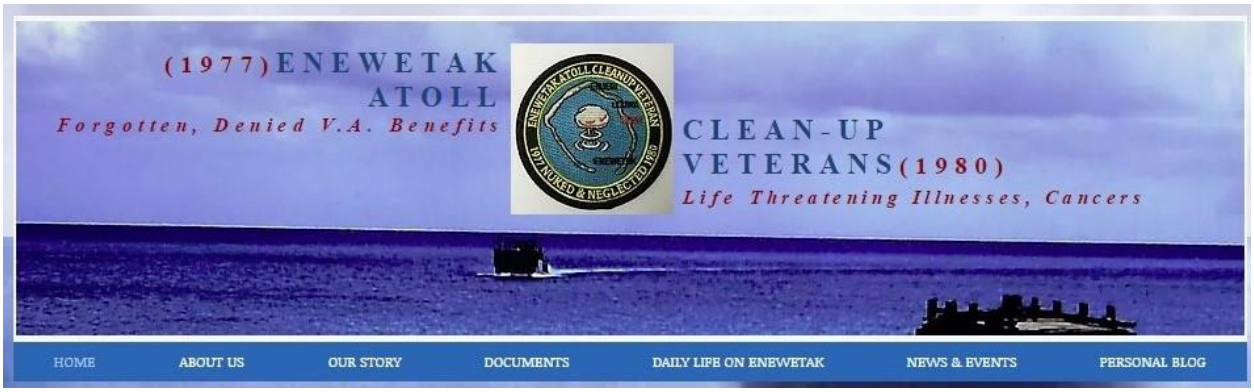

The Veterans of Enewetak Atoll

Participants in the Atomic Cleanup Operation

In search of recognition for

Atomic Veterans Healthcare Parity

By: Jeff A. Fortin
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May 26, 2017

- http://www.atomiccleanupvets.com/
- http://www.enewetakatollvets.info
- https://www.facebook.com/AtomicCleanupVeterans/

Dear Mr. President, Mr. Shulkin, Members of Congress, and Public:

I wish to bring to your attention the plight of service members who participated in the 1977-1980 Enewetak Atoll Cleanup Mission, they served with honor and answered the call to duty for this humanitarian mission. These brave men served our government and the peoples of the Marshall Islands in the remediation, clean-up of atomic waste, debris and contamination from the decades of Atomic Testing in the South Pacific. During the cleanup over 8,033 participants of the US Army, US Air Force, US Navy, US Coast Guard, and Civilians worked tirelessly in implementation of OPLAN 600-77.

The clean-up project was a three year project from 1977 to 1980, three year effort. I was one of the service members who served at Enewetak from March 1978 to March 1979 as part of the US Air Force Element as the air passenger specialist at the air terminal. The purpose of this letter is to highlight the dangers of our service on the islands and our 40-year fight for healthcare parity for the participants of this clean-up project. As of today, we have found 466 participants who served on this project, and advise you that 55% of them are suffering life threatening illnesses with chronic issues, as well as various types of cancer and disabilities.

Under the guidelines of the Energy Research and Development Administration (ERDA) issued guidelines in October 1973 related to personnel working as part of the clean-up operation. Under these rules all personnel visiting and/or working on a "controlled Island" which is a defined area in which the exposure of personnel to ionizing radiation is under the supervision of an individual for radiation protection. These personnel who are exposed to more than 10 percent of the basic radiation protection standards as a result of his employment or duties in a controlled area qualify to be called "radiation worker". The VA considers Enewetak Atoll veterans as only "occupational exposure" to the various contaminates on the various islands at Enewetak, due to not being classified "Atomic Veterans". The ERDA rules also state "These personnel preforming radiological clean-up functions will be classed as radiation workers, and islands suspected of having radioactive materials are classed "controlled" islands.

Attached to this letter is a list of known radioisotopes found in the Soil, Debris, and Water as well as the metal and scrape. Included with this listing is a map of the Enewetak Atoll Island chain with listing of the 43 Atomic Tests conducted on the atoll. A memorandum for The Commander, Joint Task Force Group, Enewetak Atoll sated January 6, 1978 stated that **"the Enewetak Atoll cleanup operation may result in exposure of personnel to ionizing radiation", further stating "Approximately 700 personnel may be exposed each month over a period of 36-months. The majority of these personnel will rotate every six-months."** Over the past five years our group has been lobbying Congress to change the existing law to classify our service as "Atomic Veterans" just as the down winders and participants in the actual testing have had for decades. In the 113th Congress the effort resulted in the submission of the Atomic Veterans Healthcare Parity Act, however this legislation died in committee, and was lost with the end of the congressional session.

In 2015, the late Mark Takai introduced similar legislation in the 114th Congress with H.R. 3870, gaining 107 co-sponsors, as well as Senator Al Franken introduced companion legislation with S2791, gaining five co-sponsors.

In 2016, Mark Takai, passed away and his legislation died as well. Then Representative Grace Meng sponsored the Mark Takai Atomic Veterans Healthcare Parity Act with H.R. 5980, gaining 102 co-sponsors. However, all these bills did not succeed getting out of committee, and the congressional session ended January 2, 2017 eliminating our success with healthcare parity. The basis of the healthcare parity act was to change the "occupational exposure" to a "presumptive exposure" thereby allowing for the priority access to VA healthcare and additional benefits. This change would allow for the expedited review of claim by Enewetak Atoll veterans by the VA and assist with the access to healthcare benefits.

As you can see, the photo above is the Runit concrete dome, the highest levels of contamination.

As of today, many of the known survivors suffer lack of proper healthcare, creating massive financial burdens on their family and undue pain and suffering. Over 8,000 service members served at Enewetak, many have died over the past 40-years, and many more will succumb to their plight before the law is changed. **They are holding on with faith the government, congress and the VA will do the right thing**.

I myself am suffering from my service, and have been unable to work since 2014, I have filed VA and Social Security disability claims and am moving slowly through the process. I have been diagnosed with initial stages of Ankylosing spondylitis (AS) of the spine, degenerative disc disease, along with focal gliosis of the spinal cord, and Scaroilliitis and reactive arthritis which has not been rated by the VA, as well as asthma and moderate obstructive airway disease which limits my ability to work, which has been rated at 40% with additional claims under review and appeal.

