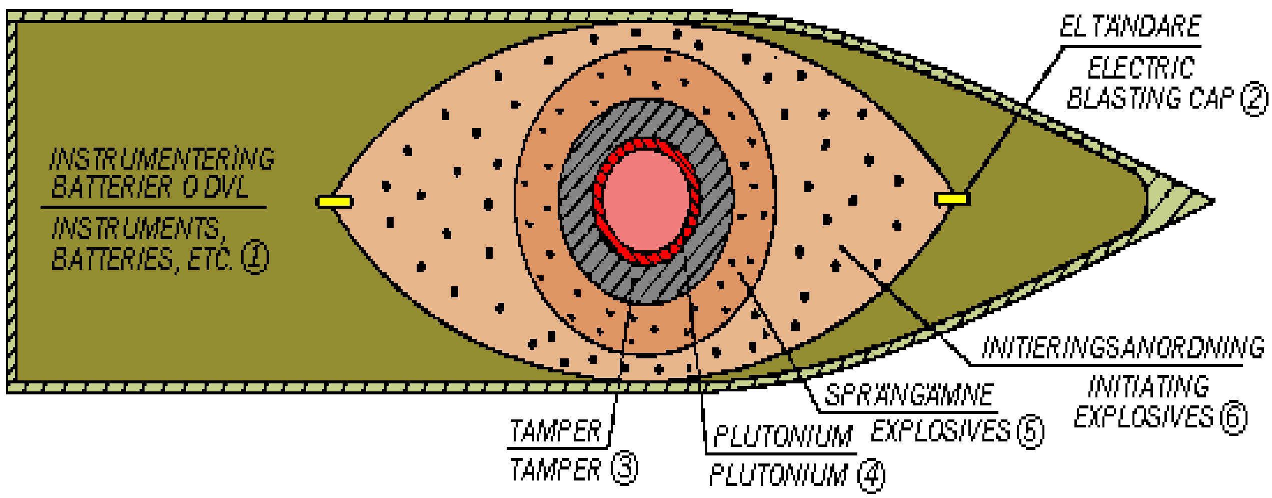
The **IA** devices offered additional options. This design was flexible enough to incorporate the use of additional "boosting-agent" components, such as Lithium-Deuteride (**L6-D** or **L7-D**) or Lithium-Deuteride-Tritide (**L6-D/T**) and Deuterium/Tritium (**D/T**) gas. **IA** designs also allowed for the use of coupling methods that would produce "staging" processes. Such "boosting" and "staging" were eventually incorporated in the total design of multi-stage Hydrogen-Bombs, producing destructive forces in the Megaton ranges. One **Megaton** is the equivalent of **1 million** tons of conventional explosives. . . .

In the first stage of a thermo-nuclear (Hydrogen) weapon, a "boosted" fission device, called the "primary" releases the increased (boosted) mass of energy. In addition to this increased fission activity, a exceedingly larger number of X-rays are generated during this "boosted" fission activity. . . .

W88 Warhead for Trident D-5 Ballistic Missile



Atomvapnens konstruktion
Atomic Weapons Construction



A good illustration of the many GA **designs floating around the nuclear scientific community is this 1956 drawing of a Swedish nuclear artillery shell. This project was terminated before they could produce a viable test device, however; the drawing does show the essential elements of the two-point hollow-pit design. There are similar drawings that come from the post-war German nuclear bomb program, which was also terminated, and from the French program, which produced an arsenal of such weapons. . . . . The mechanism of the high explosive lens is not shown in the Swedish drawing, but a standard lens made of fast and slow high explosives, would be much longer than the shape depicted. For a single high explosive lens to generate a concave wave that envelops an entire hemisphere, it must either be very long or the part of the wave on a direct line from the detonator to the pit must be slowed dramatically. A slow high explosive is too fast, but the flying plate of an "air lens" is not. A metal plate, shock-deformed, and pushed across an empty space can be designed to move slowly enough. A two-point implosion system using air lens technology can have a length no more than twice its diameter, as in the Swedish diagram above. . . . .**

These X-rays then transfer energy into the secondary stage, causing the secondary materials to begin the "fusion" process, which then releases an exceptionally large number of high-energy neutrons that, in turn, interact with the remaining fissile and fissionable materials to cause a large number of "compound" fission events, thereby significantly increasing the total yield of the entire weapon device. . . . .

Generally, the smaller the warhead size (volume, dimensions & weight), the more difficult it is to get the nuclear package to function to produce a nuclear detonation, and the harder it is to achieve any higher yields. The simplest and easiest design has been the **GA** assembly, a successful product of the efforts of the Manhattan-Project. . . . .

Because the boosted and two-staged designs are significantly more difficult, they are not practical candidates for any nation's first generation nuclear weapon design. There is no evidence that any nuclear-capable nation was able to produce either a "boosted" or "two-stage" weapon design as their first workable warhead. . . . .

