

Author's note

Here I want to put down a few paragraphs about the importance of this document, together with some notes about the process which has been followed in putting it together. At some future time, I hope to describe the process much more carefully, with the thought that it may well have application in other fields: medicine, public health, agriculture, law, etc. For the moment, though, I offer it just as an interesting sidelight.

First, a bit of history. In 1974, after an extensive radiological survey of Enewetak Atoll, United States authorities met with the people of Enewetak to inform them of the prospects for resettling their home islands. One great disappointment in that meeting was the revelation that the traditional home of the northern community - the Enjebi people - might not be habitable for a very long time in the future. I was one of those US authorities, who, along with the bad news, brought a promise that we would apply our best efforts to the task of improving the situation.

True to the promise made in September, 1974, the Department of Energy authorized, and the Lawrence Livermore National Laboratory established, an environmental radiation research program in the northern Marshall Islands. Until my retirement from DOE in 1985, I was the research manager of that program, along with others. I have since served as a consultant in these matters to both the DOE and the laboratory.

During the years 1977-1980, an enormous effort (\$150 million) was expended to restore to habitability, as well as could be done, the islands of Enewetak. At one critical point, early in 1979, a matter vital to the future of the Enjebi people came up for resolution. The three departments (Defense, Energy, Interior) had mobilized resources at Enewetak not just to clean up the atoll, but to restore it, with new homes and community buildings and, most important, producing trees - coconut, pandanus, breadfruit - so as to have a basis for a return to a traditional subsistence economy. Yet, then-existing and predicted radiological conditions made it doubtful that foods grown on the northern islands of Enewetak would very soon be suitable for consumption.

With a number of valued allies but with strong resistance from my own Department of Energy, I urged that we proceed with the planting of trees on the northern islands, reasoning that they would not mature and bear for almost a decade, and that during that time we might find that applied science could solve or at least mitigate the radiation problem. Meanwhile we would have beneficially used that decade for the reestablishment of a vital ecosystem. After much agony, and thanks especially to the director of the Enewetak cleanup, VADM Monroe, the trees were planted.

Roger Rey's Files

In a "60 Minutes" segment filmed at Enewetak in 1979, Morley Safer ridiculed this decision to plant, referring to it as a public relations ploy, and presented on-camera the Foreign Secretary of the Marshall Islands, referring to the cleanup as "a dog and pony show."

A few years later, we revisited the problem when a young attorney, serving on the staff of the High Commissioner of the Trust Territory, rang the alarm bells, revealing the "remarkably high levels of radiation" in plants grown on the northern islands of Enewetak. The radiation levels were neither remarkable nor high, but the confidence of some of the Enewetak people was shaken, and it took us some time to get that genie back in the bottle.

At Bikini, meanwhile, exciting things were happening. A research effort on a broad front was demonstrating that indeed there were entirely feasible and practical ways of dealing with radiation in the terrestrial food chain. It became apparent from the Bikini agricultural experiments not only that people could resettle Enjebi, but that those trees, planted in 1979, would be a useful and valuable resource. Not a PR ploy, as Safer had charged, but a sound investment based upon confidence in the potential of applied science. It was applied science that made possible the reconsideration of resettling Enjebi - the subject of this paper.

And now, to the document itself. Its basis was a detailed scientific document prepared by Dr. Bill Robison and his associates at the Lawrence Livermore Laboratory. I had been one of Bill's reviewers. Then last year, I was asked to assist in making the contents of that report available to the people most concerned: the Enjebi people. I welcomed that assignment, and set about the first task: putting its major points into layman's language. (It may be interesting to some to know that most of that part of the task I accomplished on my lap-top computer, standing at the serving counter on the deck at Joel Ray's house, during my September '88 convalescence in San Diego.)

The next task was a challenge, too. That was to convert the layman's text into something that could be translated into the Marshallese language. Unfortunately I have no command of Marshallese, although I have come to know a bit about the scope and limitations of the language. For example, there is no passive form: One cannot say "It has been determined that..." Rather, it must be "The scientists have determined that..." And we cannot say "The report says...etc." because everyone knows that a report cannot speak. Most important, though, is the absence of a vocabulary which can deal with most of our subject matter.

When I thought I had a pretty good text, I talked with Alice Buck, with whom I have worked on similar projects on several earlier occasions, and she agreed to work with me on the next steps. As to her credentials: Alice, daughter of one Christian missionary and wife of another, devoted 17 years to translating the Bible into the Marshallese language. She is a well known and widely respected linguist.