My service on the islands consisted of air and cargo air terminal operations. I served and lived on the islands for over a year, working 12-hour days. I was able to visit all 40-islands over a 10-day period in a search and rescue operation in search of a lost 12-foot Sunfish Sailboat with two service members lost during Typhoon Alice in January 1979, which created devastating effects on all the islands damaging buildings, roads, work areas, moving dirt, debris and contaminations outside of various contaminated areas. We never found the two lost service members at the atoll, but their bodies were found later out at sea.

I was flown by helicopter to the northern and southern islands spending hours at a time on each of the 40-atoll outlet islands. As you can see by the above image damage on the main island was not limited, this type of damage, debris and spreading of contaminations as a result of the typhoon created further risk to the participants in the project. Especially where the army personnel resided, on Lojwa a quarantined island, yet housing the base camp of the 84th Combat Engineers. The damage from the typhoon effected all living and working areas, including the hot spots and debris area.

My tour on the island ended when I was diagnosed with cyst growths appearing in my left arm, there were two growths found in a medical review and it was recommended that I be sent to Tripler Army Medical Center for further review. Upon arrival at Hickam, and proceeding to Tripler I had surgery to remove these growths. At the time, they told me they there was nothing to worry about, however I was advised that should I have been exposed to radiation due to my service any health problems may not appear for 25 to 30 years. I have attached my medical referral and issues causing my temporary duty to Enewetak to be cut short, two growths appearing within a three-week time frame.

It is unfortunate, some 40-years later I am suffering issues and conditions which were seeded during my service on the Islands, I have been fortunate that I have gained medical care due to other service-related conditions, yet in the event of developing a more serious aliment, I would have to be covered as an Atomic Veteran.

I have been told that I have initial stages of Ankylosing spondylitis (AS) of the spine, degenerative disc disease, along with focal gliosis of the spinal cord, and Scaroilliitis and reactive arthritis, which limit my movement and effects my spine, neck, and back. Further issues consist of asthma and moderate obstructive airway disease which limits my ability to work in a gainful manner.

Even with the support of the American Legion, the Veterans of Foreign Wars and many members of congress we have failed in our parity efforts to be treated with the same quality of medical care as those who participated in the atomic test era.

In the preplanning for the execution of the cleanup project there were many positions taken with the Defense Nuclear Agency, the Environmental Protection Agency, the Atomic Regulatory Commission, as well as the Department of Defense discussions were held on the risk being considered with the cleanup. Discussion was help on using civilians for the cleanup, but due to costs, possible delays and exposure risk, the Department of Defense took the lead role for the active cleanup participants. With Freedom of Information Requests and the declassifying of cleanup documents a clearer picture has emerged on the development, discussion and implementation of the mission of all involved.

The risks facing participants were numerous internal exposure to ionizing radiation occurs when a radionuclide is inhaled, ingested or otherwise enters into the bloodstream (for example, by injection or through wounds). Internal exposure stops when the radionuclide is eliminated from the body, either spontaneously (such as through excreta) or as a result of a treatment. External exposure may occur when airborne radioactive material (such as dust, liquid, or aerosols) is deposited on skin or clothes. This type of radioactive material can often be removed from the body by simply washing.

The 84th Combat Engineers were tasks with the majority of the cleanup of the contaminated islands in the controlled zones. The safety precautions were mixed, although protection gear, respirators, film badges were given to hot-spot participants many conducted this work in shorts, and tee-shirts. When protection gear was provided it was shabby, flimsy and did not keep particles, dust and debris off body or out of lungs, eyes, wounds and cuts. The Issue: Servicemen and civilians who worked on this project have developed cancers, tumors, skin lesions and other illnesses due to radiation exposure.

The Enewetak Atoll Radiological Cleanup Project was an attempt to make the islands of Enewetak Atoll safe for re-inhabitation. The cleanup effort failed and some of the Northern islands all the islands in the controlled zone remain uninhabitable to this day. However, unlike the atomic veterans of the cleanup, the Marshallese people have been compensated monetarily for their losses and illnesses. Their health care needs will also be covered by the U.S. Government for the remainder of their lives.

Their illnesses are not recognized by the U.S. Government as being associated with their exposure to these extreme conditions. Consequently, there is no mechanism to help them or their families with the health problems they have developed.

Radiation Exposure of Cleanup Workers: During the cleanup project, servicemen and civilians were subject to around-the-clock radiation exposure, intense sun, heat and humidity, with very little safety gear. A majority of the time the work was done in shorts, tee-shirt and hats.

The service at Enewetak has caused hardships and consequential health damages to its participants. The main pathway for human exposure to plutonium is through inhalation of contaminated dust particles in the air that people breathe.

The work being accomplished by our service members do create possibility of contaminates being inhaled. Plutonium in the debris that enters the body will eventually ends up in various organs—especially the lung, liver, and bone. Moreover, radioactive debris deposited in lagoon sediments of coral atolls formed a reservoir and potential long-term source for remobilization and transfer of plutonium through the marine food chain and potentially to man.

We have fished the waters, snorkeled in the lagoon, drank the lagoon water that has been desalinated, which included bathing and washing from potentially contaminated water. Elevated levels of plutonium in the terrestrial environment also represent potential inhalation and/or ingestion hazards. One hundred and eleven thousand cubic yards of radioactive debris lies within Runit Dome in the Marshall Islands, a "hulking legacy of years of U.S. nuclear testing" whose fragile structure is vulnerable to breaking from violent weather associated with climate change.

As of this date, the safety and containment of this tomb is in jeopardy with raising ocean levels. Given the mega-tonnage of nuclear testing that the US conducted in the Pacific, it appears plausible that excess cancer would have occurred in areas of Micronesia other than the Marshall Islands. "Six Islands in Bikini were vaporized by the tests.

The northern most islands in Enewetak Atoll are still uninhabited due to high levels of radiation. A thyroid study conducted by Japanese physicians in 1994-1995 confirmed hundreds of thyroid tumors among Marshall Islanders from islands throughout the Republic. This led U.S. Congressional leaders to comment in 1994 "that the thyroid cancer rate in the Marshall Islands was 100 times higher than anywhere else in the world".

The radiological illnesses in the Marshall Islands include thyroid cancer, breast cancer, and stomach cancer, cancer of the brain, cancer of the liver, cancer of the ovary, and cancer of the bone."

