



SECOND-PLACE WINNER: *Leatherneck* Magazine Writing Contest

MARINES UNDER THE BOMB

Atomic Testing and the Marine Corps

By Cpl Daniel Chandler, USMC

Editor's note: The following article is the second-place winner of the newly established Leatherneck Writing Contest. Major Rick Stewart, USMC (Ret) sponsored the contest open to enlisted Marines through the Marine Corps Association and Foundation; more than 70 entries were received. Upcoming issues of Leatherneck will feature contest finalists.

For decades, the United States Marine Corps has devoted consistent attention to training for an attack involving weapons of mass destruction, including chemical, biological and even nuclear weapons. Yet even with the overwhelming might and power displayed by thousands of nuclear tests, the threat of a nuclear attack—not to mention the ability to survive and fight in the context of a nuclear war—remains a subject largely underappreciated. Because of efforts to shroud the

nuclear science in layers of classified documents, fully appreciating the labors of the men who participated in the tests that gave us the knowledge to carry on the fight in the atomic era is difficult.

Only recently have enough written and visual documents been declassified for the American public to honor those on the front lines of the atomic testing grounds—including tens of thousands of Marines.

Beginning with the “Manhattan Project,” the pursuit of a nuclear weapon by the



United States has been carried out with utmost secrecy. Perhaps no other venture undertaken by humanity has been darkened with such mystery, even today, more than 70 years after the first nuclear detonation in Alamogordo, N.M.

Indeed, "Trinity," the code name for the first test, was publicly announced as an accidental munitions dump explosion. It was not until after the Hiroshima and Nagasaki explosions that the true nature of the Trinity test was revealed. Even after

The Baker explosion off of Bikini Atoll in the Marshall Islands on July 25, 1946, resulted in a wide condensation cloud that soon disappeared to reveal the top of the water geyser, fittingly called the "cauliflower." The water released by the explosion was highly radioactive and contaminated many of the ships nearby. (DOD photo)

victory over the Axis powers, secrecy in the nuclear field became characteristic of future testing as the United States continued to hone its capabilities, perfect its knowledge, and grow its nuclear stock.

For the Marine Corps, experience with nuclear testing stemmed directly from

the Department of the Navy, as Marines served on board the ships taking part in the first postwar testing. The tests took place in the vicinity of the Marshall Islands and provided the knowledge needed to place nuclear weapons into the framework of a new strategy for future warfighting.

Operation Crossroads

The first round of testing was called Operation Crossroads. The objective was to discern the effect of a nuclear bomb on an enemy fleet—how many ships could be sunk, how much damage could the surviving ships endure and what effect would radiation have.

After World War II, there were ships no longer needed, and roughly 70 ships were anchored within a few miles of ground zero. After extensive preparation and documentation, two atom bombs were detonated: “Able” and “Baker.” Able detonated above the anchored fleet and had a negligible impact on the ships. According to the Defense Nuclear Agency’s “For the Record—A History of the Nuclear Test Personnel Review Program,” written by Abby A. Johnson, Baker, however, was an underwater burst that “bathed [the ships] in radioactive water spray and radioactive debris ... the surviving target fleet was too radiologically contaminated for many days for more than brief on-board activities.” Nevertheless, 12 of the ships were “so lightly contaminated that their crews remanned them and sailed them back to the United States.”

Marine Corps participation in Opera-

tion Crossroads is difficult to research, but total personnel in the operation was roughly 37,000 men, and it is possible that Marines are included in the count. Also, records of individual radiation dosage are available from all participating branches. Though incomplete (only 15 percent of all personnel were issued the “film strips” needed to gather radiation data), it records radiation dosage from a total of 550 Marines. If it is assumed that 15 percent of the Marines were recorded, then a total of roughly 3,667 Marines were present.