While the U.S. pursued both the **GA** and **IA** designs, with one exception, other nations that have become nuclear-capable have focused on the **IA** design for a number of reasons. First, the **GA** design is the least efficient design for producing maximum yield / lb. of fissile material. Second, the **GA** design has inherent operational disadvantages that are not associated with the other types of designs. Third, Plutonium (Pu-239) is susceptible to pre-detonation in a **GA** design, thus requiring the use of highly-enriched Uranium (**HEU**) for a **GA** weapon device. . . . .

HEU, however, is extremely expensive because of the cost of the enrichment processes. Plutonium, on the other hand, is produced in a reactor that can also be used for the simultaneous production of electrical power, which could have a positive effect on a nation's economy, rather than the drain of the more costly **HEU** enrichment process. . . . .

Up to this time, nations that have pursued a nuclear weapons capability have been motivated to design warheads to be small enough to be used with either missiles or high-performance jet aircraft. This is probably because, unlike the situation in the early 1940's, almost all nations (and even some non-government actors), today, possess some type of effective air defense system, which render non-stealth, large cargo or passenger aircraft ineffective at penetrating to a target against almost any potential adversary. . . .

For this reason, it is highly likely that a (first generation) nuclear weapon developed by any proliferating nation, will be one that is of low-yield design, typically between **1** and **10** kilotons. Also, the max. weight for a such a warhead to be compatible with a high performance aircraft would be approx. 3,000 lbs., and the weight for coupling with a typical (medium or long range missile) would be approximately 1,800 lbs. . . . . .

Early years of U.S. testing: The first (six) nuclear tests represented the infancy stage of the U.S. nuclear weapons development program. The first test (**Trinity**) provided the mechanical & chemical reaction confidence required for an identical device design that would (shortly thereafter) destroy the city of Nagasaki, Japan. . . . .

The next two tests, were at Bikini, Atoll, associated with Operation **"Crossroads"**, again using the same device design as that used for **"Trinity."** This was then followed (in 1948) by three (tower) tests (**"X-ray", "Yoke",** and **"Zebra"**), at Enewetak Atoll, (designated Operation **"Sandstone"**) that involved similar devices that were up-graded and re-configured with new components designed to provide increased yields. . . . .

These first six tests began with no previous data, and by today's standards, incorporated very crude measurement equipment and computational capabilities. Because of this, only limited amounts of scientific data were gained in each of these test events. . . . .

The **188** nuclear tests conducted between 1951 and 1958 included **20** detonations above 1 Mt., **1** detonation between 500 Kt. and 1 Mt., **13** detonations between 150 Kt. and 500 Kt., and **17** tests that produced zero, or near zero yields, primarily as safety experiments. Many of these tests produced above-ground detonations, which were routine at that time. The locations for these tests included the Nevada Test Site (NV), The Enewetak Atoll, Bikini Island (Marshall Islands) the Pacific Ocean, the Atlantic Ocean, and on the Nellis Air Force Base Range (NV). . .

CROSSROADS "BAKER" - 07-24-46 - 21 Kt. - Bikini Island

Some of the highest yield detonations were produced by test devices that were far to large to be used as deliverable weapons. For example, the (Ivy) **"Mike"** device, which produced a **10.4** Mt. detonation (10-31-51) at Enewetak, was almost seven ft. in diameter, 20 ft. long, and weighted **82** tons. Then, the (Castle) **"Bravo"** detonation (02-28-54) at Bikini Island produced a surface burst of **14.8** Mt., the highest yield ever produced by the U.S.. The **"Bravo"** device was a two-stage design in a weapon-size device, using enriched Lithium as fusion fuel in the secondary stage. It was also responsible for the contamination of more than 300,000 sq. miles of surface area, and most of the entire chain of the Marshall Islands. . . . . .

During this period, as the base of scientific data grew, and as sensor technology, test measurement, and diagnostic equipment became more sophisticated and more capable, the amount of data and scientific information gained from each test increased. The initial computer "codes" used to model fissile material compression factors, fission events, etc., were based on two-dimensional models. These computer models became more capable, and reliable, as the scientific data base expanded and computer hardware technology evolved accordingly. . .

<u>Transition to underground tests:</u> Between Oct. 31, 1958 and Sept. 14, 1961, the U.S. conducted no nuclear tests because of a self-imposed testing moratorium. Then, on Sept. 15, 1961 the U.S. resumed nuclear testing, and conducted **100** tests over the next 14 months, including underground, underwater and above-ground design improvement and upgrade "proof" detonations. . .

