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February 22, 1979

Mrs. Ruth Clusen
 Assistant Secretary for
 Environment
 Department of Energy
 Washington, D.C. 20545

Dear Ruth:

Enclosed is an article about the Marshall Islands which appeared in the February 1979 issue of the Bulletin of the Atomic Scientists. I thought you should be aware of this article since it might stimulate further public interest and inquiry.

Sincerely yours,

A handwritten signature in cursive script that reads "Bill".

W. J. Bair, Ph.D.
 Manager
 Environment, Health, and
 Safety Research Program

WJB:ms

Enclosure

cc: W. W. Burr, Jr., w/encl.
 J. L. Deal, w/encl.
 H. Hollister, w/encl.
 J. L. Liverman, w/encl.
 R. Ray, w/encl.
 W. L. Robison/V. E. Noshkin, w/encl.
 Marshall Island Advisory Comm., w/encl.
 T. F. McCraw

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The lives of the people of the Marshall Islands have been irreversibly changed by the U.S. nuclear bomb tests.

GIFF JOHNSON

Micronesia: America's 'strategic' trust

On August 6, 1945, the B-29 Enola Gay dropped the first of two atomic bombs that would kill over 200,000 people in Hiroshima and Nagasaki. Within months the United States began searching for sites far from American population centers for further development and testing of nuclear weapons. The Defense Department looked to Micronesia in the western Pacific, whose 2,000 remote islands have only one-half the land area of the state of Rhode Island.

Easternmost in Micronesia lie the Marshall Islands, about 2,200 miles southwest of Hawaii. Up to the 1940s the Marshall islanders, like most other Micronesians, were self-sufficient, living off the ocean and land. Though covering a great expanse of ocean, the Marshalls' 28 multi-islet atolls and five single islands comprise only about 70 square miles. The atolls are rings of 15 to as many as 97 islets connected by a coral reef that encircles a clear blue lagoon. Out of necessity, the Marshallese are traditionally expert fishermen, deriving most of their protein from the rich lagoons, while the land provides coconuts, breadfruit, pandanus and taro.

The most isolated and least westernized of the Marshallese lived on the northern atolls of Bikini and Enewetak. Having little contact with foreigners (not even with the Japanese during their 25-year occupation), they relied on the outside world for almost nothing.

Ironically, this very isolation thrust the Bikini and Enewetak people into the nuclear age.

In January 1946, Navy officials in Washington, D.C., announced that Bikini Atoll fitted all requirements for *Operation Crossroads*, designed to test the destructive power of nuclear weapons on naval vessels. When the U.S. military governor of

the Marshalls went to Bikini in February, he told the people that American scientists were experimenting with nuclear weapons "for the good of mankind and to end all world wars." He promised that their atoll would be returned after the tests were finished, and asked that they consent to be moved to another island. With more than 42,000 military, scientific and technical personnel, 250 naval ships and more than 150 observation aircraft poised to enter Bikini Atoll for *Operation Crossroads*, the 166 Bikinians had little choice but to leave their island.

Less than two years later, in December 1947, the Navy decided to use another atoll, Enewetak, for a second series of atomic tests. The Enewetakese, like the Bikinians, were relocated by the United States quickly and with little planning to small, uninhabited atolls.

Even while the United States was removing the Marshallese from their islands, in July 1947 it was signing the United Nations Trusteeship Agreement for the U.S. Trust Territory of the Pacific Islands (Micronesia). This agreement stated:

"In discharging its obligations, the administering authority [U.S.] shall: promote the economic advancement and self-sufficiency of the inhabitants, and to this end shall . . . encourage the development of fisheries, agriculture and industries; and protect the inhabitants against the loss of their land and resources."