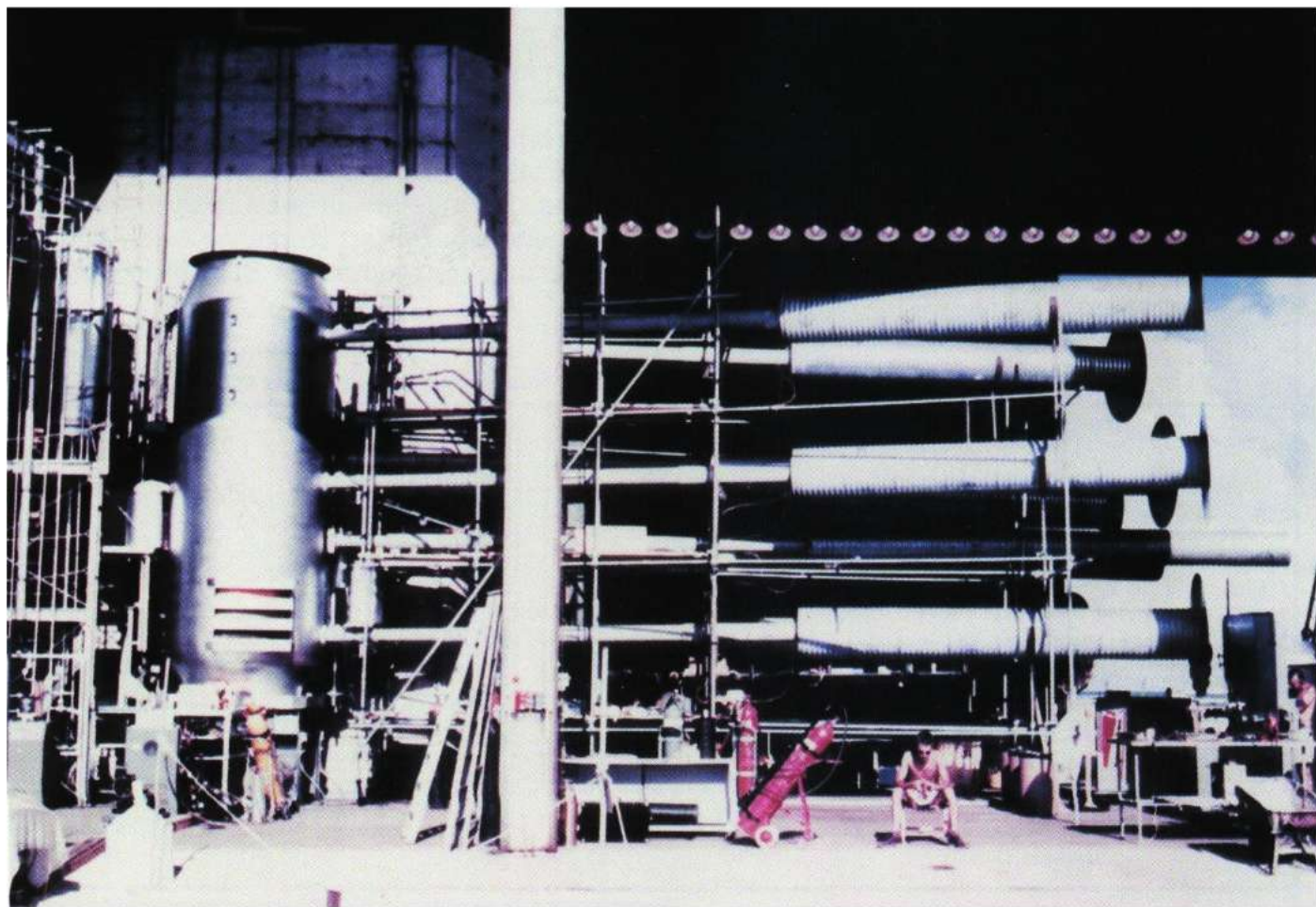
Nevada Tests

The meticulous testing of nuclear weapons continued, slowly at first, then incrementally faster as tensions continued to build during the Cold War. Operations Sandstone, Ranger, Greenhouse, and Buster-Jangle carried the torch of scientific testing from isolated islands in the Pacific Ocean to the Mojave Desert in Nevada on a scale never before attempted. The United States tested its first hydrogen bomb, “Mike,” on Elugelab Island and obliterated it with a 10.4 megaton explosion. The Nevada Test Site opened for testing in 1951. All throughout these tests, the Marine Corps was always present,

whether as security detail aboard Navy ships, as onlookers, or otherwise. Yet even so, its participation in the tests was minimal. The Corps’ moment would not come until May 25, 1952.

