

**Statement of**  
**Harry J. Pettengill**  
**Deputy Assistant Secretary for Health**  
**U.S. Department of Energy**  
**Before the**  
**Subcommittee on Oversight and Investigations**  
**Committee on Natural Resources**  
**United States House of Representatives**  
**February 24, 1994**

Statement of  
Harry J. Pettengill  
Deputy Assistant Secretary for Health  
U.S. Department of Energy  
Before the  
Subcommittee on Oversight and Investigations  
Committee on Natural Resources  
United States House of Representatives  
February 24, 1994

I am pleased to appear before you on behalf of Secretary O'Leary and Dr. Tara O'Toole, the Assistant Secretary for Environment, Safety and Health. As you know, the Department of Energy (DOE) is currently engaged in working with other Federal agencies such as the Department of the Interior (DOI), the Republic of the Marshall Islands (RepMar) and local Marshall Islands government representatives to provide medical surveillance and radiological environmental monitoring on behalf of the Marshall Islands people exposed to the radioactive fallout from the atmospheric weapons testing in the South Pacific. In 1954, one of the weapon tests conducted in the Pacific resulted in the deposition of fallout on inhabited islands. This test code named "BRAVO" was one of the tests in the Operation Castle series. In response to this unfortunate occurrence, the United States Congress has enacted several legislative initiatives to redress this circumstance. There were 66 atmospheric nuclear tests conducted in the Marshall Islands with one additional test, "YUCCA", detonated from a high-altitude balloon northeast of Enewetak Atoll. The United States Congress has enacted several legislative initiatives to attempt redress of any harm or loss suffered by the Marshallese as a result of these weapon tests.

Program Mandate

Public Law 99-239 of January 14, 1986, known as the "Compact of Free Association" requires that DOE:

"continue to provide special medical care and logistical support to the remaining members of the population of Rongelap and Utrik who were exposed to radiation resulting from the 1954 United States thermonuclear 'BRAVO' test"

Most funding to support Marshall Islands health and support needs is appropriated through and administered by DOI. The Department of Energy receives separate appropriations, however, for the medical surveillance and the environmental monitoring programs.

Public Laws 95-134 and 96-205 require DOE to continue to provide environmental monitoring to characterize the radioactivity remaining at the four affected atolls of Bikini, Enewetak, Rongelap, and Utrik. On August 3, 1990, the Senate passed an amendment stating that "all responsibilities...and all activities at the Department of Energy with respect to medical and environmental programs applicable (by law) in the Republic of the Marshall Islands shall be managed, controlled, and conducted through the Office of Environment, Safety and Health." During the period from November 1982 until April 1990, the Office of Defense Programs had provided this program management role.

Over the years, scientists and physicians have worked diligently to monitor the health of the exposed populations from the four affected atolls of Bikini, Enewetak, Rongelap and Utrik, and to characterize the persistence of radioactivity in the environment for all of the Marshall Islands. DOE's current Marshall Islands program is conducted by the national laboratories

that possess the specific expertise to provide medical surveillance and radiological monitoring and evaluation. The personnel and scientific expertise associated with these laboratories have generally had a long association with the Marshall Islands and have developed a unique working relationship with the Marshallese people.

#### The Department of Energy Medical Program

The DOE conducts two field medical missions annually to examine and provide medical surveillance and follow-up medical care for the 253 Marshallese exposed at Rongelap and Utrik Atolls. There are now 147 of this population that still need clinical care and follow up for possible radiogenic illnesses. An initial unexposed control group of 86 Marshallese people has been expanded over the years to include 135 people. The DOE medical missions treat up to 300 persons annually.

The Brookhaven National Laboratory conducts medical surveillance of the surviving people of Rongelap and Utrik Atolls who were exposed to radiation resulting from the BRAVO test. The medical surveillance results of the "exposed" population are compared to the results of the "control group" referred to hereafter as the "unexposed" group. Also, Brookhaven facilitates care for those exposed individuals with suspected radiogenic diseases who require referral to medical facilities outside the Marshall Islands. During twice-yearly surveillance visits, the Brookhaven medical teams also make themselves available to provide consultive medicine services to the unexposed populations after attending to the needs of the exposed population.