Castle **"Bravo"** was the code name given to the first test of a "dry-fuel" (thermo-nuclear) Hydrogen-Bomb device, detonated on March 1, 1954 at Bikini Island. As the first test of the **"Castle"** series, **"Bravo"** was the most powerful nuclear device ever detonated by the U.S., (and just under one-third the energy of the most powerful device ever detonated), with a yield of **15** Megatons. That yield, far exceeded the expected (design) yield of **4** to **6** Megatons, and combined with other factors, led to the most significant accidental radiological contamination ever caused by the United States. Fallout from this single test — intended to be a secret test — poisoned the Marshallese Islanders who had previously inhabited the atoll and returned there after the test, as well as the crew of *Daigo Fukuryo Maru* ("Five Lucky Dragon"), a Japanese tuna fishing boat, and created international concern about atmospheric thermo-nuclear weapon testing. . . . .

These tests included **9** detonations above the 1 Mt. range, **8** detonations between 500 Kt. and 1 Mt., and **4** detonations between 150 Kt. and 500 Kt. The locations of these tests included the Nevada Test Site (NV) , Carlsbad Caverns (NM), the vicinity of Christmas Island (Indian Ocean), the Pacific Ocean and Johnston Island (also in the Pacific). The last **4** tests of this group were conducted during the nine day period, between Oct. 27 and Nov. 04, 1962. These were the last U.S. nuclear tests that produced above-ground or surface burst detonations. . . . .

In compliance with the Limited-Test-Ban-Treaty (**LTBT**) of 1963, all subsequent U.S. nuclear test detonations were conducted deep underground. Initially, there was some thought that this restriction would have a negative impact on the program to develop accurate data on the effects of nuclear weapons. . . . .

The Atomic Energy Commission (**AEC**) and Defense Atomic Support Agency (**DASA**) responded with innovative ways to minimize the impact of these restrictions. Through the use of long and deep horizontal tunnels, and with the development of specialized sensors and diagnostic equipment to meet the needs, the effects testing program was successfully continued. . . .

In the **30** years between Nov. 09, 1962 and Sept. 23, 1992, the U.S. conducted **760** deep underground nuclear tests. During this period, there were tests to satisfy every aspect of the various development program criteria. The locations for these tests included the Nevada Test Site (NV); The Nellis Air Force Range (NV); Fallon (NV); Hattiesburg (MS); Amchitka (AK); Farmington (NM); Grand Valley (CO), and Rifle (CO). . . .

After May 17, 1976, all U.S. nuclear tests were conducted at the Nevada Test Site. The tests during this period, prior to April, 1976, included **4** detonations above 1 Mt., **14** detonations between 500 Kt and 1 Mt., and **88** detonations between 150 Kt. and 500 Kt. Of the **1,054** total U.S. nuclear test detonations, **63** had simultaneous detonations of **2** or more devices, and **23**

PREPARING FOR A DEEP SHAFT TEST AT THE N.T.S.

others produced zero or near-zero yields. Additionally, **4** of these were surface experiments, without a "nuclear" detonation, to study the effects of (Plutonium) fissile material scattering & dispersion. . . . .

Generally, a device for a weapons-related under-ground-test (**UGT**) for physics research, or other purposes, was positioned down a deep vertical shaft in one of the **NTS** test areas. Informally, this type of test was called a Vertical-Test (**VT**). Typically, a large instrumentation package would be lowered into the shaft, positioned relatively close to the device, with electrical wires that ran back to the recording instrument packages. The shaft was then covered with earth, and structural support was added to prevent the weight of the earth from crushing the instrumentation or the device itself. . . .

This closed the direct opening to the surface and precluded the fireball from pushing hot radioactive gases up the shaft into the atmosphere. When the detonation occurred, the hundreds of thousands of down-hole instruments transmitted data momentarily, before being consumed by the resulting fireball. The preparations for such a **UGT** often required months and included drilling the vertical shaft, with great precision & tolerance, preparing all instrumentation packages, erecting a structure above the shaft, so as to carefully lower all components to the test depths, all of which required a virtual "bee-hive" of activity. After the test, the earth would collapse into the shaft, leaving a large depression in the landscape, at the center of the test. . . . .

In addition to the shaft tests, several other tests were set up in horizontal tunnels, leading deep inside the Yucca mountain range, a part of which was on the edge of the **NTS**. These tunnels were relatively large, usually more than 30 to 40 ft. across, and ran several miles into the side of the mountain. Instruments were placed at various distances from the test device, and a large "blast-door" was then erected between the instruments and the device. . . . .

At detonation, the nuclear thermal radiation, X-rays and electromagnetic pulse effects were allowed to reach the instrument packages, then the "blast-door" would close prior to the arrival of the blast shock wave, thus protecting the delicate instrumentation devices. At time, there were some incidents where "venting" occurred, that is, the release of radiation particles to the atmosphere through natural fissures, or faults within the mountain, or resulting from the initial blast effects. . . . .