Alice recruited two native Marshallese to work with us. Rev. Nashon Naiser is a Christian minister, presently living in Honolulu. Alice Balos, wife of a senator in the Marshall Islands parliament, does medical interpreting for Marshallese patients being treated in Honolulu.

Together the four of us put in an intensive week of ten hour days. Our technique, largely Alice Buck's brainchild, was for Alice to provide each of us with a first draft translation of my work, which then became the subject of a roundtable discussion and paragraph-by-paragraph analysis. Usually, Nashon read the paragraph aloud in Marshallese, and then expressed in English (not referring to my text) what it meant to him. Almost invariably, this led to lengthy discussion and frequently led me to the blackboard for a mini-lecture on one of the sticking points. Nashon, once he understood the point in English, would then suggest a clarification in Marshallese. I would note here that there were some amusing misunderstandings that came through in both languages.

Next, Alice Balos, having listened quietly to all of the discussion so far, had her chance to read and comment upon the revised text, leading to perhaps another trip to the blackboard. Then, paragraph by paragraph, the Marshallese text went to our English-speaking typist who, as far as she knew, was typing gibberish. At the end of each day, Alice Buck prepared for me a back translation into English. That back translation was usually a grammatical and syntactical nightmare, but remembering that our target audience was Marshallese I cleaned it up only to the point of having it make sense. A complex process? Indeed; but a necessary one. The published text represents, on the average, four or five iterations of the process I have described, and then quite a bit of fine-tuning during the following month by telephone between Bethesda and Honolulu.

One interesting aspect of my task here relates to the role of the ever-present attorneys. Our primary purpose, of course, was to inform the Marshallese people in a language they could understand. Inevitably, this required simplification of both concept and expression. At the same time, we had seen previous efforts of

this nature become issues themselves, as the lawyers scrutinized the text of each document, looking for omissions, misleading wording and ambiguities. These, of course, would be described in the courtroom or the congressional hearing as "government cover-ups" and worse. Perhaps some will be found in the current document, and that will explain for you the message I put into the foreword.

Early in May, Alice Buck and I, together with Bill Robison and my DOE successor, Harry Brown, travelled to Enewetak to present and explain the results of our work. Present also were a representative of the government of the Republic of the Marshall Islands and, as expected, the attorney for the people of Enewetak. This young lawyer was the least prepared of the group and he did not disappoint us, devoting most of his time and effort to his search for the hidden flaw.

We spent two days with the Enewetak community: a public meeting the first day, an executive session with the municipal council on the second, and many informal discussions in between. It's too early to tell what the community's decision will be, but I am optimistic. They were cordial and friendly, as always, but in addition (and this was most gratifying) their questions were thoughtful and showed evidence of real comprehension. This leads me to conclude that the people of Enjebi have and understand the information they need to permit them to resettle their ancestral home.

For me there could be no more welcome reward than to see that happen.

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TALLEB IN JET MELELE KO KIN ENJEBI

ENJEBI INFORMATION SUMMARY

U.S. DEPARTMENT OF ENERGY

APRIL 1989

**TALLEB IN JET MELELE KO
KIN ENJEBI**

ENJEBI INFORMATION SUMMARY

**KEMELEN ENJEBI ISLAND
DOSE ASSESSMENT
ILO KAJIN MAJOL
IM UKOT ILO KAJIN ENGLISH**

AN INTERPRETATION IN THE
MARSHALLESE LANGUAGE
(WITH ENGLISH TRANSLATION) OF

**UCRL 53805
ENJEBI ISLAND
DOSE ASSESSMENT**

**U.S. DEPARTMENT OF ENERGY
APRIL 1989**

FOREWORD

This document is intended as an instructional and briefing aid for the people of Enjebi and others who would assist them in considering, and perhaps in carrying out, resettlement of their home island. Due to language limitations, and in the interest of brevity and clarity, certain concepts and conclusions have been simplified by the author and translators. The decision makers and their technical advisors are referred to the source document, UCRL 53805, for a complete and reliable exposition of the subject matter.

The Marshallese reader is invited to carefully review the earlier DOE document "Enewetak Atoll Today", which will amplify both vocabulary and content. Another bilingual document, "The Meaning of Radiation for Those Atolls in the Northern Part of the Marshall Islands That Were Surveyed in 1978" will provide additional useful material also.

Because of our desire in the Foreword to speak directly and as precisely as possible to readers in both languages, we present on this page the original English language text of the Foreword, without a modified literal back-translation of the Marshallese. As with the remainder of the paper, the Foreword is accompanied by the dynamic equivalent in Marshallese.