As early as 1956, the Atomic Energy Commission had characterized the Marshall Islands as "by far the most contaminated place in the world."

In 1998, staff from the U.S. Centers for Disease Control and Prevention (CDC) made a comparison study to compare the amount of radioactive Iodine-131 at four different radiation-polluted sites, measured in curies (1,000 curies of Cesium-137, as found in a radiation therapy machine, could produce serious health effects in a direct exposure of just a few minutes)."

"The CDC team reported its finding that the atmospheric release of curies of Iodine-137 at the Hanford nuclear processing plant was 739,000 curies; at Chernobyl the release was 40 million curies; at the Nevada bomb test site, 150 million curies; and in the Marshall Islands, 6.3 billion curies (more than 30 times as much radiation as the other three sites combined)."

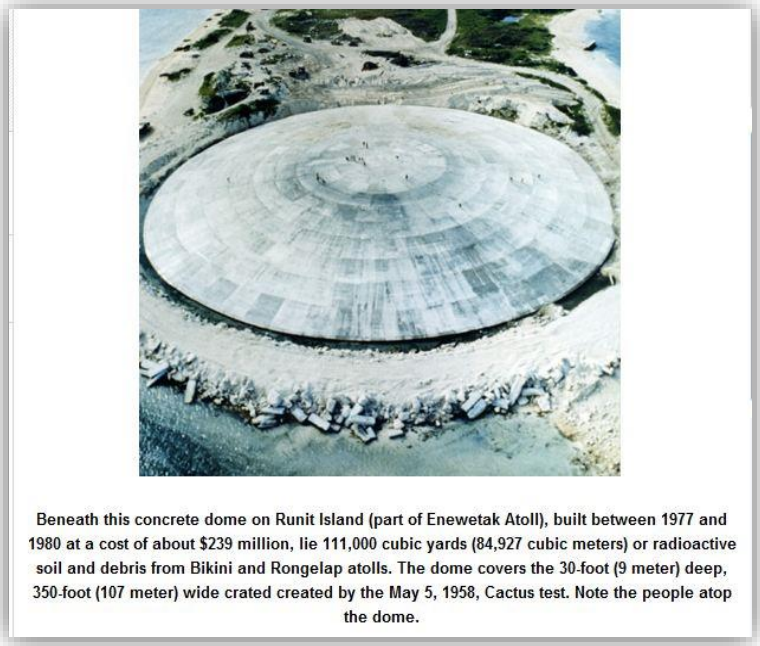
In a letter Feb 1974 from the EPA to AEC – **"We have serious reservations as to the adequacy of the AEC recommendations for environmental protection**. The exposure situation at Enewetok is expected to continue indefinitely with the return of civilians into a contaminated area.

These Trust Territory people are entitled to as much protection as that afforded residents of the U, S. We also believe the EPA position on ocean disposal of radioactive wastes, which is sufficiently flexible to give a fair consideration of an appropriate EIS, is seriously misrepresented, we request this material be deleted from the task force report."

In a *telex message from USAEC to Gen Gates* "telephone conversation Wednesday with Bob Law, trust territory liaison office Honolulu I learned that there are rumors here approximate quote that the **AEC may be having second thoughts about Enewetak atoll and may not let the people return after all unquote**".

As well in *June 1974 from Dr. Ray Chair AEC from the DNA* **"There is some controversy over what constitutes an acceptable level".**

From the EPA to DNA – "Due to the large amount of plutonium on the atoll and the uncertainties in predicting resuspension factors it is very important that the actual conditions be determined rather than calculated. We have no specific comments to make about this phase except to note that there will be significant possibilities for inhalation exposures to workers and. And transport of radioactive material from greater to lesser contaminated portions of the atoll.



Beneath this concrete dome on Runit Island (part of Enewetak Atoll), built between 1977 and 1980 at a cost of about $239 million, lie 111,000 cubic yards (84,927 cubic meters) or radioactive soil and debris from Bikini and Rongelap atolls. The dome covers the 30-foot (9 meter) deep, 350-foot (107 meter) wide crated created by the May 5, 1958, Cactus test. Note the people atop the dome.

Constant health physics support will be needed. DNA has recommended that a risk-benefit study should serve as a basis for the decision on dose criteria. The Task Group had severe reservations about the validity of the estimates." *In a letter to Senator Rogers from Vice Admiral Monroe* on behalf of the Secretary of Defense "**Of the 650 DoD personnel on the Atoll, possibly 400 have the potential for being exposed to radiation.** Whenever earth-moving operations were being conducted on a controlled island in the northern Enewetak Islands water sprinklers were supposed to be set up to minimize resuspension of contamination, rarely did such activity occur and the cleanup went forward with no sprinklers.

Rarely were water trucks used. Minimal air sampling was conducted downwind of the operation cleanup activities. Personnel involved in earth-moving operations rarely wore respirators and protective clothing. Most were done in shorts, short sleeves, and hat – unprotected.

AEC Health Physicist to File "The government planners stated that there would be a pre-employment physical, screenings, and prior to being deployed to the islands for all personnel.

"Such medical physicals did not occur for a majority of its clean-up personnel. Individuals undergo pre-deployment physical examinations which pay special attention to past history of exposure to ionizing radiation and baseline blood counts. The results are entered in individual permanent medical records, these did not occur".

Regarding clean-up operations – in a letter from the *NRDC to DNA, EPA and AEC March 1975:* "We have no specific comments to make about this phase except to note that **there will be significant possibilities for inhalation exposures to workers** and transport of radioactive material from greater to lesser contaminated portions of the atoll."

Constant health physics support will be needed the in a report from NRDC to file finds the ***"****Draft Environmental Impact Statement, Clean Up, Rehabilitation, Resettlement of Enewetak Atoll -- Marshall Islands," to be incomplete and inadequate. Furthermore, the proposed (preferred) clean-up operation is totally inadequate to protect the health of "the Enewetak people from exposure to hot, particles of plutonium which carry. The basis for these conclusions high risk of producing lung cancer, and other ailments."*

NRDC Staff Scientist in a letter to DNA Sept 1974: "Exposure can produce roughly 10 times as many cancers as 100 rad of X-Rays. The total elimination of any radiological health risk at unrealistic objective which can never be attained. The risks personnel are exposed to and the environment, and concentrations increase risk of generating bone deformities, bone tumors, and cancers of the blood-cell-forming organs. Irradiation of the bone marrow also impairs the immune system."