With the end of the WW II, the Marine Corps found itself in the crosshairs of a skeptical Congress. Only two nuclear bombs were all it took to end the greatest war in history, and the strategic implications were vast. Many experts and politicians began to say the Marine Corps was obsolete because a single nuclear strike would destroy an amphibious landing party (this was before Operation Crossroads proved that neither an air nor underwater burst could effectively sink a fleet because the ocean itself cushions the ships in the explosion). In response, the Marine Corps began to legitimize its existence by reinventing the way it fought. The invention of the helicopter piqued the interest of the Corps’ leadership because of its speed and ability to drop troops almost anywhere. This idea combined with an overall vision of the execution of nuclear warfare over the next seven years. To practice and refine this style of warfare, an experimental unit known as Marine Corps Test Unit 1 was founded.

The “sausage” device, below, of the Mike nuclear test was the first true hydrogen bomb ever tested. The device’s casing is on the left and its cryogenic equipment is on the right.



U.S. DEPARTMENT OF ENERGY

For decades, the details of Marine Corps Test Unit 1 remained classified. The book “Fighting Elites: A History of U.S. Special Forces” makes no mention of the unit’s role in nuclear tests at all. Nevertheless, the operation it took part in became one of the most widely publicized series of tests ever conducted, with citizens from nearby Las Vegas looking on as a mushroom cloud from one of the many tests rose in the distant horizon. This mixture of secrecy and publicity resulted in a general knowledge of nuclear tests taking place, but a lamentable lack of knowledge of the Marine Corps’ involvement.

Marine Corps Test Unit 1

Marine Corps Test Unit 1 participated in an exercise known as Desert Rock IV, which was a part of a series of tests known as Operation Tumbler-Snapper. The objectives were to find ways to compensate for a lack of adequate support from European allies in the Korean War with nuclear force and to usher in a new military policy with less emphasis on large standing armies and more on a readily available nuclear arsenal. Desert Rock IV played into these themes with its own objective of training troops to fight in close proximity to an atomic explosion and then studying the effect of the witnessed explosion on morale and courage. Depending on the outcome, the Department of Defense might decide to make more such exercises in order to train soldiers and Marines for nuclear combat in much the same way that Marines today train in gas chambers, but on a far larger scale. Marine Corps Test Unit 1 accomplished these objectives by digging fortifications 4 miles from ground zero and then marching toward ground zero while stopping occasionally to check if radiation levels were too high to proceed.

The Desert Rock IV exercise proved to be a massive undertaking for all involved. The exercise itself involved four shots: “Charlie,” “Dog,” “Fox” and “George,” of which Charlie, Dog, and George involved tactical maneuvers. Fox was observed but had no staged assault on ground zero. Of the roughly 8,700 participants in Operation Tumbler-Snapper, about 7,350 of them took part in Exercise Desert Rock IV, including scientific observers, air support and administrators, as well as more than 2,000 men in Marine Corps Test Unit 1. Ultimately, however, the exercise was run for and by the Army, which fielded more than 4,000 soldiers for the staged assault on ground zero and undertook the meticulous task of analyzing the emotional response of both soldiers and Marines after the assault was over.

Modern-day criticism of nuclear weaponry—particularly concerning the dangers



COURTESY OF NATIONAL NUCLEAR SECURITY ADMINISTRATION

Marines prepare to move out after one of the explosions during Operation Tumbler-Snapper. The main objective of Tumbler-Snapper was to study the impact of atomic explosions on troops in close proximity.

of radiation overdose—has overshadowed the appreciation of historic moments such as Desert Rock IV, yet public knowledge of nuclear technology and radiation proves ambiguous and often misunderstood. Today, declassified film footage of Desert Rock IV personnel climbing out of their trenches and marching toward the still-towering mushroom cloud attracts misguided, uninformed commentators that denounce the observed exercise as foolish, irresponsible and even evil. However, testing was planned and operated with the highest concern for public safety. Safety precautions were calculated and directed by professional scientists to sustain maximum well-being for all involved while still achieving the goals of the testing.