By the 1980's, the U.S. nuclear test program had evolved into a structure that categorized tests as: physics research, weapon effects, warhead development & engineering, and post-fielding tests. Physics research tests contributed to the scientific knowledge and technical data associated with general weapons design principles. Likewise, the effects tests contributed to the base of nuclear effects data, and to testing the vulnerability of key weapons (and related systems) to the effects of nuclear weapon detonations. . . . .

Development tests were also used to test key aspects of specific designs, or to refine specific designs to increase yield output or to improve certain nuclear detonation safety features. For each warhead-type, a Stockpile Confidence Test (**SCT**) was conducted between 6 and 12 months after fielding. This was intended to check the yield to ensure that any final imperfections that may have resulted from the mass-production process did not corrupt the designed yield. . . . .

Post fielding tests were also used to confirm or repair safety or yield problems when non-nuclear testing, other surveillance, or computer simulation detected possible problems, especially unique abnormalities with the nuclear fissile components. . . . .

Radioactive particles escaping from a (deep shaft) cavity is known as "containment failure." Massive, prompt, uncontrolled releases of fission products, into the atmosphere is driven by the pressure of steam or gas, and is commonly known as "venting." An example of such failure is the (12-18-70) Emery "Baneberry" test. . . .

If a problem was confirmed and a significant modification applied, a series of nuclear tests could be used to validate the modification to ensure that fixing one problem did not create a new problem, or issue of concern. . . . .

By the early 1980's, the U.S. had conducted more than **970** nuclear tests, most of which had a basic purpose of increasing the scientific data associated with a given weapon design, or refining specific design changes or up-grades. The physics laboratories had acquired the most capable computers of the time, and were expanding the computer codes to analyze fissile material compression, fission events, etc., in a three-dimensional (**3-D**) model. By the mid 1980's, use of **3-D** codes became "the routine of the day" for "proofing" purposes. . . . .

An so it was, that each year the results of the nuclear testing program increased the labs computational modeling capabilities, the results of which led to the massive U.S. stockpile of various types nuclear devices for use against a hostile enemy who also possessed a host of nuclear devices. Then, in 1992, in anticipation of a potential comprehensive test ban treaty, the U.S. voluntarily suspended it's **UGT** program. . . . .

The 1992 legislation that ended U.S. nuclear testing had several key elements, including a provision for **15** additional tests to be conducted by the end of September, 1996 for the primary purpose of applying three modern safety features to those warheads planned for retention in the reduced stockpile under the proposed Strategic Arms Reduction Treaty II (**START-II**). Also planned was a joint venture test (U.S. & U.K.) code named **"Deepfreeze,"** that would test a nuclear device (frozen with liquid refrigerant) in a deep shaft at the **NTS**. This test was supposed to simulate the effects of extreme cold on weapons (mounted on aircraft "hard-points") at high altitude (sub-zero) temperatures . . . .

Given that the legislation was deemed to be too restrictive to achieve the objectives of improving the safety of those warhead-types. and lacking all of the available safety enhancement elements, there was no sufficient time to make any such adjustments. . . . . .

End of Part 1

OPERATION "PLUMBBOB" FLASHBACK

Nevada Test Site – 1957: As a junior ROTC artillery officer (from Yale) I was a participant in the *Plumbbob* ***"Pricilla"*** nuclear weapon test at the Nevada Test Site. At that time, I was assigned to the 19th. Field Artillery Battalion (5th. Infantry Div.) our of fort Ord. I signed up for an Atomic-Weapons course, part of which was to go to Camp Mercury (NV) for a "live" nuke test experience. . . .

After a long bus ride across the desert, we checked in at Camp Mercury. Our barracks were crowded and hot, and I remember some lectures and especially an "aura-of-gloom," driven by our uncertain anticipation of (unknown) things to come. As I recall, the "Priscilla" test had been delayed for a day or two because of some type of instrumentation glitch. Anyway, one morning beginning at perhaps 0330, we boarded trucks and buses for a long ride in the dark out to Frenchman's Flat, and our assigned trench positions. . . . .

We were just settling in, when the sun began to become visible over the distant mountains. Our instructor told us that we were 3,750 yards from ground zero. Now, the sun had risen and it was fully light. I believe the trenches may have be located east of what would be ground zero, because I remember we could clearly see in the distance, in very clear light, the large captive balloon with a small black object suspended underneath, 700 feet over "ground-zero". . . .

It was dead silent, there was no wind, and I had a feeling of increasing anxiety in addition to a heightened expectation of the unknown. Along with my trench buddies, I was wearing a full combat equipment package, plus a film badge that was clipped onto my vest, and I was also wearing my dark goggles. . . . .

We were instructed (at our Camp-Desert-Rock pre-test lecture), that when the countdown began, we were supposed to kneel down low in the trench, and press our body hard against the front of it, well below ground level. Then we were to make sure that we had our dark goggles on, then raise a forearm and press it tightly against the goggles, and our eyes, to completely cover them, and to keep our eyes tightly closed. . . . .

