

**Battelle**

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

Dear Ruth:

The Northern Marshall Islands Advisory Group met March 27-28, 1979 at the National Bureau of Standards in Washington. Members present were: C. W. Francis, R. O. Gilbert, J. W. Healy, R. O. McClellan, C. R. Richmond, W. L. Templeton, R. C. Thompson, B. W. Wachholz, and W. J. Bair. Also present were Joe Deal, Tommy McCraw, Jay Beaufait, and Roger Ray. Joining for part of the discussion were Nat Greenhouse (BNL), and Robert Watters (OHER). The agenda items were: Plans for post-cleanup assessment of Enewetak, coconut planting on the Northern Enewetak Islands, participation of Marshallese in re-habitation decisions, levels of radionuclides in persons who temporarily returned to Bikini, and use of Rongelap coconut crabs for food. An additional agenda item at the request of Joe Deal was a review of the DOES draft statement to the Department of Interior on assessment of radiation doses to Marshallese if allowed to return to Eneu or Bikini Islands on the Bikini Atoll. The agenda topics were dealt with in very frank discussions with DOE staff, who are to be commended for their cooperation, patience and endurance.

The following are brief comments on the agenda items, including, in some cases, the Advisory Group's recommendation:

1. Post-Cleanup Dose and Risk Assessment

The plan for preparing a post-cleanup dose and risk assessment for Enewetak should be documented as soon as possible concurrent with continued preparation of the assessment. This documented plan should assist the Livermore staff and others in carrying out the task, help headquarters staff become more aware of how the assessment is being done and provide a basis for the Advisory Group comments on the adequacy of the assessment approach prior to its completion. This should assist in minimizing misunderstanding between the several parties involved and increase the likelihood of a satisfactory final assessment.

The plan for a post-cleanup dose and risk assessment should provide a clear indication of all expected inputs to preparation of dose and risk estimates, where the inputs will come from and the dates they will be available. All expected outputs should be clearly documented. At a minimum this should include, for the various living pattern scenarios, estimates of body and

organ burdens by year for individual radionuclides that are expected to be significant contributors to the total dose to people. Further, estimates of dose by year should be prepared for each individual radionuclide and each source of exposure in addition to aggregate annual and cumulative dose. Whenever possible, some estimate should be made of the expected uncertainties in radionuclide burdens and dose. Provision should be made for rigorous documentation of all dose and risk calculations. Because of the importance of the dose and risk estimates, provision should be made for Livermore to provide their input data to other institutions allowing the other institutions to verify the Livermore dose and risk estimates.

Concurrent with development of the post-cleanup dose and risk estimates a detailed plan should be developed for medical and radiological followup activities in Enewetak. This plan should clearly indicate the objectives of each proposed activity, the responsible party and how the objective will be achieved. Where practical, there should be linkage between the post-cleanup dose and risk assessment and the medical and radiological followup. For example, plans for whole-body burden measurements and urinalysis for ^{90}Sr and Pu should link back to estimated body burdens and urinary excretion of radionuclides.

The plans for conducting a post-cleanup dose and risk assessment and for medical and radiological followup are obviously dynamic in nature. They will change as new information is obtained. The Advisory Group is available to review the plans and offer comments on them as they are developed and implemented.

The Advisory Group recommends increased participation by statisticians in LLL's post-cleanup transuranic and fission product dose assessment for the Enewetak Atoll. At the present time statisticians do not appear to be involved in the dose assessment effort other than to provide LLL with environmental concentration data for their data bank. Specifically, statistician activities should include (a) statistical analysis and summary of each island's data for inclusion in the dose assessment report, (b) assisting LLL modelers to place estimates of precision on dose estimates to the extent possible, (c) reviewing dose assessment calculations and the final dose assessment report to verify that soil concentration and other data are used and presented appropriately, and (d) any other activities necessary to assist LLL in providing a dose assessment of the highest scientific standards.

Although not discussed during the meeting, some members of the Advisory Group have expressed concern that procedures for certifying completion of the cleanup have not been agreed upon. This should receive immediate attention.

2. Coconut Planting - Copra Production and Use for Food

- Copra Production

Confirmation is needed on the distribution of radionuclides between coconut meal, oil and residues following product production. Since

processing of existing stock of contaminated copra has not been possible, other techniques such as measurement of weapon test fallout and stable isotope determinations should be conducted on commercial systems such as exist in the Pacific Islands; e.g., Majuro, Panape and Palan.

