



THE SECRETARY OF ENERGY  
WASHINGTON, D.C. 20585

May 20, 1985

Honorable Donald Paul Hodel  
Secretary of the Interior  
Washington, DC 20240

Dear Mr. Secretary:

In response to letter of July 5, 1984 from the former Secretary of Interior, William Clark, I am pleased to provide the Department's update of its 1979 evaluation of the habitability of Eneu Island in Bikini Atoll and to advise what conditions, if any, should be imposed upon a population which might resettle on that island.

A decision as to the acceptability of the risks from exposure to radiation on Eneu Island is a complex matter. A number of factors, including the social costs to the Bikini people of not having access to their homeland, are appropriate for consideration.

Based upon our evaluation of the radiological conditions at Bikini, it can be concluded that if imported food can be substituted for a major fraction of local coconut product intake, the average exposure to the population on Eneu would be consistent with current radiation protection guidance. Unless imported food replaces a substantial portion of the locally grown coconut in the diet, however, the recommended radiation exposure limits would be exceeded. Actual doses to individuals will, of course, depend in large measure on their dietary habits and may, for some individuals, exceed current radiation protection limits.

Conditions that could be imposed to reduce exposures and risk of a population resettling Eneu Island include:

1. Imported foods should constitute a substantial fraction of the Eneu diet for at least the next 15 to 20 years.
2. Residence on Bikini Island and consumption of terrestrial foods, including coconut tree sap grown on Bikini Island, should be prohibited.
3. At least for several years following any resettlement, a program should be maintained to monitor the actual radiological situation.

Enclosed herewith is a more detailed discussion of this matter prepared by my staff.

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If you require additional information, please let me know. Should you decide to authorize or facilitate an Eneu resettlement, we would be pleased to assist in your planning.

Yours truly,

A handwritten signature in cursive script that reads "John S. Herrington". The signature is written in dark ink and is positioned above the printed name.

John S. Herrington

Enclosure

## DISCUSSION PAPER

### Radiological Implications of the Resettlement of Eneu Island, Bikini Atoll

The most recent information regarding doses and health risks on Bikini Atoll is contained in the Marshallese/English book entitled "The Meaning of Radiation at Bikini Atoll" which was published in September 1980. A copy is enclosed. Full-time residence on Eneu is discussed on page 21 for two alternative cases: (a) with imported foods available, and (b) with only Eneu-grown foods available. The expected doses and their predicted consequences are tabulated. These estimates assumed resettlement in 1980. They have been updated in the following discussion by applying a reduction of 11 percent to account for radiological decay between 1980 and 1986. Assuming that imported foods constitute approximately one-half of the daily intake (case a), the dose rate to a population resettled on Eneu in 1986 would reach a maximum of approximately 115 one-thousandth parts of roentgens equivalent in man (mrem) per year in 1989 and decline thereafter at a rate of some 2 percent per year. In the maximum year 70 percent of the population would experience dose rates below 115 mrem per year. Approximately 1 or 2 percent of the population might experience dose rates exceeding 350 mrem per year during this maximum.

The population dose rate will continuously diminish over the years following resettlement and, over a 30-year period, will average approximately 90 mrem per year. At any given time, 70 percent of the population will be experiencing exposures below the average, while 1 or 2 percent may be experiencing exposures at a rate of three times the average or higher. However, these above-average exposures will be randomly distributed in the population and in time, and are included in the 90 mrem per year population average. The most probable cumulative dose for the average individual over the 30-year period will be about 3 rem (3000 mrem).

It is estimated that the number of cancer deaths that might be attributable to these exposures in a population of 550 might number between three tenths and one. In the same population 24 cancer deaths would be expected to occur from causes other than radiation.

The above estimates of dose and health consequences would be approximately doubled if only Eneu-grown terrestrial foods were consumed and substantially more than doubled if a significant fraction of the diet were derived from foods grown on Bikini Island.

General guidance exists for limiting radiation exposure from manmade sources. The Federal Radiation Council in 1960 recommended 500 mrem per year for an individual, 170 mrem per year as an average for population groups, and a cumulative dose limit of 5,000 mrem over a 30-year period. The Federal Radiation Council stated in 1960 that these standards might be exceeded if the reason for doing so were carefully considered.

Recently both the International Commission on Radiation Protection and the United States National Council on Radiation Protection and Measurements have reviewed the issue of radiation protection standards. Both groups have concluded that: (1) the limit of 500 mrem per year whole body dose equivalent, not including medical and natural background radiation, is still recommended for individuals when the exposure is not continuous, and (2) the recommended limit for continuous exposure of an individual in the population is 100 mrem per year whole body dose equivalent, not including exposure from natural background and medical procedures. This limit for continuous life-time exposure is associated with a life-time risk of cancer of one in a thousand. The Environmental Protection Agency, which develops standards and provides advice to Federal agencies, endorsed these recommendations in recent rulings establishing national emission standards for radionuclides.

A decision as to the acceptability of the above-described risks from exposure to radiation on Eneu Island is a complex matter. A number of factors, including the social costs to the Bikini people of not having access to their homeland, are appropriate for consideration.

Based upon our evaluation of the radiological conditions at Bikini, it can be concluded that, if imported food can be substituted for a major fraction of local coconut product intake for at least the next 15 to 20 years, the average exposure to the population resettled on Eneu would be consistent with current radiation protection guidance. Unless imported food replaces a substantial portion of the locally grown coconut in the diet, however, the recommended radiation exposure limits would be exceeded. Actual doses to individuals will, of course, depend in large measure on their dietary habits and may, for a small number of individuals under certain circumstances, exceed recommended radiation protection limits.

Conditions that could be imposed to reduce exposures and risk of a population resettling Eneu Island include:

1. Imported foods should constitute a substantial fraction of the Eneu diet. Our experience in recent years and our observations at Rongelap, Utirik, and more recently at Enewetak, indicate a distinct preference for a mix including imported foods over an exclusively locally produced diet. This apparent preference should be reinforced by authoritative dietary recommendations and by assuring that regular field trip service or some other dependable source of imported foods is maintained.

2. Residence on Bikini Island and consumption of terrestrial foods, including coconut tree sap grown on Bikini Island, should be prohibited.

While some Eneu residents, notwithstanding these recommendations, may visit Bikini and partake of some Bikini local foods, the population must be informed of the risks associated with such practices. Brief visits to Bikini Island, especially if Bikini foods are not eaten, will not appreciably change the dose prediction, but, if visits are extended and include consumption of local foods, the doses will rise rapidly. For example, if 50 percent of the diet were to come from Bikini Island, the average annual dose would be in excess of 500 mrem.

3. At least for several years following any resettlement, a program should be maintained to monitor the actual radiological situation.

Department of Energy  
Washington, DC  
May 13, 1985