The countdown began at approx. 0600, and when the bomb detonated, through my closed eyes and dark goggles, I could (momentarily) see the bones in my forearm that was pressed firmly against my face. A second or two thereafter; the ground shook like nothing I have ever experienced in the past, and I was sure it was an earthquake. This was then followed by an indescribable rumbling noise that overwhelmed all of us. . . . .

These activities caused a section of the trench to collapse, partly burying one or more personnel under mounds of dirt and debris. With the noise it seems all sorts of debris was suddenly flying away from the blast center, and over our trench line. During this blitz, we all stayed as far down below ground level as we could. After 20 or 30 seconds, we were permitted to stand up and look out at the fireball, which seemed nearly overhead and was still glowing, rumbling and changing colors. . .

There were several vertical contrails near or through the mushroom cloud, which I was told were rockets fired up from the ground to provide visual (photo) effects of the blast wave patterns. Then, as I recall, some debris and dust had reversed direction and was now coming back the other way, towards the blast, but without as much force as that caused by the initial blast. I was later told that this was caused by the vacuum effect of the rising fireball, causing air to be sucked back unto the center of ground zero, and upwards to the fireball . . . .

Later we climbed out of the trenches, shook of all of our dirt, and advanced towards, what was left of ground zero. We had also been told that animal experiments, especially pigs, were involved in this test, but I don't believe we were taken to those areas. We did hear some scuttlebutt, from those who were involved with those animal experiments, that the squeals of pigs and smell of burned carcass's was not a pleasant experience. . . . .

At some point, I surrendered in my film badge, and I was later told that it just disappeared, along with other records, in a fire at a records center at St. Louis, MO. I believed at the time it would be possible to fight a war involving such weapons and didn't realize until some years later that it was official madness to conduct such tests, deliberately exposing combat troops to nuclear radiation and to indoctrinate (brain-wash) troops, or anyone else, to believe that it would be useful or even possible to fight and win a war on a nuclear battlefield . . . . . .

Over the years, I have experienced many health issues, but have not been able to get any of my claims successfully approved by the VA, or any other Government entity. . . . .

Respectively submitted: **Steve Gurney** (New Haven, CT.)

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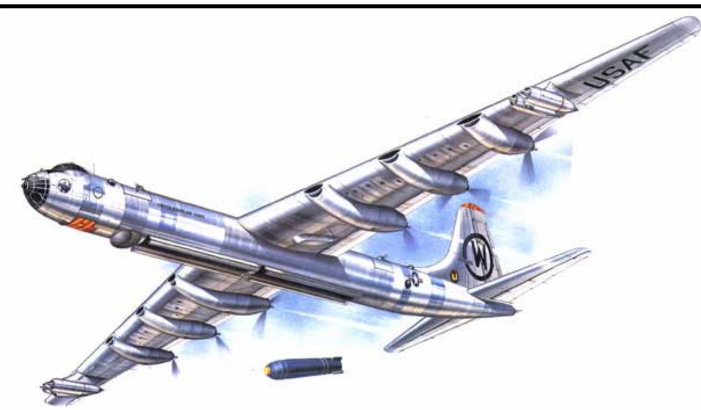
OPERATION "CASTLE" FLASHBACK

Howdy all. My name is ***Olin H. Hasty***, and I want to tell all you ***NAAV*** members & fans how much I have enjoyed reading and remembering things that happened to me, more than **60** years ago. We don't get that opportunity to re-visit the past, and to briefly re-live those long lost (personal) experiences, as depicted in past issues of the ***NAAV*** newsletter. . . . .

You see, I was involved with the (1954) Operation ***"Castle"*** atomic bomb tests out in the Marshall Islands, and I've got to tell you, that was one hell-of-an earth shaking experience. Over the years, and after I figured out how a computer works, I have read all the information that I can find on the web about my short term experience with the Atomic Energy Command, Joint Task Force Seven, SAC Test Detachment, Test Aircraft Unit (Provisional), and I have been unable to uncover hardly anything other than an occasional mention of our aircraft and nothing about our job assignments. Unfortunately, I have lost track of the entire crew I flew with and if anyone reading this letter could help me locate any of these people it would be greatly appreciated. I hope the following (personal recollection) will not be boring, but add to the history of Operation ***"Castle"***. . . . .

Back then, I was assigned permanently to the 28th. Strategic Recon Wing; 28th., A&E Squadron; Ellsworth AFB (SD) from Jan. 1952 to Dec. 1954. I was "officially" designated an (APQ24 / APS23 / APA44) Airborne Radar Technician assigned to the **RB-36** (Peacemaker) aircraft, and eventually assigned to three different Squadrons, associated with the 77th., 717th., and 718th. Recon Groups. . . . .