WORDS OF EXPLANATION ABOUT THE REPORT NAMED

"ENJEBI ISLAND DOSE ASSESSMENT"

(Report of the Studies of Potential Radiation Doses
to People Living on Enjebi)

When the Congress of the United States approved the "Compact of Free Association," it ordered the government of the United States to continue the studies that the Department of Energy was doing of radiation at Enjebi, and to inform the Enjebi people when they might begin to again live at Enjebi and not receive more radiation than the U.S. Federal standards allow for the people of the United States.

In July, 1987, the scientists of the Department of Energy completed their study of Enjebi and published their report, entitled "Enjebi Island Dose Assessment." The report states that if people return and again live at Enjebi in 1990, and get food from other islands and places, then the amount of radiation they receive will not be more than the amount established by the United States Government for its own citizens. The Enjebi people can eat food from the food-bearing trees on Enjebi; however, it would be good for about half of the food they eat to come from other islands (like the main island of Enewetak, Medren, Ujelang) and from boats or airplanes that bring food. If the Enjebi people want to eat only food from Enjebi, and

not get about half of their food from other places, the amount of radiation they will receive will be more, unless they wait 30 years to resettle. After 30 years, radiation levels in the soils there will have diminished by about half. (See "Enewetak Atoll Today", page 2.)

There are some ways that can accelerate the reduction of the amount of radiation that people receive. This information is in the "Enjebi Island Dose Assessment". Some of it is in the words of explanation below.

A. WORDS OF EXPLANATION ABOUT THE RADIATION THAT
SURROUNDS US [Background Radiation]

In the book named "Enewetak Atoll Today" there are words of explanation about the energy called radiation, which has always been a part of the world from the beginning. This energy comes from the soil, from ocean water, from plants, from the sun, and also from people's bodies. The unit that scientists use to measure the amount of this energy that a person takes into his/her body from anything, is the "millirem." The amount of this kind of radiation that people get by living at Enjebi, as well as at other atolls in the Marshalls, is about 60 millirem in one year. This report does not talk about this kind of radiation, that is a natural part of the world. However, as a result of the atomic bomb tests, there is increased [background] radiation in some places, including Enjebi. The amount of radiation that one person receives can be small or it can be larger according to the place that he/she stays and also according to the kinds of activity that make up his/her daily routine. Scientists expect that in the first year that the Enjebi people return and live at Enjebi, they will receive about 20 millirem

of the kind of [background] radiation that came from the testing. This amount (20 millirem) is included in the numbers in the Enjebi report.

B. WORDS OF EXPLANATION ABOUT THE RADIATION THAT COMES
FROM THINGS INSIDE PEOPLE'S BODIES

If the dust of soils that are radioactive is in the air people breathe, and if people eat foods that grow in radioactive soil, then some of the radioactive particles will enter into their bodies. During the time the particles are in their bodies, they are able to cause harm to their bodies.

(See "Enewetak Atoll Today," page 11.)

1. BREATHING AIR [Inhalation]

As the scientists worked at Enewetak Atoll and Bikini Atoll, they studied the way that radioactive things in the soil rise into the air. As people work or play or sit around, they may breathe some of the radioactive dust that is resuspended from the soil. Scientists also examined the whole island of Enjebi with measuring/detecting instruments, and found that in some places on the island there were concentrations of plutonium and americium in the surface soils which could be resuspended and present an inhalation hazard. However, during the clean-up from 1977 to 1980, they scraped off these surface soils and took them to Runit and buried them there. Therefore the amount of radioactive things in the soil at Enjebi today is low enough that it is not harmful to breathe the air there.

2. DRINKING WATER

The concentrations of radioactivity in rain water in the cement cisterns that people drink and use for cooking are very small. The concentrations in ground wells in some places on Enjebi is larger. Therefore it is clear that rain water from cement cisterns is better for drinking and cooking food, so it is good to conserve it and use it for these purposes, using ground wells for other purposes. However, if the rain water in cement cisterns gets all used up, people can use water from the ground wells for drinking and cooking food for a short time; it is not something to cause alarm.

3. FOODS FROM THE SEA

Fish and other seafoods in the ocean and lagoon at Enewetak contain some fallout radionuclides. However the concentrations are much smaller than those of other radionuclides that have always been found in all of the oceans in the world. There is no reason for people to be afraid to eat the fish and other things in the sea and lagoon at Enewetak as a result of the tests.

4. FOODS FROM THE LAND

If people will return and live at Enjebi in 1990, while there are only limited amounts of breadfruit, pandanus, coconuts and other local foods there, they will need to bring in almost all of their food from other islands, like Medren, Enewetak Island, Ujelang or from the field trip ships and airplanes. Scientists expect that if the Enjebi people plant food-bearing trees and plants, they will not bear/produce for about ten years sufficient for the number of people who will live at Enjebi.