The DOE program is limited by congressional mandate to the exposed populations of Rongelap and Utrik. Section 177 of the "Compact of Free Association" provides for a separate Marshallese 177 Health Care Program, independent of the DOE program. The 177 Health Care Program is funded under the Compact and overseen by the U.S. Department of the Interior and provides health care for the peoples of Bikini, Enewetak, Rongelap and Utrik. The local atoll authoritative have expanded enrollment in this program to approximately 10,000 people. DOE physicians refer all non-radiation related disorders of its exposed and control populations to the Marshallese Section 177 Health Care Program physicians who oversee the populations for the Atolls of Bikini, Enewetak, Rongelap, and Utrik. Recently, Section 177 program physicians began to accompany the DOE medical missions. This provides an opportunity to share clinical expertise between the two programs in addition to providing for expedited referrals and consultive practices for all resettled populations.

The DOE and its predecessor agencies, the Energy Research Development Agency (ERDA) and the Atomic Energy Commission (AEC), have had a long history of support efforts on behalf of the Marshallese people since Brookhaven National Laboratory (BNL) physicians first began to treat the exposed populations of Rongelap, Utrik, and Ailinginae Atolls shortly after the BRAVO test. A medical team from BNL, supplemented by a national corps of consultants, continued to implement medical surveillance and treatment programs under the auspices of AEC and later ERDA with the cooperative support from the Departments of Defense and Interior. From its inception, the primary objective of the DOE Marshall Islands Medical Program has been the early detection and treatment of any medical condition that might evolve as a

consequence of radiation exposures resulting from the BRAVO test. Both scientific and humanitarian considerations led to the establishment of an effective field capability for DOE to administer routine and scheduled primary medical care, with facilities being made available outside the Marshall Islands for secondary and tertiary referral.

#### DOE's Environmental Program

From the time of the BRAVO test to recent years, the medical program has been augmented with long-standing environmental monitoring programs dedicated to the routine characterization of the residual levels of radionuclides on the affected atolls. Currently, DOE conducts two environmental monitoring missions annually. A primary objective of the environmental program is to afford complete grid sampling of vegetation and soil prior to resettlement of each affected atoll. In addition, many years of the program have been devoted to program research on mitigation techniques to reduce uptake of radionuclides by plants and local foods that could impact resettled populations.

To fulfill the congressional mandate to conduct continuing environmental monitoring, Lawrence Livermore National Laboratory (LLNL) has performed radiological monitoring of the environment at Bikini, Enewetak, Rongelap, Utrik and other atolls throughout the northern Marshall Islands. The monitoring has been designed to determine environmental concentrations of radionuclides in indigenous food products, vegetation, and soils and to evaluate agricultural restoration or utilization methods to diminish the uptake of cesium-137 into the food chain. In 1978, LLNL and DOE conducted the Northern Marshall Islands Radiological Survey, a combination aerial

radiological and photographic survey and ground sampling program of 11 atolls which included Rongelap, Taka, Utrik, Bikar, Rongerik, Ailinginae, Likiep, Ailuk, and Wotho in addition to the two islands of Jemo and Mejit. The main purpose of these surveys was to document the remaining external gamma levels for these atolls that may have received fallout from the nuclear tests conducted at the Enewetak and Bikini atolls. The aerial portion of the survey was performed to quantify the levels of gamma emitting radionuclides on the ground, and the ground segment involved selective sampling to provide more accurate and comprehensive information.