Back then, there always seemed to be a shortage of flight technicians so we were never assigned to any particular squadron and flew as per the requirements of a given day log assignment. So, if your lucky number was pulled, you got on the aircraft associated with your lucky number. . . . .



The B-36 was specifically designed to carry the (thermo-nuclear) Hydrogen-Bomb to a target of opportunity, and it was one super high altitude airplane. It was driven by six (6) Pratt & Whitney R-4360 (28 cylinder) pusher-type, turbo-prop engines, developing 18,000 horsepower, and assisted by two General Electric (twin-pod) Ram-Jet engines. It had an operational range of more than 3,500 miles, with a payload in excess of 72,000 lbs. Although our aircraft was designed to drop a Hydrogen bomb, it would not do so until the (1956) Redwing *"Cherokee"* test, when the weight of the H-Bomb was reduced from 164,000 lbs. to 42,000 lbs. . . . . .

One short story before I get into Operation **"Castle."** I married a Rapid City (SD) gal, and our first son was due to be born the second week of March (1953). I had been selected to fly on TDY to the Azores and the U.K. the last part of Feb., 1953 and our base commander (*Brig. Gen. R.E. Ellsworth*) was to be a passenger on our aircraft. I was excited about the trip cause we "recon" boys flew a lot of operational missions but seldom got the opportunity for any TDY assignments. I lived in Rapid City (SD) at that time. . . . .

On the morning of Feb. 22nd., we were to depart around daylight, I think. Anyway, stations (for the RB-36) was three hours

THE MASSIVE SIZE OF THE B-36 CAN BE MORE APPRECIATED WHEN VIEWED NEXT TO A B-29 ! ! !

before takeoff. I had left home and was on the aircraft with mt preflight completed when the AC called me on the intercom and informed me that he had just been notified that I was to be removed from the flight and that the AP was on the way, to pick me up and transport me back to base Ops. That shocked the hell out of me. . . . .

When I arrived back at base Ops., I was told that after I had left home, my wife started hemorrhaging and they had to rush her to the base hospital, where our son was born (on Feb. 25th.), and 3 weeks premature. Today he is in his mid 50's, and doing great. However, as it turned out, fate was on my side, as his birth kept me off the aircraft that crashed into the mountains of Newfoundland on its return to the U.S., and there were no survivors. Shortly after this event, Rapid City AFB became known as "Ellsworth" AFB. In the early summer of 1953 I was selected as in-flight technician, to be attached to the 77th. Strategic Recon Squadron, for an indefinite period, with further assignment to the Strategic Air Command (SAC) Atomic Test Detachment, Joint Task Force Seven. I have never been able to figure out how I got picked out of the entire base for this special assignment, but it was truly an experience never to be forgotten. I was also assigned to a special crew from the 77th., at that time commanded by Lt. Col. Robert Cummings. . . . .

In July (1953) we were transported to Kirtland AFB and took delivery of our own **RB-36H-55-CF** "Peacemaker" (Serial Number 52-1386). We returned to Ellsworth and flew many practice missions prior to departing for the Marshall Islands in (1954). Our aircraft was called the "Controller" and as such had multiple responsibilities, many of which I did not know, since we always operated under a "need-to-know" basis, and lived with the restrictions of a **"Q"** Queens) security clearance. I was assigned with this crew until the termination of Operation **"Castle,"** in June of 1954, after which, we returned to Ellsworth. My primary responsibility was to keep the special modified AN/APQ24-ASP systems operating. I think I could describe our function as the forerunner to the **ACT** system of today where by aircraft are positive identified by **"Transponder"** codes and can be positive-controlled as to location, etc. . . . . . .

To accomplish this they took an additional system, mounted the antenna upside down in the location of the top forward gun turrets and tied some modified AMAX-6's to it. This gave me two systems to maintain. But, as it turned out, I was fortunate. All equipment worked without an in-flight failure for the entire operation. And, I've got to say, that I was real glad that no one in our air crew was named "Murphy". . . . .

Our function was to control the **F-84** sampler (fighter) aircraft that would be vectored through the radiation fall-out clouds, while collecting (radiation) air samples. I think these guys were out of the 4926th. Test Group at Kirkland AFB, but I can't be sure that my memory is clear on that one. . . . .

I wound up with a dual responsibility. A Sgt., by the name of Joe Simmons (from the 28th. A&E) was sent over as NCO in charge of our ground shop, with the mock-ups, etc. He was returned to the States, on an emergency exit early on, and I was asked to take on both ground and flying job responsibilities. I thought, "no sweat, what-the-hell, everything but the pay was working out well, so why not." The other responsibility I am familiar with was that we were the airborne photo ship for all the shots. You may not know it, but the **RB36** had a complete photo compartment. Having no other assigned duty during the shots while everything was working I spent a lot of time in the photo compartment. . . . . .