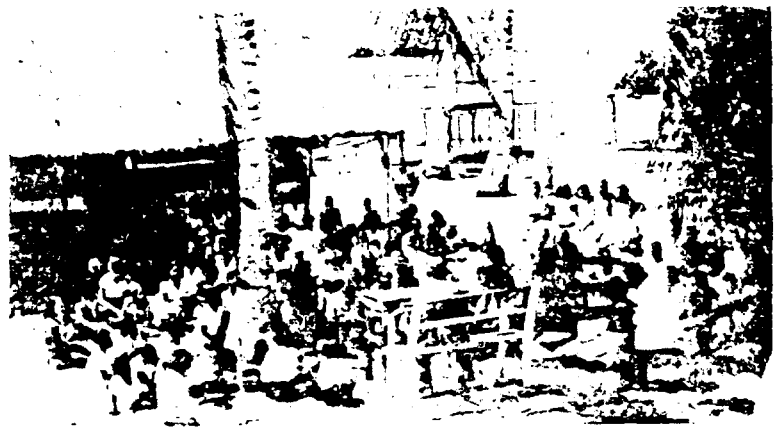
In addition, this agreement bound the United States to "promote the social advancement of the inhabitants, and to this end . . . protect the rights and fundamental freedoms of all elements of the population without discrimination; and protect the health of the inhabitants. . . ."

After the relocation of the Marshallese, however, what happened during the next 12 years was that about 70 atomic and hydrogen bomb blasts devastated the islands and irreversibly changed the lives of the people.

The Bikinians first moved about 100 miles east to Rongerik, an uninhabited atoll consisting of barely one-half square mile of land. Within two months, they expressed anxiety over the atoll's meager resources and made the first of many requests to return home. Within a year, the people faced starvation: a visiting American medical officer reported that the Bikinians were "visibly suffering from malnutrition." In 1948 the Bikinians were evacuated to a temporary tent city at the Navy base on Kwajalein.

Kili Island in the southern Marshalls was selected for their next home. Kili, a single island, has no lagoon or protected anchorage: heavy surf from November until late spring halts fishing and isolates the island. On the other hand, Kili had once supported a Japanese cobra plantation, and U.S. authorities hoped that, while the Bikinians were not a farming people, the island's agricultural possibilities would overcome its drawbacks. Thus, the Bikinians were forced to adapt to a completely alien environment.

In early December 1947, Washington officials announced without preliminaries, that Enewetak was to be used for the next series of bomb tests. In less than three weeks, the people of Enewetak were relocated to Ujelang, the westernmost atoll in the Marshalls. Like Rongerik and Kili it was also uninhabited, and for good reason. Ujelang has only a quarter of the land area of Enewetak and its 25-square-mile lagoon is less



The last church service on Bikini, March 1946.

than 15 the size of Enewetak's 390-square-mile fish-filled lagoon.

Because the islands could not support the growing Marshallese populations, critical shortages of food and water occurred. More than once air drops of emergency food rations were needed to prevent starvation.

In 1952, the first hydrogen device was tested at Enewetak. The blast, estimated at 10.4 megatons, completely vaporized one island in the atoll and left a crater one mile in diameter and 170 feet deep in the coral reef.

On March 1, 1954, the United States detonated *Bravo*, the first test of a deliverable hydrogen bomb, at Bikini Atoll and severely contaminated fishermen aboard the *Lucky Dragon*, a Japanese fishing vessel that had strayed into nearby waters. More than 200 Marshallese on the neighboring atolls of Rongelap and Utrik, and some 28 Americans monitoring the explosion were also contaminated.

The U.S. Atomic Energy Commission called *Bravo* a "routine atomic test." But it was far from routine.

Despite an incomplete and alarming weather report indicating that winds from sea level to 55,000 feet were blowing in an easterly direction toward Rongelap and Utrik, the test proceeded.

The *Lucky Dragon*, illegally fishing near Bikini, was the first thing hit by the radioactive fallout. Returning to Japan quickly, unaware that they had been exposed to nuclear fallout, the 22 fishermen began to feel the effects of acute radiation exposure: itching of the skin, nausea and vomiting. Within two years the Japanese government received \$2 million in compensation for the fishermen's suffering.

In the AEC's Nevada Nuclear Proving Grounds in the United States, prior to an atomic test series, a public information program, including films and discussions on the forthcoming tests, was implemented. No such programs had been conducted in the Marshalls, although the United States did inform the chief of Rongelap that a hydrogen test would soon occur. What the chief was told about the test, and what his reactions were is not clear; that he knew nothing of the radiation disaster soon to befall his people is certain. Indeed, the Marshallese on Rongelap and Utrik were not even warned of precautionary measures they might take in the event of radiation exposure.