In November 1982, DOE published the results of the Northern Marshall Islands Radiological Survey in the form of a bilingual report. In December 1982, DOE introduced and presented at the capital island of Majuro in the Marshall Islands, a report entitled, "The Meaning of Radiation for Those Atolls in the Northern Part of the Marshall Islands That Were Surveyed in 1978." In the spring of 1983, the report was also presented to the populations at each of the four affected atolls. DOE has continued its radiological monitoring activities between 1982 and 1985 but placed its main emphasis on collection of samples and continuation of environmental studies at the most radioactively contaminated atolls of Bikini and Enewetak. Since that time, radiological evaluations have expanded to include Rongelap and Utrik atolls. Since 1985, the Lawrence Livermore National Laboratory team has collected soil and vegetation samples to determine the levels of cesium-137 in locally grown foods and to determine the concentration of plutonium-239 and plutonium-240 in the soil. These characterizations are continuing and the actual raw data,

results and reports generated on these data are shared with the Marshallese people.

#### DOE's Dose Assessment Program

Brookhaven National Laboratory conducts a radiological monitoring program of the Marshallese people to determine and quantify the presence of radioactive material which may have been taken into their bodies. The program includes two types of monitoring techniques. The first one quantifies the amount of gamma-emitting radioactive material located within the body by means of a technique known as a whole-body count. This method is typically used to measure predominant long-lived gamma fallout radionuclides such as cesium-137. The second monitoring technique involves the collection and analyses of urine samples to test for the presence radionuclides which emit alpha particles such as plutonium, a secondary dose contribution. Since plutonium does not emit any gamma-rays that can be readily detected using the whole body counting technique, both techniques must be used to generate an accurate assessment of radioactivity that might have been acquired from weapon tests.

#### Memorandum of Understanding for Resettlement of Rongelap Atoll

With the signing of a Memorandum of Understanding between the DOE and the Republic of the Marshall Islands in 1992, an entity known as the Rongelap Resettlement Project was established to conduct an independent assessment of the habitability of Rongelap atoll. DOE scientists from LLNL have at times split samples, shared and compared results with each other to assure the best science is applied to make the resettlement decision. The Rongelap Resettlement Project also sponsors a number of other independent studies in

order to fully evaluate habitability. A final report on this action should be completed by May of 1994.

### Incidence of Thyroid Disease in the Marshall Islands

Mr. Chairman, an important issue of great concern to the Committee is the reported elevated incidence rate of thyroid abnormalities in population from the northern Marshall Islands as compared to population to population in the southern Marshall Islands. I wish to provide you with the following DOE perspective on this subject.

The Republic of the Marshall Islands as provided for under Section 177 of the Compact of Free Association is currently completing a Nationwide Radiological Study to establish residual environmental radiation levels throughout the Marshall Islands. The Nationwide Radiological Study is most timely since it will document what potential for radiation exposure still exists on all the atolls and will provide data to assist in an effective dose reconstruction.

The Nationwide Radiological Study is also conducting a separate thyroid nodule and disease survey utilizing independent physicians from an institute in Japan. A phase 1 survey was done using current inhabitants at Ebeye on Kwajalein atoll. After the data has been fully evaluated, the study will be expanded to include surveillance of thyroid disease in other parts of the northern Marshall Islands. The survey utilizes an ultrasound imaging technique which provides more resolution when defining thyroid nodules. Arrangements have also been made to include these same physicians using the

ultrasound technique to accompany the DOE sponsored medical missions to outer atolls in 1994.

The DOE and its predecessor agencies conducted extensive environmental monitoring activities throughout the northern Marshall Islands. During a recent review of the supporting documentation that accompanies the document entitled, "Marshall Islands Chronology, 1944 to 1990" which was compiled in January, 1990, we discovered radiological survey information, conducted relatively soon after the Castle BRAVO test, which indicates that the fallout levels on the atolls to the south and east of the four affected atolls (e.g., Wotje, Maloelap, Likiep, Ailuk, Kwajalein, Lae, and Ujae) at about 3-4 milliroentgen/hour were typically several orders of magnitude less than those levels observed at Rongelap Atoll which ranged from 2000 to 3000 milliroentgen/hour initially. Because the primary fallout radioiodine (iodine-131) decays away quickly because of its 8 day half-life, significant exposure to any mid-belt inhabitants would likely be small when compared with thyroid doses received by inhabitants at Rongelap and Utrik Atolls. Additionally, fallout levels measured during the 1978 aerial survey showed that levels at that time were comparable to and consistent with generally known worldwide fallout levels outside the four most affected atolls. However, there is a possibility that fallout from the other 65 tests may have deposited radioiodine and other short-lived radioisotopes that should be considered.