"Cesium-137 and because of the chemical nature of cesium, it moves easily through the environment at increasingly concentrated levels. Upon entering the human body, cesium-137 can produce acute and chronic health effects, including cancer. Acute exposure causes thyroid disease and tumors. Long-term exposure to lower levels of iodine-131 causes thyroid cancer"

From the DNA to AEC May 1974 - With the radioactive contamination being beyond our ability to turn off or wholly eliminate, it is an uncontrolled localized contamination event in the definition of the Federal Radiation Council (FRC).

Being the release of radioactive material from nuclear explosions of many years ago, the Enewetak situation is Category III of p. 30 of FRC Staff Report No. 7. For this category, protective action is to be considered on a case-by-case basis (p. 38). Any situation resulting in a bone marrow dose greater than 0.5 rad per year is to be appropriately evaluated.

FRC Report No. 7 does not include any criterion for bone dose for this Category III, but the present AEC Report numerically uses bone dose criteria to advise against the desired return of the Enewetak people to the island of Enjebi and to advise against full use of other islands.

This particular case of Enjebi should instead be individually evaluated on such bases as relative risks or cost vs. benefit that are recurrently requested in FRC reports. The present AEC Report seems wholly inadequate in such evaluations.

Over the past five years the veterans of Enewetak have sought to gain government acknowledgment of their plight and recognition as Atomic Veterans. With letter writing campaigns and supportive many reporters we have been covered in the media (both newspapers and broadcast news) sharing our cause with the public. We have been on 60 Minutes (during the actual period of the cleanup) and for healthcare parity in local news shows, regional and local newspapers. Yet we still have failed to get Congress to right the wrong of the past and classify us as Atomic Veterans. We have developed numerous websites, Facebook pages announcing our goals, rally point for veterans and the sharing of information.

***Our group is suffering cancers of various types, bone degeneration, esophageal, stomach, and brain ailments, including lung disease, asthma and airway obstruction, skin aliments to name a few*.**

This also includes blood disorders and other life threatening ailments. Many veterans are without proper medical care and benefits from the Veterans Administration. We conducted a survey of the 555 known known survivors and asked how their health status is, based on this over 55% of them suffer from aliments, cancers, tumors and other illness not covered by the veterans administration.

The original group of cleanup participants consisted of 8,033 service members. It is though the freedom of information act and declassifying of atomic testing and clean-up files that we can now share our story for recompense from the government and VA.

Extrapolating estimated medical conditions from the 8,033 is could possibly effect over 4,418 veterans with life threatening issues, very unacceptable, and change in law and classification is warranted.

Enewetak Atoll was a very contaminated and hostile environment to blindly place service members in harm's way with the forewarned dangers of illness, cancers and death some 20, 30 and 45 years later without acknowledgment and coverage in healthcare parity.

The purpose of this narrative is to bring awareness and understanding to our cause. To rally support for the reintroduction and passage of the Atomic Veterans Healthcare Parity Act within the 115th Congressional session.

We need to right a wrong and have available healthcare, expanded benefits for the participants of the Enewetak Atoll Cleanup Mission rather than just a Humanitarian Service Medal. Many have preceded us in death, many more are suffering, and many more are caught in the red-tape of government Bureaucracy. The time to change is now!

As of January 24, 2017 House Representative Grace Meng, New York's congressional Democrat introduced H.R. 632 the Mark Takai Atomic Veterans Healthcare Parity Act so far sponsored by 36 fellow house members.

In February, Senator Al Franken, Junior Senator from Minnesota, Democrat along with five fellow Senate members introduced the companion legislation for enact legislative changes to help the veterans of Enewetak with healthcare parity.

Congress must act, the Veterans Administration should stand ready to help the Enewetak Atoll Veterans, and the public become aware of our plight, need and resolution.

The cost of action is the saving of life, holding the Veteran's Administration accountable for treating the veterans of Enewetak Atoll, providing healthcare parity. The cost of inaction is the slow, agonizing death of thousand denied healthcare and benefits of service to the Country, from a known service of 8,033 members, to a known number suffering illness of over 555.

Please help us with our cause! Help us reach public demand for change.