Instead, the Marshallese were astonished observers of the snowlike fallout that covered them and their islands. On Rongelap the white ash soon formed a layer one-and-one-half inches thick on the ground and fell into the drinking water tanks. Children played in the radioactive powder and an old man with vision problems rubbed the ash into his eyes to see if this might somehow cure his ailment.

The 28 RadSafe (radiation monitoring) personnel on Rongerik Atoll intensified their observations following news of the nuclear cloud's erratic behavior. About seven hours after *Bravo*'s detonation, radiation levels on Rongerik exceeded their monitoring instrument's maximum scale of 100 millirads per hour. Instructed to take strict radiation precautions, the RadSafe team put on extra clothing and remained inside the tightly shut building until their evacuation 34 hours after the test. Medical reports on these men are still unpublished.

Utrik's 157 men, women and children were the last to experience

Bravo's fallout 22 hours after the explosion.

The Rongelap people were exposed to 175 rems of gamma radiation, considered a high dose of radiation. (A lethal dose is estimated at 300 to 500 rems in the absence of intensive medical care.) Nevertheless, they were not evacuated from the island for more than 24 hours after the Americans left Rongerik, which is only about 25 miles away. The Utrik population was not removed by the United States until more than three days after the *Bravo* test.

After their evacuation to the Navy base at Kwajalein, many of the exposed Marshallese began to experience the effects of severe radiation poisoning: itching and burning of the skin, eyes and mouth; nausea; vomiting and diarrhea. Later in the month, in the second stage of acute radiation exposure, many of the people began to wholly or partially lose their hair, and skin burns began appearing on the necks, shoulders, arms and feet of those most heavily exposed.

The Utrik people were told by the Atomic Energy Commission that "their island was only slightly contaminated and considered safe for habitation," and they were moved back in May 1954.

Three years later the Rongelapese were permitted to return home—after a July 1957 radiological survey stated that "in spite of slight lingering radioactivity" Rongelap Atoll was safe for rehabilitation. With this dubious recommendation, the Rongelapese returned. Brookhaven National Laboratory (on contract to the AEC) reported that:

"Even though . . . the radioactive contamination of Rongelap Island is considered perfectly safe for human



Giff Johnson, a free lance writer who has traveled extensively throughout the Pacific, edits the *Micronesia Bulletin* published in Honolulu, Hawaii 96826.

habitation, the levels of activity are higher than those found in other inhabited locations in the world. The habitation of these people on the island will afford most valuable ecological radiation data on human beings."

Even at the outset of its medical treatment program, the AEC seemed willing to experiment with the exposed Marshallese islanders.

Up to 1958 the incidence of stillbirths and miscarriages in the exposed Rongelap women was more than twice the rate of unexposed Marshallese women.

In 1961, a Brookhaven National Laboratory report (prepared for the AEC) showed that after the exposed Rongelap people returned to their island in 1957 their body burden of radioactivity rapidly increased. In 1961 their body levels of radioactive cesium had risen 60-fold, zinc rose 8-fold and strontium-90 rose 6-fold.

In 1964, the first thyroid tumors and cancers appeared. Since that time, more than 90 percent of the Rongelap children who were under 12 years old in 1954 have developed thyroid tumors. Forty percent of all the exposed Marshallese have developed thyroid problems, as compared to an average of 3 or 4 percent among Americans.

Some people who returned to Rongelap in 1957 had been away from the island when the bomb exploded and therefore had not been exposed to radiation.

Brookhaven's 1960 medical survey showed little difference in radioactivity levels among exposed and unexposed people living on Rongelap. However, as late as 1969, the body radioactivity levels of previously unexposed Rongelap people was 10 times that of Marshallese living on a noncontaminated island.

In 1971, Marshall Islands leaders invited a Japanese medical team to perform an independent survey of the Rongelap and Utirik people. Barred by the United States from ac-

tually going to Rongelap and Utirik, the team examined exposed people in the district center of Majoro. The Japanese report stated:

"The people of Rongelap who were not exposed to fallout, received a considerable amount of radioactive nuclides from the environment. Consequently, the 'unexposed' group actually became an 'exposed' group . . . it was a great mistake to permit the people of Rongelap to return to their island in July 1957 without sufficient work having been done to remove radioactive pollution from the island."