All of the airborne shots for the "Castle" series, to the best of my knowledge, were taken from our aircraft. We had a (20" focal length) Rapatronic (high-speed), in addition to regular cameras, taking shots out the mid-ship compartment ports. I spent most of my time standing along side those cameras, looking out a side port. The **"Bravo"** shot (Feb. 28, 1954) was something I'll never forget and hope to God that I will never again witness. We were positioned some 40 miles out from ground zero at near 50,000 ft. Looking down into that (**15** Megaton) rising cloud with the continuous explosions boiling inside as it rose to well above our altitude was a most fascinating & beautiful site, while at the same time, a most sobering and creepy experience. I could not imagine that such an explosive event could be made possible by the hand of man . . . . .

A short while after the explosion we made a pass over "surface zero" at around 10,000 ft. The atoll was completely gone and the water was still boiling, over (what appeared to be) a 45 mile area. We didn't tarry as our on board dosimeters were raising hell and the dials were going off scale. Since those nuclear weapon detonation events, and over the years, I've learned more about the results of these tests, from reading the letters and information now open on the web, than I ever knew, or was told. .

We were aware of a couple of things. First, it seems that the announcement of our participation resulted in a security breach when it was discovered that a soldier described his experience with the "**Castle"** shots in a letter to his family back home, and it was then released to the local newspaper. After that, all Hell broke loose, and I was on the ramp the day the **CID** (Central Intel) folks flew in to pick him up. I often wondered where he ended up after they took him away. . . . .

The other thing was that "scuttlebutt" had it that the **"*Bravo"*** test was a real problem. We were shut down with no outgoing or incoming news for a couple of weeks. Then the lid was off when a Jap fishing boat (Lucky Dragon-5) got back to Japan. To tell you the truth, we didn't know if we were going to complete the rest of those tests or what, as all hell broke loose, again, at both the DOD and State Dept. I have a few "official" crew pictures and copies of Certificate of Achievement and Participation if you would like to use them. I enjoyed looking at all the pictures the civilian construction guys have submitted to various websites. I guess it was OK for them to have cameras, but not OK for us to do the same. . . .

Listed here are the names of my crew that I would love to get in touch with, if they are still with us: Lt. Robert Cummings (AC), Maj. Rex Covey (1st pilot), Col. Tom Fredericks (Navigator), Maj. Al Gray (Photo Nav), Capt. Tomas Kosiba (Rad Nav), 1st.Lt. Lionel Kelliher (2nd Flight Engr.), Tech. Sgt. Harry Buckley (Radio Op), A/1C Rob Gunderson (Photo Op), M/Sgt. Bill Auth (Scanner) A/1C Lou Faith (Scanner), M'Sgt. Herman Risen (Crew Chief), Sgt. Harold Clendenin (Asst. Crew Chief), S/Sgt Carl Lyons & A/1C Bobby Wuinby (Ground Crew). . . . .

The **B-36** aircraft we flew was a **"II"** version, with the "feather weight" modification. This meant that the guns had been removed. As such we were able to operate at a much higher altitude and operate out of air fields with shorter runways. . . .

We also had three **B-36** "effects" aircraft (out of Carlswell AFB) assigned to assist us with our missions. One of these was the **1086** aircraft that **Bill Flint** submitted a picture of. I could be mistaken but I think this was one of the "effects" aircraft that was pretty heavily damaged by the blast (shock-wave) effects from one of the tests. Anything that I might say about this aircraft's experience would be third hand so I'll leave it to one of its crew to bring forth the details of that experience, should there be one around who might want to contribute their experiences in these areas. In addition to the **F-84** "air-sampler" aircraft there was one **B-47** and several **B-29** "weather-ships" also assigned to the Enewetak **"Castle"** event missions. At times, that air strip got pretty crowded. I remember standing outside and watching the **F-84's** and **B-47** use jet assisted-take-off (**JATO**) bottles, to get off the ground. It was also interesting to watch the **F-84's** bomb the Officer's Club when they jettisoned their empty **JATO** bottles. One day one took a direct hit and that ended that ball game. We will never know if the lucky pilot ever received an "efficiency" medal for his accuracy that day. . . .

And then there was another event where we witnessed a helicopter lose its rotor and crash into the ocean adjacent to our living quarters. From the looks of the crash, followed by the

This B-47 has reduced it's takeoff distance with the use of several "JATO" bottles attached to the rear underside of the airframe. . .

rapid sinking of the wreckage, I don't think there were any survivors. This was later confirmed by our base Commander. . . .

After the **"Castle"** events, we were ordered back to the States, with a three day stopover in Honolulu, Hawaii. We would be later told that no one in Hawaii had never before seen a **B-36**. The local newspaper described the awesome sight of "three monstrous (**B-36**) aircraft circling the airport, on a Sunday morning", with all **6** (turbo-prop engines) turning and all **4** (ram-jets) burning. To those on the ground, looking up at us, that must have been was hell-of-an ear shattering racket. . . . .

