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January 5, 1979

Mr. Joe Deal
Division of Operational and
Environmental Safety
Department of Energy
Washington, D.C. 20545

Dear Joe:

In your teletype of November 29 to Mahlon Gates (R291515Z Nov. 78) and confirmed by your direct request at our meeting in Germantown on December 13, 1978, we have been asked to supply the final radiological dose assessment at Enewetak Atoll after the conclusion of the clean-up activities. The Nevada Operations Office was at the same time asked to supply a sample collection and analytical program to supply the data base for the assessment. I understand this assessment is to be part of the verification and certification of clean-up at the atoll. The final dose assessment, as indicated by HQ, must now include an assessment of the potential doses due to ^{137}Cs and ^{90}Sr as well as the transuranics. We are willing to assume this responsibility but several points need clarification:

A. Subsistence crops are essentially unavailable in the northern part of Enewetak Atoll. As a result the final dose assessment will be primarily predicated on concentration ratios (defined as pCi/g in the plant fruit/ pCi/g in the soil for ^{137} Cs, ^{90}Sr, Pu and Am) developed from our research program on Engebi (Enewetak Atoll) and Eneu Islands (Bikini Atoll). Current and future radionuclide concentrations in the soil throughout the depth of the root zone are required to produce this evaluation. Radionuclide data in surface soils are required to evaluate the resuspension pathway. Other than the transuranics, data for other radionuclides are not available. It is therefore necessary to develop a post clean-up data base which delineates the radionuclide soil concentration as a function of depth in order to complete a post clean-up assessment.

B. We have as yet not received official tasking to provide the final dose assessment. This I feel is essential in view of the critical nature of this final assessment.

C. This assessment will have to be done in conjunction with the pending assessment of Eneu Island at Bikini Atoll and the various assessments associated with the recently completed multi-atoll survey to which we are already committed.

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D. The present available data base is inadequate to permit a final dose assessment for ^{137}Cs and ^{90}Sr for Enewetak Atoll after clean-up.

E. We are still uncertain as to what is completely necessary for final verification and certification of clean-up at Enewetak Atoll. Will the assessment have to include Runit Island, islands Alice through Daisy and will it have to include the transuranics as well as ^{137}Cs and ^{90}Sr? If additional radiological data are required for these islands and for the transuranics then a sampling, analytical and assessment program greater than described herein will have to be considered.

In view of the fact that the entire radiological portion of the clean-up project has been directed toward the transuranic radionuclides little effort has been directed toward developing a data base which would be adequate for making the final evaluation of the ^{137}Cs, ^{90}Sr situation in the northern atoll. As a result, a considerable effort is now required between January and the wind-down of the DOE support of the clean-up activities (which is now scheduled for June of 1979) in order to develop a data base upon which we can, with some confidence, make a final assessment of the northern part of Enewetak Atoll.

A more critical situation is to develop an adequate data base for Engebi Island in time to meet the May commitment, which you discussed at the December Enewetak Meeting, for providing as assessment of that key residence island.

As a result of the urgency of the situation, Vic Noshkin and I met with the NVOO people on December 19 and 20 to evaluate the current situation and outline a sampling and analytical program that would, in the short time available, provide a data base for final assessment. In order to meet the commitments made at Enewetak on December 1 thru 6 the following will be necessary and adequate support must be directed from HQ to meet the goals:

1. A. Priority 1 is Engebi Island. This is the largest island, the major residence island and the island that the people would prefer to use. The sampling and analytical program will be directed toward this island first.

Sampling will be on a 50 m grid which will generate 325 sampling sites. This density of sampling is required because of the history of events on Engebi Island resulting in a very inhomogeneous distribution of radionuclides and the recent soil removal activities. In addition, we have received no direction from HQ as to what is really required from their point of view for final assessment for verification of clean-up. It was mentioned in our December 13 meeting that perhaps the final assessment should be done on a scale as small as an individual Wato. I feel that this is unrealistic and unlikely, but to insure

a data base which would be adequate to permit such a possible analysis we have decided that a 50 m grid for soil sampling should be completed on Engebi Island. Samples on a 100 m grid will initially be analyzed and additional samples will be analyzed as is deemed necessary.

All soil sampling will consist of soil profiles through 60 cm. I am attaching a brief memo I sent to Roger Ray discussing what would be needed in the way of soil sampling and data in order to evaluate Enewetak Atoll after clean-up.

It is estimated that the sample collection would take 16-20 days and the analytical program about 11 weeks. Therefore, if the go ahead were given immediately for supplying support for the sampling program and additional funding were made available to allow analytical work at Albuquerque as well as at Enewetak Atoll, we could probably generate an assessment of Engebi Island in the May time frame previously discussed. It is emphasized that support such as backhoes, boats, personnel, analytical capacity, etc. must be available as soon as possible to have any hope of meeting the May time line for Engebi Island and for developing an adequate data base for the rest of the Northern part of the atoll by the scheduled wrap-up of the clean-up project.

However, all samples and all analytical work should be handled through NVOO. They have a sampling program in place and a quality control program for the analytical work. They do of course need tasking and support to accomplish the program. We will work directly with NVOO and have access to the data for developing our final assessments.

Our plans for assessment of Engebi Island include using an island average for soil radionuclide concentrations, or perhaps, divide the island into three of four areas if the data generated from the sampling program justify such an approach.

1. B. A very important feature of all of our dose assessments is the assumed diet which is the basis for estimating the daily radionuclide intake. This has been an area of uncertainty and a part of the dose model which has concerned me for a long time. Previous diet models were based upon published data developed by observation at many atolls for short periods of time during the 1950's, by some of our staff for a two week period and with discussions with an anthropologist living in the Marshalls but where main objectives were not detailed evaluation of diet. The initial diet generated from these sources and used in post dose assessments was thought to be conservative (i.e. possibly over estimated the daily intake) and was appropriate in the previous assessments to evaluate the general situation at the atoll and ensure an initial, safe public health approach.

It is now critical to better define an average diet and make the dose assessments as realistic as possible to provide a basis for

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the difficult decisions which have to be made concerning future use of the atoll. We have made arrangements to have the Enewetak people themselves supply us with information on average, normal daily intake and on intake during famine situations. This will be the most reliable and thorough information available and we plan to use the information in our final assessment model. It is important that DOE and DOI recognize this opportunity to develop a more reliable diet model and concur in its use for the final dose assessment.

2. Second priority will be the Aomon-Bijire complex and the other islands in the northeast quadrant of the atoll including Boken (Irene) to the west of Engebi. A 50 m sampling grid will also be used on these islands. The logistics are such that a 50 m sampling grid is as feasible as any other and will supply a more detailed data base. A lesser sampling grid will save very little time. A detailed assessment of the Aomon-Bijire Complex as a possible residence island complex and evaluation of the other north east islands or agricultural islands will be made at a later date consistent with sample collection and the analytical program.

In summary, when we and NVOO have received tasking and support from HQ to develop the sampling, analytical and assessment program for Enewetak Atoll we are prepared to proceed as rapidly as possible to meet committed time lines consistent with doing a scientifically and professionally sound job.

WLR/mt

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