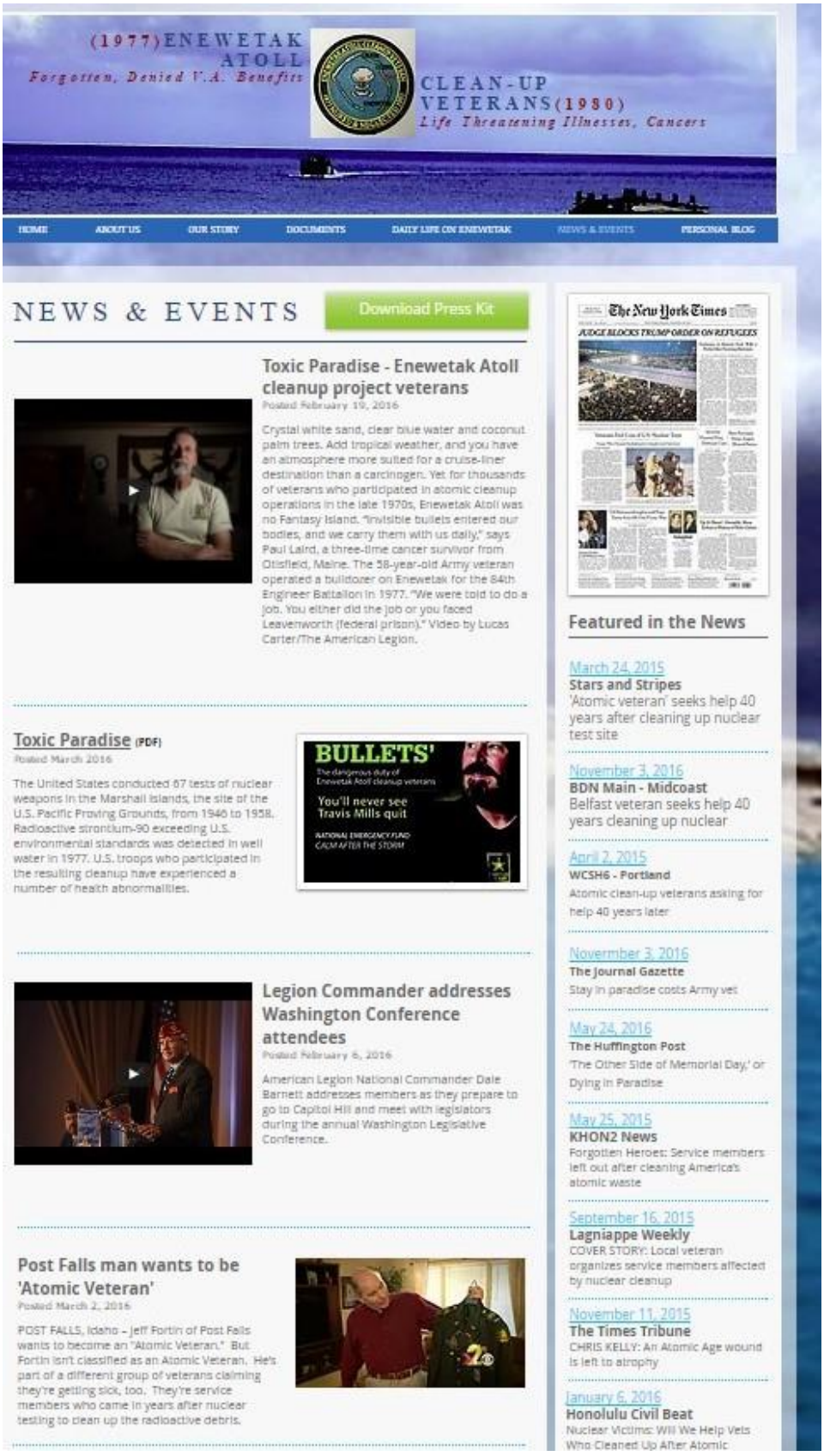
Cordially,

Jeff A. Fortin
2LT US Army Reserve (Ret)
Member, SRA, (E4), USAF Element, Airfield Operations (1978-79)

Attachments:

- Energy Research and Development Administration (ERDA) Guideline on Radiation Worker **(2-Pages)**
- Letter from Steven L. Simon Re: Plight of Richard Doherty, Veteran of Enewetak **(4-Pages)**
- Summary of the Status of Health of the Known Survivors of Enewetak **(1-Page)**
- Map of Enewetak Atoll – 43 Atomic Tests on Atoll **(1-Page)**
- Radioisotopes of Interest found in Enewetak Atoll Soil, Water, and Debris **(1-Page)**

News on our Healthcare cause (http://jfortin670.wixsite.com/enewetak/news-and-events)



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ENEWETAK ATOLL RADIOLOGICAL INFORMATION

1. As an initial step in preparing the return of Enewetak to the people of Enewetak, a comprehensive radiological survey of the Atoll was conducted by the Atomic Energy Commission (AEC), now the Energy Research and Development Administration (ERDA), in October 1973. The study showed that many of the Northern Test Islands were contaminated with Radioisotopes associated with the metal and concrete debris and some soils.

2. This study developed the data that indicated some removal of radioactive material would be necessary before the affected islands could be used by the returning people. Guidlines which enabled the tasked agencies to develop plans for removing radioactive materials were developed from the data. The plans for the cleanup and return of the Atoll have been coordinated with the people in order to incorporate their desires.

3. Contaminated material and soil will be moved to the island of Runit and placed in a concrete-matrix in one of two craters that resulted from testing. The crater will be capped with concrete. Runit will remain a quarantined area.

4. The cleanup of the Atoll is a Joint Military Operation under the management of the Defense Nuclear Agency. Soldiers, Seamen and Airmen supported by specialized civilians will accomplish the Atoll Cleanup. Although these personnel will be working in a contaminated environment, most should receive no radiation above the normal background received from Cosmic and Terrestial sources for the area. This is less than 0.01 REM per year. In contrast, inhabitants of Denver, Colorado receive approximately 0.18 REM per year (excluding medical, etc) and the U.S. standard for an individual is 0.5 REM per year. The standard for the relatively few people in the U.S. population who are employed as radiation workers is 5 REM per year. These personnel performing radiological cleanup functions at Enewetak will be classed as radiation workers, but it is expected that their annual exposure will be kept well below the U.S. individual standard of 0.5 REM per year. An aggressive, comprehensive radiation safety program designed to protect the individual throughout the project has been initiated. Islands suspected of having radioactive materials are classed as "CONTROLLED" Islands. Access and activities permitted on such islands are reviewed and supported by Radiation Safety Personnel.

5. Individual exposures are monitored by Film Badges, Dosimeters and Survey Instruments as necessary and Bioassays will be obtained to document radionuclide intake, if any.

6. All personnel will be trained in health hazards associated with exposure to radioactive materials, precautions to minimize exposure and an explanation of the use of protective devices to be employed. A requirement for personnel to wear protective clothing/Equipment at the initiation of the cleanup operation on each controlled island has been established for safety purposes. This requirement will not be changed until the results of air sampling and frequent

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6 January 1978

MEMORANDUM FOR: THE COMMANDER

SUBJECT: Radiation Exposure Records - Enewetak

1. Statement of the Problem: To determine the method of storage and retrieval of radiation exposure data resulting from the Enewetak cleanup operation.

2. Facts Bearing on the Problem:

a. The Enewetak cleanup operation may result in exposure of personnel to ionizing radiation.

b. Approximately 700 personnel may be exposed each month over a period of 36 months. The majority of these personnel will rotate every six months. Exposure records on about 4,200 people will result. Personal data on an additional 4,500 non-radiation workers is also expected.

c. Dosimetry in use consists of:

(1) U.S. Army film badge service for all radiation workers.

(2) Ion chamber (pocket dosimeter) supplementing film badges as required.

d. Bioassay program consists of:

(1) Initial entry urine samples for all radiation workers. These samples are to be stored and will not be analyzed unless final exit sample is positive.

(2) Final exit urine samples from all radiation workers. All final exit samples will be analyzed.

(3) Urine samples, as determined necessary by the radiological protection officer, for any suspected exposures.

(4) Nasal smears are taken from personnel working in contaminated areas when air filter readings give a positive indication of alpha activity. Contaminated nasal smears would require fecal and/or urine samples be collected from contaminated individuals.