We were overwhelmed with the size of the crowd of folks gathered outside of the base gates, and was showered with local hospitability. I would like to (belatedly) thank the Honolulu auto dealers for providing (free) cars for each 4 people and all those free drinks & excellent food that were provided EVERY where we went . . . . .

Before we knew it, the party was over, and we were once again landing back at Ellsworth, AFB, after which we went straight into post-flight docks. The next day I went down to retrieve my tool box and noticed that the aircraft had been moved out over on the back side of the field and a fence had been erected around it. Hanging in the fence was several "radiation" markers. Our airplane was declared "off-limits," and I never did get my tools back. The aircraft was still there in December '54 when I mustered out of the Air-Force, and returned to college. I was given to understand, from un-named contacts, that it remained "hot" for many years thereafter. . . . .

I have, over the years, enjoyed a (mostly) healthy existence, and have heard that some of my crew-mates did, in fact, develop what could be termed "radiation" sickness, of one type or another. And, from the research that I have been engaged in, I could also develop any one of a dozen health problems at any time. I guess what they say about "living with the hand your are dealt" has lot's of merits. In my life span, I feel that I was dealt a fair hand, and have done my best to live each day to it's fullest. I feel privileged to have also been an intricate part of an experience of a lifetime, having participated, first hand, in Operation **"Castle."** I only hope to God that the world will never see the use of those type of weapons - ever again, and that the **sane** nations of the world will keep a tight leash on the **insane** nations of the world, to these ends. . . .

Best regards to all; **Olin H. Hasty** (GA)

VOICES FROM NUCLEAR HELL ! ! !

My name is **Rodney Buntzen**, and (as a **NAVY** scientist) I was involved with Operation **"Hardtack."** I began working at the Naval Radiological Defense Laboratory (**NRDL**), located at Hunters Point Naval Shipyard in San Francisco (CA) in 1957 while a junior in Engineering Physics at the University of California, Berkeley. At this time, I worked in the Radiation Physics Division's (Ocean Technology Branch) during the summer and continued part time through the spring of 1958 while attending classes at Berkeley. I was then assigned to the field experimental group preparing instrumentation for the ***Hardtack*** (***"Wahoo"*** and ***"Umbrella"***) underwater nuclear device shots, during the preceding year, and was asked to participate in the team's field work at Parry Island (Enewetak'). Begging my professors to take late exams for the spring semester, I arrived on Parry Island on May 17th, just after the ***"Wahoo"*** shot. . . . .

In preparation for the tests, my work focused on calculating of the prompt radiation fields from the plume and base surge that developed after an underwater burst. At Parry Island, I was Jack-of-all-trades for Evan Evans, the manager for **"Project 2.3."** While there, I continued estimations of the radiation fields, participated in surveys of the test instrument arrays surrounding the ***"Umbrella"*** site, the painted film pack floats and just about anything else that Evan thought needed to be done. Shot ***"Umbrella,"*** was a **10** Kt. burst at a depth of 150 ft., and created a large base surge as the airborne radioactive plume fell back into the water. The instrument array placed shortly before consisted of a number of moored coracles containing multiple fallout and radiation field measuring components. In addition to these instruments, floating film packs were distributed around "surface-zero" to measure the total radiation dose, from the base surge, as a function of both range and direction.

My job, during these events, was to work with **NAVY** dive teams, to recover the floating film packs after the base surge subsided. I was "captain & crew" of a ***DUKW*** for the recovery operation. We were dead in the water about a mile from ground zero, with the engine off, when the burst occurred. We were far enough away that we experienced little effect from the shock wave. The most impressive display was the upward thrust of the exploding plume and the subsequent unfolding base surge of the resulting tidal wave . . . .

Once the water was calm again, we got the radio call from Evan, who was aboard the U.S.S. Boxer (CV-21) monitoring the test. He instructed us to begin film pack recovery. Since we could accidentally venture near or into a radioactive area, everyone wore protective clothing and I carried two Geiger counters (in case one failed). Unfortunately (or fortunately for us) the engine would not start, and the recovery operation was delayed. . . .

HARDTACK "UMBRELLA"

Given this turn of events, and the resulting delays, the radiation levels were not as high as we would have assumed, had our trip into the area been as previously planned. Following the ***"Umbrella"*** test, our work centered on packing up and preparing a preliminary report. I then returned to Berkeley while others did most of the report writing. I continued working at ***NRDL*** until the laboratory closed in 1967 when the Navy decided it knew all it needed to know about underwater nuclear weapon explosions. I continued on as a **NAVY** scientist, completing an exciting career, and am now retired. I can still see the center of the ocean erupting into a giant plume of boiling water followed by a giant roar. We sure did cook lots of fish, on that day, in the Marshall Islands. . . .

Cheers to all: **Rodney Buntzen** (CA)

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