In 1972, Leko Anjain, who had been only a year old at the time of his exposure in 1954, died of myelogenous leukemia at the National Cancer Institute in Bethesda, Maryland.

The Atomic Energy Commission has consistently obscured information about the irradiation of the people and their high incidence of thyroid disease and cancer. In 1975 Nelson Anjain, Rongelap's magistrate, wrote to Dr. Robert Conard of Brookhaven:

"For me and the people on Rongelap, it is life which matters most. For you it is facts and figures. We want our life and our health. In all the years you've come to our island you've never once treated us as people. You've never sat down among us and really helped us honestly with our problems. You have told the people that the 'worst is over,' then Leko Anjain died. I am very worried that we will suffer again and again."

The Utirik people were suffering as well. Because their exposure was considered "small," tests on genetic and second generation effects were not conducted on them. The Atomic Energy Commission had always told the Utirik people that the 14 rads of radiation they had experienced was too insignificant to be harmful. Nevertheless, in 23 years the Atomic

Energy Commission treated 11 reported cases of thyroid tumors, 3 of them malignant, out of a population of only 157.

But suddenly in 1977 the cancer and thyroid disease rate among the Utirikese rose so sharply that it equalled that of the much more heavily exposed Rongelap population. This unexpected increase has forced government scientists to revise theories on which radiation dose rate will lead to adverse human effects.

"Thyroid nodules have been increasing in the Utirik people and this was quite unpredicted and we had some of the best experts in the United States," said Dr. Conard, who has headed the Atomic Energy Commission and now ERDA (Energy Research and Development Administration) medical program in the Marshalls since 1954.

"The theory was put forth that Utirik received low radiation so a detailed follow-up was not necessary," said Dr. Konrad Kotrady, a former



Up to the 1940s the Marshall islanders, like most other Micronesians, were self-sufficient living off the ocean and land.

Brookhaven resident physician in the Marshalls. "Now the facts of the thyroid cancer at Utirik have strongly shown that the theory was wrong." Kotrady wrote in a stinging critique of the ERDA medical program. "The people ask if this thyroid problem has suddenly occurred is it not possible that the experts have been wrong for so many years and that more problems will occur in the future."

Despite the inability of the AEC's "experts" to predict the thyroid can-

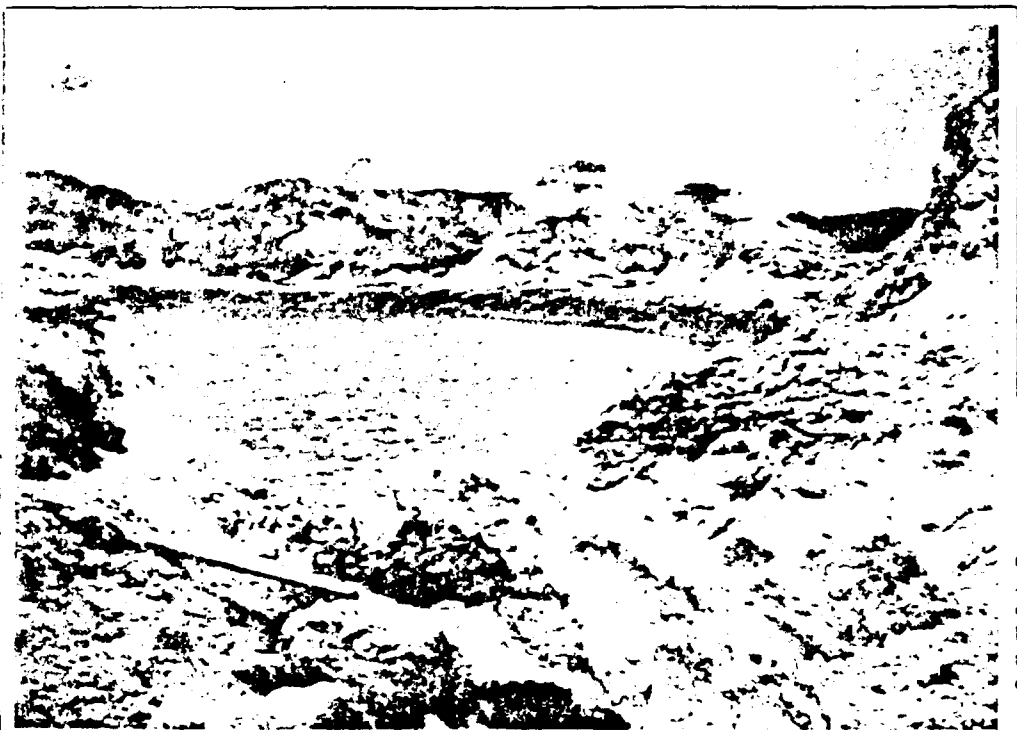
cers among the Utirik population, they have adamantly barred outside medical teams from the islands. Not until the Rongelapese and others refused to undergo the 1972 AEC medical examinations unless independent doctors participated were two doctors added to the AEC team for that examination.