In your December 10, 1993 letter to Secretary O'Leary, you referenced Dr. Thomas Hamilton's confidential statement to your Committee. Since the time

that Dr. Hamilton made his statement, his findings were subsequently published in the Journal of the American Medical Association (Vol. 258, No.5, August 7, 1987, pgs. 629 - 635). In summary, Dr. Hamilton suggests that a linear relationship between distance from Bikini Atoll and the prevalence of thyroid abnormalities could be ascertained throughout the northern atolls and not limited to only Rongelap and Utrik. Dr. Hamilton suggests that these findings indicate that fallout from the BRAVO test extended much further south than is currently believed and resulted in exposures to more people than the populations of Utrik and Rongelap atolls. However, these mid-belt atoll contamination levels, as stated earlier, were significantly below those of the four affected atolls.

A study related to weapons testing thyroid disease titled, "A Cohort Study of Thyroid Disease in Relation to Fallout From Nuclear Weapons Testing", a combined publication of 9 individuals, was published in the November 3, 1993, issue of the Journal of the American Medical Association (JAMA Vol. 270, No.17, pgs 2076-2082). In this study results were reported as a function of three separate histological categories which were identified as nodules, neoplasms, and carcinomas. The investigators report that "the associations found were specific to neoplasia and were not seen for non-neoplastic nodules or any other thyroid condition". An increased risk was cited for thyroid neoplasms at doses greater than 400 mGy (40 rem). The mid-belt atoll exposures were significantly less than this.

An additional source of information may have relevance to this issue. The National Research Council, acting in its capacity under the auspice of the

National Academy of Sciences have prepared a series of reports to advise the U.S. government on the health consequences of radiation exposures. The most recent report is entitled, "Health Effects of Exposure to Low Levels of Ionizing Radiation" (alternatively known as the BEIR V report) and was published in 1990. This report contains a section devoted specifically to thyroid carcinoma. The data of Dr. Hamilton is reviewed in addition to other populations exposed to I-131 or radiations of external origin.

The BEIR V report observes that: 1) "the development of thyroid cancer from initiated cells is profoundly dependent on hormone balance."; 2) "there is wide variation among reports of spontaneous thyroid cancer incidence among different Polynesian populations "; 3) "there are major differences in background thyroid rates among unirradiated individuals of different reported cohorts. Analysis suggests that these differences are related, at least in part, to life-style, although ascertainment may also play a critical role."

Because of the low potential for exposure to radiation, any follow up study on the mid-belt atoll inhabitants probably would be inconclusive in that low exposure doses among such a small population would make it extremely difficult to detect significantly increased rates of thyroid disease. Such studies would require significant increases in current levels of appropriations for the DOE Marshall Islands Program.

#### DOE's Openness Initiative

As you are aware, on December 7, 1993, Secretary O'Leary announced the Department of Energy Openness Initiative. As a result, the Department is

undertaking the declassification of many weapons testing related documents. I am currently unaware of any previously classified documents which would add significant value to the immense database of health effect or medical information already existing on this topic. Much information has been already published in the professional health journals since the time of the BRAVO test. My staff has recently initiated an effort to identify, locate and review information that remains classified on the subject of weapons testing in the Marshall Islands. The Secretary has directed that any documents relevant to the Marshall Islands be identified and declassified whenever possible.

Mr. Chairman, I thank you for this opportunity to share with you our program accomplishments and information on the subject of thyroid disorders in the Marshall Islands.

I would now be pleased to answer any questions that you may have.