Declassified documents reveal many details of how dangers were perceived and

accounted for, though not all documents are declassified and some no longer exist. For troops and troop observers, exposure limits were designated as such: 5 pounds per square inch of overpressure, 3 roentgens of nuclear radiation per bomb test (6 roentgens in total for a six month period), and 1 calorie per square centimeter of thermal radiation. For Desert Rock IV, a cap of 3 REMs (roentgen equivalent man) per 13 week period was enforced. Indeed, these limits were not merely adequate, but in fact excessive: a *Forbes* article published Jan. 11, 2013, reports that any dosage of radiation under 10 REMs is negligible according to recent conclusions from the United Nations Scientific Committee.

In addition, safe distances also were calculated. Bombs Charlie, Dog, and George had yields of 31, 19, and 15 kilo-

tons respectively. Safe distances for each shot was calculated as 12,000, 9,000, and 9,000 yards respectively for troops in the open, and 3,800, 3,500, and 3,500 yards respectively for troops in trenches and foxholes, which would be 6 feet deep. In addition, troops in fortified trenches were instructed to “keep all parts of the body below a point at least two (2) feet below the ground level.” These, in addition to pages of further specifications, were the ground rules for such tests. The result was minimal exposure to radiation; of the 2,042 Marines whose external doses of radiation were recorded, 2,033 of them absorbed between 0 and .5 REMs for the entirety of Operation Tumbler-Snapper, that is, 99.6 percent of all Marine participants. An additional eight Marines absorbed between .5 and 1 REM, and one Marine absorbed between 1 and 3 REMs. Therefore, the safety precautions of Desert Rock IV were not only maintained, but also succeeded far beyond expectations.

Psychological Impacts

The overall success of Exercise Desert Rock IV, however, is a different matter. The main objective was to evaluate the psychological effect of nuclear war on soldiers and Marines. Could men remain calm under such conditions? On this question rested all others, including the Marine Corps’ intent to develop tactics for combat

in a nuclear environment. As such, the men involved in the exercise were briefed extensively on the safety precautions as well as what to expect during the explosion. This, in addition to the certainties of a controlled environment for the test, resulted in troops who performed well. However, as the psychologists evaluated the troops afterwards, data became hard to obtain. “Reactions of Troops in Atomic Maneuvers: Exercise Desert Rock IV” compiles the research obtained by the psychologists, and it concludes that while “troops suffered no impairment of manual dexterity in their performance of a routine military task as a function of witnessing an A-bomb burst,” and “gave larger emotional reactions to questions concerning combat dangers than questions concerning atomic dangers ... it is not believed that atomic maneuvers of the type held in Exercise Desert Rock IV, with their emphasis on safety measures and control, yield the kind of data necessary for making predictions of how troops will actually perform in combat when A-bombs are used.” In other words, a test in a controlled environment cannot show how troops will react in the uncontrolled, dangerous conditions found in a combat environment.

Ultimately, while the tests were impressive and informative, they did not succeed in legitimizing future exercises for the purpose of training troops for nuclear

combat because not only were troops unafraid of the explosion in the first place, the tests were too expensive to do frequently. Similar exercises involving troop entrenchment near ground zero were conducted for the next five years, their purpose served to answer other questions. As for Marine Corps Test Unit 1, its mission shifted more toward helicopter and paratrooper tactics and less on nuclear warfare. For what it was worth, Marine Corps Test Unit 1 made the most of its experience in Nevada and heralded a new style of fighting incorporating helicopter tactics into warfighting that would prove key to Marine Corps operations in Vietnam and beyond. Having served its purpose, the unit disbanded on June 19, 1957.

The future is open to interpretation, but the continuing prevalence of war remains a certainty. It is anyone’s guess as to the role of nuclear weaponry in the future, but its past role is recorded, no matter how secretly. As the Marine Corps prepares itself to serve on the field of battle, may it remember the contributions made by one of its most interesting training units.

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NATIONAL ARCHIVES

During Operation Tumbler-Snapper of Desert Rock IV, the atomic cloud formed by the Dog detonation seemed close enough to touch.