Every year since 1954, the AEC and later ERDA medical teams have examined the Marshallese people, and every year they reassure them of their good health. When the people

eventually began asking, "If nothing is wrong with us, why do you keep coming back every year to examine us?" ERDA replied that it was a precautionary measure.

Although the AEC/ERDA has treated the Marshallese for 24 years, a study by a special committee of the Congress of Micronesia stated, "Time and again the committee found that the people did not understand *anything* about their exposure, the possible effects on themselves and to their children and on their environment."

Protesting what they considered inadequate medical care and to underline the monumental cultural clash between the U.S. medical personnel and the islanders, the Utirikese refused a quarterly ERDA medical checkup on December 1976, and the ERDA physician was recalled. "The people of Utirik are very distressed and angry as a result of the radiation," the chiefs of the atoll wrote the Energy Research and



(left) Nuclear bomb crater, Enewetak Atoll. (below) Leaving Bikini, carrying pandanus leaves to build new houses on Rongerik. Suffering from malnutrition, the Bikinians are evacuated to a tent city on Kwajalein.



On Rongelap, the white ash formed a layer 1½ inches thick on the ground; it fell into the drinking water tanks and the children played in the radioactive powder.

Development Association in 1977. "The people feel that the ERDA program is in need of vast changes."

While the Utirik and Rongelap populations were experiencing the effects of direct fallout exposure, the peoples of Bikini and Enewetak were attempting to survive in their U.S.-imposed exile on tiny, inhospitable islands.

Because living conditions on both Kili and Ujelang deteriorated further during the late 1950s and early 1960s, the United States instituted small trust funds in an effort to alleviate some of the problems. For the Enewetak people the trust fund was \$150,000 and for the Bikinians it was \$300,000, both yielding semi-annual interest payments (approximately \$15 per capita for the Bikinians).

By the mid-1960s the people were demanding a return to their home islands. Because the Bikinians and Enewetakese began to receive extensive international publicity for their plight, the pressure increased on the United States to return them to Bikini and Enewetak. In addition, the Atomic Energy Commission, which had been increasingly criticized for advocating that there were "permissible levels" of radiation exposure, was eager to demon-

strate that low levels of radiation were not harmful to people.

In 1968, ten years after the Marshalls' nuclear test program had ended, President Lyndon Johnson promised the 540 Bikini people a permanent return to their home; the radiation had dropped below the danger level, according to the Atomic Energy Commission. In 1969, an AEC radiological survey stated, "There's virtually no radiation left and we can find no discernible effect on plant or animal life (on Bikini)."

In the early 1970s the Bikinians began slowly returning to their atoll to help in the massive rehabilitation program, which included the replanting of more than 50,000 coconut trees and many other local crops, as well as construction of a new village.

About 100 Bikinians were on the atoll when the Lawrence Livermore Laboratory conducted a radiation assessment in June 1975. The study, "Dose Assessment at Bikini Atoll," not released until mid-1977, stated clearly: "All living patterns involving Bikini Island exceed federal (radiation) guidelines for 30-year population doses." A preliminary report issued by Energy Research and Development Association in August 1975 pointed to the need to

restrict completely the use of pandanus, breadfruit and coconut crabs (a dietary mainstay in the Marshalls).