Steven L. Simon, PhD

Business address:
c/o Board on Radiation Effects Research, Rm 342
National Research Council
National Academy of Sciences
2101 Constitution Ave., NW
Washington, DC 20418

Home address:
1530 16th St., NW #408
Washington, DC 20036

DATE: 31 January 1998

TO: TO WHOM IT MAY CONCERN

FROM: Steven L. Simon, PhD

SUBJECT: Radiation exposure of Mr. Richard Doherty

This letter is written on behalf of Mr. Richard Doherty with whom I have corresponded and spoken with by telephone, but never met personally. The purpose of this letter is to express the opinion of a qualified radiation health scientist regarding the need and appropriateness of benefits to Mr. Doherty as a result of his work assignment on the cleanup of Enewetak Atoll while serving in the U.S. Army. Though his radiation exposure as a result of that assignment is unknown, there should be a consideration of Mr. Doherty's service to the US Army with the possibility that he has suffered from that experience - either as a result of radiation exposure or otherwise.

As a preamble to this discussion, let me introduce myself. I am a doctorate level radiation health physicist and have worked in the field of radiation in medicine, radiation in the environment, and dose reconstruction for over 20 years. In the late 1970's, I was a medical physicist for the University of New Mexico Cancer and Treatment Center. After completing my doctorate in the mid-1980s, I was a Research Associate at the University of Utah where I participated in research of the health effects of radioactive fallout from the Nevada Test Site on residents of Utah[1],[2]. Subsequently I was faculty member of the School of Public Health, University of North Carolina at Chapel Hill (1987-1990) and during the years 1989-1995, I was the scientific director of the Marshall Islands Nationwide Radiological Study - a radiological monitoring program of the entire Marshall Islands nation sponsored by the Government of the Marshall Islands. That program was the first such evaluation of the Marshall Islands nation and was published in the open scientific literature[3],[4]. Presently I am a Senior Program Officer for the Board on Radiation Effects Research of the National Academy of Sciences. This institution conducts definitive studies of health effects of radiation in this country and is world recognized.

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[1]see Stevens et al., Leukemia in Utah and Radioactive Fallout from the Nevada Test Site. Journal of the American Medical Association 264(585-591), 1990.

[2]see Kerber et al., A Cohort Study of Thyroid Disease in Relation to Fallout from Nuclear Testing. Journal of the American Medical Association 270(17):2076-2082. 1993.

[3]see the entire July 1997 issue of Health Physics (73(1), 1997).

[4]Simon, S. L.; Graham, J. C. 1997. Findings of the first comprehensive radiological monitoring program of the Republic of the Marshall Islands. Health Physics 73(1):66-85.

This written statement, however, is not an opinion of the National Academy of Sciences or the National Research Council. This statement constitutes my personal opinion only.

It is not necessary here to attempt to document the state of knowledge on the possible health effects of exposure to ionizing radiation but it is widely recognized that exposure increases the risk of a number of detrimental health conditions, the most prominent being cancer of various organs, leukemia, eye cataracts (in the case of high exposures) and other conditions. Less is known about, though it is still suspected, that damage might occur to the vascular system including the heart from high exposure to gamma radiation. The literature on the entire subject of radiation health effects is vast and the Veterans Administration would undoubtedly have access to it through their radiation compensation programs. The most recent comprehensive treatise of the subject was a report written by the institution for which I now work[5].

The intent of this letter is not to speculate on levels of Mr. Doherty's exposure but rather to discuss factors that might have led to his exposure during his work experience on Enewetak and to express my opinion regarding the services and benefits which I believe should be provided to him. Furthermore, the intention of this letter is not to argue for any benefits which seem undeserved or out of the normally accepted realm of compensation for radiation exposed U.S. veterans. The basis for my opinions are twofold: (1) I have long experience with radiation exposure determination - both by measurement and calculations, and (2) I have intimate knowledge of the radiological conditions of the entire Marshall Islands and have personally measured the radiation environment on all the islands on which Mr. Doherty worked.

According to Mr. Doherty, he participated in the cleanup effort of Enewetak atoll that took place during the late 1970s. Mr. Doherty was a bulldozer operator in an operation to scrape and and dispose of radioactively contaminated soil from the surface of islands in an effort to rehabilitate the environment to an exposure level suitable for the Marshallese population to return to it to live. In general, the hazards of moving radioactive soil are recognized; dust is created which can coat the clothes and body and be inhaled and ingested. The persons involved in this activity would be exposed to: (1) penetrating external radiation - in the case of Enewetak, this would primarily be from the radionuclide cesium-137 (^{137}Cs) with lesser amounts from cobalt-60 (^{60}Co) and very small amounts from other remaining fission and activation products that originated from the atomic tests conducted there, (2) external beta radiation (less penetrating than gamma emissions) mainly from ^{137}Cs and strontium-90 (^{90}Sr), and (3) ingesting and/or inhaling any of the above radionuclides plus the entire suite of actinide or transuranic elements remaining from the tests (these emit alpha particles) including the plutonium isotopes (primarily plutonium-239 [^{239}Pu], but also, ^{240}Pu , ^{238}Pu, and ^{241}Am).

That those servicemen engaged in soil moving activities could be exposed to radiation was recognized during the atoll cleanup activities. That was, of course, the reason for the various monitoring and safety programs implemented. The special case and risks of those engaged in soil disposal activities was described by U.S. Navy Vice Admiral R. R. Monroe in a letter to Congressman Mr. Paul G. Rogers. Mentioned in that letter were the U.S. radiation exposure standards cited to 10CFR-20 as implemented by the Army. At the time of that letter writing, that standard was 5 rem per year or 1 1/4 rem for any three consecutive months. Over the years as additional information has been gained about the hazards of radiation, guidelines to limit

[5]National Research Council. Health effects of exposure to low levels of ionizing radiation. National Academy of Sciences, National Research Council. Washington, DC: National Academy Press, 1990.

exposures to the public have recommended successively lower levels. Presently the International Commission on Radiological Protection[6] recommends a limit of 0.1 rem[7] exposure per year or 2 rem per year for radiation workers (averaged over a 5-year period) though dose limits for radiation workers do still remain at 5 rem per year.[8] The North Atlantic Treaty Organization (NATO) limits exposure of military for one year of continuous exposure at the edge of a "Radiological Hazard Area" to be 2 rem per year[9].