In the year 2000, if everyone eats only food that grows on Enjebi, with no food coming from other places, the amount of radiation that each person receives from the food he/she eats will be about 320 millirem in one year. It is clear that there will not be the same amount of radiation received by everybody because they do not eat the same quantities. (See the explanation in "Enewetak Atoll Today", page 16.) A few will receive smaller amounts and larger amounts, but most will receive amounts close to 320 millirem in one year.

Scientists realize that the people will continue to want to eat imported foods (like rice, bread, corned beef, tea, coffee and other such things). If half of their food/diet comes from other/outside places, and half from foods at Enjebi (from both land and sea), then the amount of radiation they will receive from the food they eat will be only about 150 millirem in one year. Almost all of this radiation comes from the cesium in the foods that grow at Enjebi. This radiation that people receive will get smaller and smaller every year because over many years cesium continues to change into other things that are not radioactive.

C. THE TOTAL AMOUNT OF RADIATION THAT WILL ENTER THE
BODIES OF PEOPLE WHO LIVE AT ENJEBI [Total Dose]

The United States government has established an amount of radiation that the people in the United States should not exceed: it should not be more than 170 millirem in one year, and not more than 5000 millirem during 30 years.

As is clear from the explanation earlier in this book, the amount of radiation that those who will live at Enjebi will receive from things outside their bodies from test fallout is about 20 millirem in one year.

If they do not get food from other places but eat only foods from Enjebi, the amount of radiation that one person will receive from the things inside his/her body is about 320 millirem. Added to the 20 millirem this makes about 340 millirem in one year.

If they bring food from other places, not including the northern islands in the Enewetak Atoll, then the highest amount of radiation a person may get from the things inside his/her body will be about 150 millirem. Added to the 20 millirem this makes about 170 millirem in one year. This amount is the same as the United States federal standard for its citizens. Because the radiation from the cesium gets smaller every year, the amount of radiation that a person will receive during 30 years will not be 30 times 170, but will be about 3500 millirem. This amount is much smaller than the 5000 millirem (per person) of the United States federal standard for 30 years.

D. WAYS THAT CAN MAKE-LESS THE RADIATION THAT PEOPLE AT
ENJEBI RECEIVE [Remedial Measures]

As has already been explained, during the clean-up, the workers scraped off the top soils where the scientists found large amounts of plutonium and americium. This is one of the methods they used to reduce the amount of radiation people would receive when they again live at Enjebi.

There are other things that people can plan to do before and after they return to Enjebi so that the amount of radiation they receive will be small.

1. They can scrape off the surface soil in the places where they plan to build houses and buildings, and bring clean coral and spread it over the area.
2. They can fertilize gardens with a kind of chemical that hinders the radioactive things from going up into the roots of the food-bearing plants and trees .*
3. All buildings should have large cement cisterns so that there will be plenty of rainwater [available]. Then people will not have to drink or cook with ground-well water.

*The way to do this has been explained in a letter from the Department of Energy to the Chief Secretary, Oscar deBrum [written] January 15, 1988.

If people will do one of these things (or better yet, all of them) then the amount of radiation they receive will be less than the amount they would receive if they had not done these things.

E. OTHER THINGS FOR DISCUSSION

We have explained about the amount of radiation that the United States standards provide that its people should not exceed. Some scientists in the world want the amount of radiation the United States rules say is acceptable to be smaller. However, these new standards that they propose are intended for large working-places where people are making radioactive things every day, and also for the people who live close to these working-places.

If the people return to Enjebi in 1990, even though they do not do the three things that were explained on page 9, the amount of radiation that they receive will be smaller than the amount that the United States standards say is acceptable for people in the United States. The reason is because almost all of their food will initially come from other places. However, after the trees and plants on Enjebi begin to bear, and the people begin to eat from these fruits/foods, the amount of radiation they will receive at that time will be larger. Therefore, it is very important that there be a plan for about half of their food/diet to keep coming from other places, so that the amount of radiation they will receive is not more than about 170 millirem in one year, the amount the United States rules say is acceptable for its people.

Let us remember and understand that everywhere in the Marshall Islands (including Enjebi) the amount of radiation surrounding us that is naturally part of the world is very small, and even if the radiation from the test time is added to it, it is still a small amount. We have explained in this book some of the ways that people living at Enjebi can keep the amount of radiation they receive smaller than the amount that is received by people in many other countries of the world where no atomic tests were ever done.

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translation of an original English draft;
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of the Marshallese.

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