Despite these and other warnings, Energy Research and Development Association's Dr. Conard stated a short time earlier:

"Our medical team has evaluated the radiation exposure in the people who have been working on Bikini the past two years. There is some low level radiation remaining on the island of Bikini and measures have been taken to reduce these levels. . . . The internal absorption of radioactive materials will be . . . only slight from terrestrial food plant sources. Therefore, we do not expect to see any ill effects in the Bikini people or in their offspring from the small amounts of radiation to which they will be exposed."

Caught in the middle of these conflicting statements, in late 1975 the Bikinians filed a federal law suit against the U.S. government demanding a complete scientific survey of Bikini to determine if the island was indeed safe for habitation.

In late 1977, ERDA monitoring of the Bikinians who had returned ear-



**Because living conditions deteriorated further
the United States instituted small trust funds.
For the Bikinians, the trust fund yielded semi-annual
interest payments of approximately \$15 per person.**

lier showed a marked increase in the amount of radioactive nuclides in the people's bodies. These tests show that the Bikinians were ingesting higher than acceptable concentrations of cancer-causing radiation from the water and from food grown in the island's contaminated soil. The U.S. government then began importing all food (except local fish, which was declared safe) and drink to Bikini. This food program has compounded the Bikini dilemma: while the Bikinians have been told that the island is radioactive and potentially dangerous, the prospect of free food and housing and a chance to move from Kili—called the "prison" by residents—has encouraged people to return.

In early 1978, the Energy Research and Development Association considered moving the people to another island in Bikini Atoll—Eneu—and was growing fruits and vegetables in an experimental garden to test radioactivity levels there. Results from these experiments, however, weren't expected for about a year.

According to a careful report in the Los Angeles Times, by February 1978 it was official government policy: Bikini was unfit for people to live on. Nevertheless, in April, Trust Territory officials, testifying at a congressional hearing on funding for re-establishing the Bikinians on Eneu Island, insisted that the people could remain on Bikini *without harm* until the experiments on Eneu were completed in January 1979—provided that they didn't eat any coconuts, and that the coming medical tests showed, as was expected, no large increases in internal radiation levels.

In the April 1978 medical examinations, however, the Bikinians' internal radiation levels ranged up to 0.980, or nearly *twice* the U.S. maximum safety standard of 0.5 rems. At the same time, the preliminary results from the experimental garden at Eneu Island showed that radioactivity levels

were 5 to 6 times higher than expected.

Throughout the rehabilitation of Bikini, the Energy Research and Development Association and the Department of Energy had conducted countless radiological surveys of the island—many of which suggest the Bikinians were unwitting subjects for scientific radiation tests. A recent study for the Department of Energy concluded that "Bikini Atoll may be the only global source of data on humans where intake via ingestion is thought to contribute the major fraction of plutonium body burden."

A 1976 Lawrence Livermore Laboratory scientist stated that Bikini "is possibly the best available source of data for evaluating the transfer of plutonium across the gut wall after being incorporated into biological systems."

Government scientists vehemently deny they have used the Marshallese for experimentation. A DOE official explained, "It was done by technical types anxious to know about the transfer of radioactive elements."

Interior Department officials announced in May 1978 that the atoll would be evacuated within 90 days, and the people returned to Kili Island. In late August, Interior representatives went to Bikini to supervise the evacuation, in many ways reminiscent of the 1946 removal. "There are some things we didn't feel good about," said Taro Lokebal, who serves as liaison between the Bikini Council and the United States. "The (U.S.) High Commissioner made the people rush. . . . Some things were left behind—pigs, chickens, lumber. We had to have our ceremony on the ship. It was supposed to be on the shore but we had no time."

Though the Bikinians, like the Enewetakese, suffered the devastating physical and psychological effects of relocation and, at times, even near starvation, they had never

suffered radiation exposure until they returned to their radioactive island after 25 years. Now the Bikinians are an exposed population, too. And who knows what the future holds for the Enewetak people—many of whom have now returned to their home atoll to work with thousands of U.S. army soldiers in the massive nuclear debris cleanup.

Until the scientific community and independent organizations begin critically to monitor U.S. government agencies' treatment of the Marshallese, their situation is not apt to change.

From the nuclear bomb tests at Bikini and Enewetak to the medical treatment of the irradiated islanders, the 30 years of American trusteeship has brought the Marshallese anything but the conditions promised in the U.N. trust agreement. □

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