In the remainder of this memorandum, I will try and address several topics including: (1) can Mr. Doherty's prior exposures be determined, (2) what are some of the unknown factors about his prior radiation exposure, and (3) the benefit programs I believe should be made available to him.

What were possible exposures on Eniwetak? Documentation about the cleanup effort indicates that on the most contaminated island (Runit, also called Yvonne), the external gamma radiation dose rates were as much as 500 to 700 μR per hour. A one month assignment there (working 8 hours per day) would result in about 0.1 rem (whole body) external dose. While not a large or dangerous dose according to the current state of knowledge, it is equal to the maximum recommended yearly exposure for the public. Only if the worker incurred no additional external exposure or internal contamination would this be his/her entire dose for that period. It must be realized that the exposure accumulated during those working hours would have to be added to whatever exposure he/she received during the other 16 hours of the day and also during the rest of the year. Thus, the individual's exposure for that year would have exceeded that amount by several times. Assignment on other islands would lead to lower exposures.

Though I cannot estimate Mr. Doherty's dose with what little information I have, it seems to be a relevant question: Were US Army servicemen such as he, radiation workers, i.e., were they volunteers who understood and recognized the risks and received protection and payment suitable for such risks. Similar questions were recently asked to the Institute of Medicine (National Research Council). In reply, their 1997 report recommends that "[the Army] Provide soldiers the same level of radiation protection as civilians working in similar environments."[10]

I think it is also an important question: What kind of protections were made available to the servicemen? The documentation about the cleanup program describes personal dosimeters and respiratory protection devices. It is not clear, however, to whom such devices were made available and the control measures to ensure their proper functioning.

Mr. Doherty asserts that a personal ion chamber was not available to him. Even so, these devices are sensitive to damage and were not designed for heavy working situations and field use. I would not be surprised to learn that they were routinely damaged and often did not provide reproducible results. Film badges were apparently available to Mr. Doherty though he asserts that they were not wrapped in plastic - a measure to protect them from the damaging tropical environment. Possibly the most important protective device for a bulldozer operator would have been respiratory protection - mask and filters to prevent inhaling small radioactive dusts and particles. I have seen pictures of Mr. Doherty working on bulldozing soil without such

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[6]Internation Commission on Radiological Protection. ICRP Publication 60. Annals of the ICRP 21(1-3). 1991.
[7]For gamma exposure, e.g., from 137-cesium or 60-cobalt, 1 rem equals 1 rad.
[8]Code of Federal Regulations. Nuclear Regulatory standards for protection against radiation: Final Rule. [10CFR20], Federal Register, Vol. 56. Washington, DC. 1991
[9]ACE policy for defensive measures against low level radiological hazards during military operations. ACE Directive Number 80-63. Brussels: Supreme Headquarters Allied Powers Europe, 2 August 1996.
[10]Institute of Medicine. An evaluation of radiation exposure guidance for military operations: Interim Report. Washington, DC: National Academy Press. 1997.

protection. I do not know for certain about the availability of such protective devices, but that should be investigated. Working to remove and move soil without such devices is an unreasonable risk.

As Mr. Doherty was a US serviceman serving in a hazardous situation, any records of his exposures should be made available (if not already) and some determination should be made to assess the quality of that data, considering for example, the issue related to improper film badge protection. If such information is not available, a reasonably detailed dose reconstruction could be done and I believe should be made available if he requests it. The information required for that would be his complete work history on Enewetak, when and where he was billeted, precise descriptions of his work assignments, their duration, etc. That data would have to be coupled with the historical environmental radioactivity and exposure rate measurements on Eniwetak. Even so, numerous assumptions would be required, hence the uncertainty of those calculations should be determined. All of these results should be clearly communicated to him.

It is also my opinion that there are a number of reasonable responses to Mr. Doherty's concerns that could be provided by the Veterans Administration. One would be diagnostic measurements to assess his present day contamination as a result of working on Eniwetak. Such measurements are limited in variety, but a quality whole body count would be appropriate. Because of the short biological half-life of ^{137}Cs, there would be no use for a conventional count using sodium-iodide (NaI) based detectors. To properly assess his internal contamination - if it can be measured at all - would require a body count in a facility equipped to detect low levels of actinide elements. Such facilities, though few in number, use hyper-pure silicon or germanium detectors. This expense is not out of line with conventional medical benefits to veterans. Plutonium urinalysis by fission-track or the newest techniques of mass spectrometry would also be useful to assess present day contamination. The respective detection limits of any measurements used should be explained in full to Mr. Doherty.

It might also be advised to submit the counting results to at least two independent groups for interpretation. This would be advisable to resolve any uncertainty concerning possible falsification or misinterpretation of results. The veteran population has reasons for some mistrust, thus, that would be a rather small price for assurance to them.

The combination of the two methods - mathematical reconstruction of prior exposures (from personal dosimeter data and dose reconstruction techniques), and the present day contamination measurements (by whole body counting, etc.) - would allow the best assessment of radiation risk that current technology allows. It is my opinion that such services and benefits should be provided to Mr. Doherty as well as to the entire group of servicemen who participated in the Enewetak cleanup. With this information, the level of risk to each person could be better assessed.

Mr. Doherty and the others that others that participated in the cleanup of Enewetak seem to be for all practical purposes - except under current law - "atomic veterans." It is difficult to understand why this small group should be denied access to reasonable, and equal, benefits.

Please fee free to contact me if you have any questions about this statement. Thank you for your consideration.

As of 25 March 2016, we have **342 responses** to our survey.

In response to who was your employer during the Enewetak Atoll Atomic Debris Cleanup Mission the answers are as follows:

UPDATED 4/17/17

- According to The Radiological Cleanup of Enewetak Atoll published by the Defense Nuclear Agency in 1981, 8,033 people were involved in the 1977 – 1980 Mission. The response vs total participants breakdown is as follows:
  - 282 of the 2670 Army participants responded (10.6%).
  - 74 of the 2207 Navy participants responded (3.4%).
  - 46 of the 740 Air Force participants responded (6.2%).
  - 5 of the 1011 DOE & Contractor participants responded (0.5%).
  - 0 of the 597 DOI/TTPI participants responded (0%).
  - 8 of the 246 DNA/JTG participants responded (3.3%).
  - 0 of the 49 Journalist participants responded (0%).
  - 3 of the 513 Others participants responded (0.6%).
  - 418 of the 8033 Total Participants Responded (5.2%).