Additionally, a market analysis is required which should include export quantities and routes, as well as product distribution patterns and use. This should be sufficiently detailed to allow calculation of probable market dilution of copra products produced in the Northern Marshall Islands and potential dose calculations to humans at the identified use points. However, this analysis may be pointless if emotional considerations about radionuclides prevail.

- Use for Food

Whether coconuts should be planted for use as food can only be determined upon completion of the fission product survey, dose and risk assessment. Data on levels of radionuclides in soil and in coconuts grown in that soil can be used to define areas of islands suitable for coconut planting (where the concentration of radionuclides in soil is sufficiently low that coconuts grown in the soil could be used as sustenance food without leading to radiation doses exceeding appropriate guidelines).

3. Participation of Marshallese in the Decision Process

According to the linear, no-threshold hypothesis, no dose of ionizing radiation can be considered to be completely free of potential harm. In radiological protection work the safety of a given dose can be judged only in the context of the situation involving the dose. Hence, the benefit-risk and the as low as reasonably achievable (ALARA) concepts. Present recommended numerical maximum limits in Federal radiation protection guides are, therefore, based upon value judgments as to the balance between dose (or risk) and the benefits attained by each group in the U.S. population for normal uses of radiation.

The Federal Radiation Council, in establishing the current radiation protection guides, recognized the need for flexibility in such guidance. Thus, in Report 1, p 27, they first discussed the need to keep doses as low as practicable. This is followed by: "Similarly, it is obviously appropriate to exceed this level if a careful study indicates that the probable benefits will outweigh the potential risks". This type of reasoning led to the definition of the Radiation Protection Guide on page 37 as: "...the radiation dose which should not be exceeded without careful consideration of the reasons for doing so; every effort should be made to encourage the maintenance of radiation doses as far below this guide as practicable."

From this it is apparent that the FRC guidance goes beyond the specific numerical values chosen for normal activities in the U.S., and makes it not only possible, but also necessary to appraise the proper risk-benefit balance in the specific case of the Marshallese. It is obvious to the Advisory Group that there may be many otherwise unobtainable benefits to the people of these islands if a somewhat higher dose limit is applied. It is recognized that the dose criteria in the Enewetak Environmental statement also must be considered.

The Group, therefore, recommends that DOE bring to the attention of appropriate authorities the need for a careful study to assess both the risks and benefits. The study should be done in concert with the Enewetak people.

4. Brookhaven Bikini Data

The presentation by Nat Greenhouse to the Advisory Group on March 28 and the letter dated January 10, 1979, from Mr. Greenhouse to Tommy McCraw suggest the following:

1. That communication should be improved between Brookhaven National Laboratory and LLL regarding the design, implementation, statistical analysis and dose estimation procedures with regard to radiological surveys of the environs and people inhabiting the Northern Marshall Islands.
2. That an attempt be made to improve the statistical analyses of data in all letter and formal reports to DOE. Even though letters may be followed by more comprehensive formal reports it is important that letter reports present effective data summaries to provide DOE with timely information upon which decisions may be based.

5. Use of Rongelap Crabs for Food

The Advisory Group was asked by staff to review a memorandum on the radiological impact of coconut crabs from the Northern Islands of Rongelap (Greenhouse; BNL - McCraw; DOE 1/10/79). The Group assumes that the assessment will be the subject of a more formal report since the conclusions given in the verbal presentation appeared to be in conflict with the memorandum. The staff should review the final report and insure that their recommendations are communicated in an effective manner to the Rongelap people.

6. Predictions of Radiation Doses to Present and Returning Residents of the Marshall Islands

Because decisions regarding habitation of the Marshall Islands will be based on predictions of radiation doses to present and returning residents, the Advisory Group recommends that all such dose calculations be independently verified by two or more organizations and that the basis for these calculations be clearly presented. This is not intended to reflect on Livermore activities, but we believe DOE cannot risk a repeat of the Bikini experience. A small error could have major consequences.

Sincerely yours,



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Manager
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Research Program

WJB:ms

cc: Northern Marshall Islands Advisory Group
J. L. Deal
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