J3 = 3
DNA = 6
USAF = 67
USA = 405
USN = 107
USCG = 4
H&N = 7
UNIV. CAL = 1
Total = 600

In response to which island did you live on while at Enewetak Atoll, the answers are as follows:

- 251 lived on Enewetak Island (62%).
- 147 lived on Lojwa Island (38%).
- A total of 408 replied to this question.

Updated 1/17/17 Enewetak = 233 Lojwa = 354

In response to the Health Challenges believed to be due to exposure to Ionized Radiation during the Mission, 348 responded.

- 201 claim health challenges are due to Radiation Exposure (58%).
- 147 claim no health challenges due to Radiation Exposure (42%).

Updated 4/1/17 283 55% 228 45%

In response to Veterans Administration Assistance Status, 352 responded.

- 101 reported they are receiving VA Health Assistance.
- 30 reported they have pending VA Health Assistance Claims.
- 149 reported they have no need for VA Health Assistance.
- 79 reported "Other" as their VA Health Assistance Status.

Updated 4/1/17 Yes = 159 Pending = 96 None = 217 Other = 101

All 43 Nuclear Tests, Enewetak Atoll and Lojwa Location

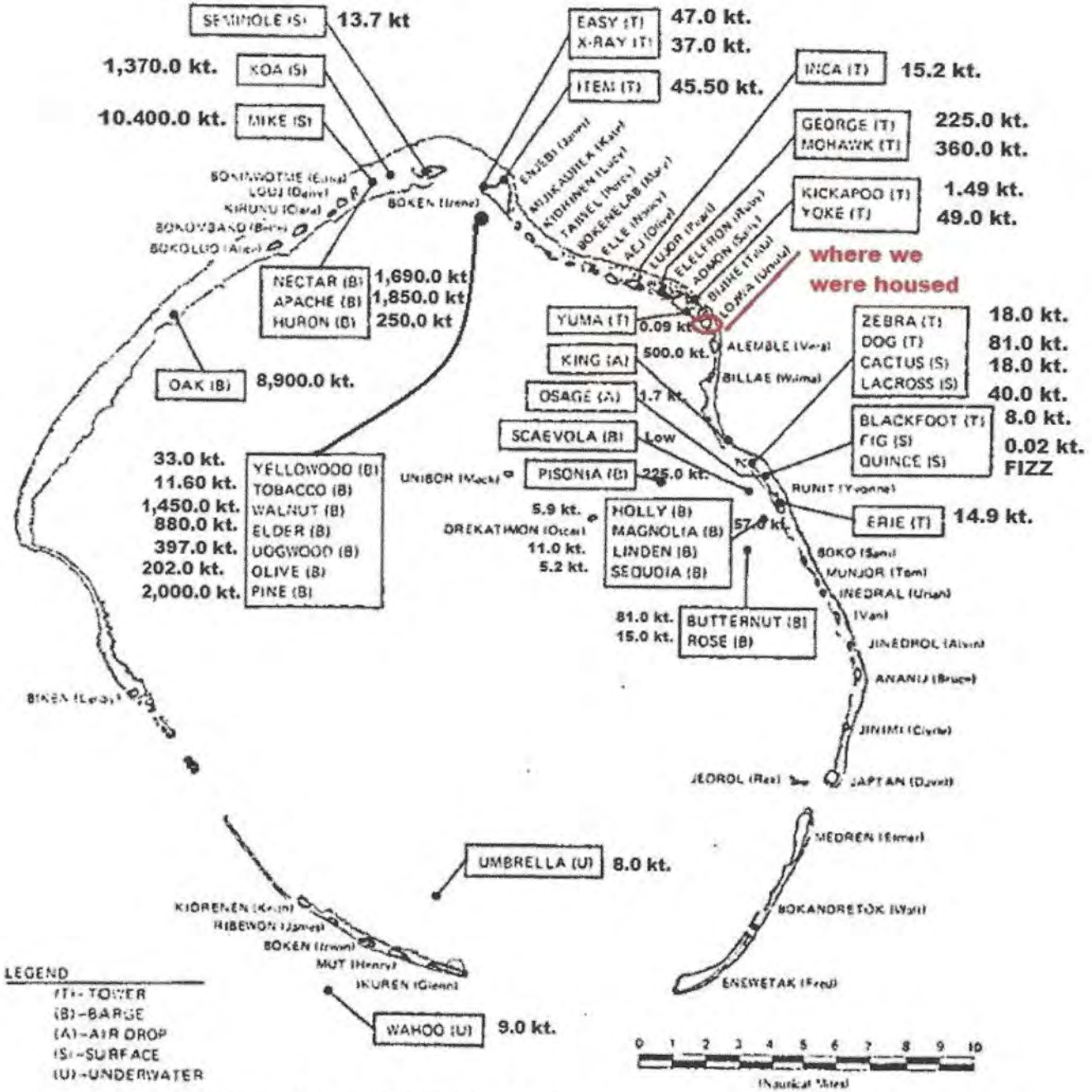

FIGURE 1-53. NUCLEAR DETONATION SITES ON ENEWETAK ATOLL.

TABLE 1

RADIOISOTOPES OF INTEREST FOUND IN ENIWETOK ATOLL SOIL

Radioisotope	Source	Material*
Americium-241	Plutonium Contamination	D, S
Plutonium-240	Plutonium Contamination	D
Plutonium-239	Plutonium Contamination	S
Plutonium-238	Plutonium Contamination	S, D
Uranium-238	Unburned Weapon Fuel	S
Uranium-235	Unburned Weapon Fuel	S
Bismuth-207	Fission Product	S
Europium-155	Fission Product	S
Europium-154	Fission Product	S
Europium-152	Fission Product	S
Samarium-151	Fission Product	S
Promethium-147	Fission Product	S
Cesium-137	Fission Product	S
Antimony-125	Fission Product	S
Rhodium-102	Fission Product	S
Strontium-90	Fission Product	S
Nickel-63	Fission Product	S
Cobalt-60	Activation Product	A
Iron-55	Activation Product	S
Carbon-14	Activation Product	S
Tritium		S, W

*S = Soil
A = Act. Metal or Scrap
D = Debris
W = Water