Battelle
Pacific Northwest Laboratories

Project Number

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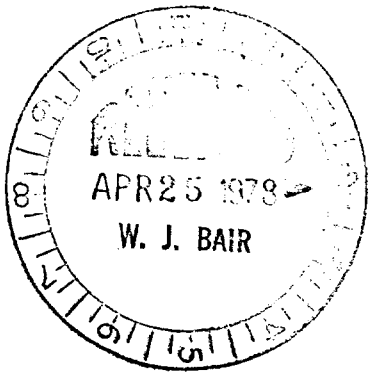

Date April 25, 1978

To W. J. Bair

From R. O. Gilbert

Subject Response to Request for Evaluation of Dose Estimates and Future Actions Concerning Eniwetok Cleanup

Question 1: Do the recent LLL dose calculations in the draft paper "Assessment of Potential Doses to Populations from the Transuranic Radionuclides of Enitetok Atoll" suggest the current "minimal action level" (40 pCi/g soil) and the mandatory cleanup level (400 pCi/g soil) should be reduced?

As you know Bill, I was not a part of the review last August of the Environmental Impact Statement (EIS) for the Eniwetok Cleanup that used the 40 and 400 pCi/g levels. I have not seen the EIS and hence cannot comment on it or previous evaluations of it. However, I do feel that the dose estimates obtained by the above LLL paper for soil concentrations of 400 pCi/g suggest that additional sampling, statistical analysis, and dose estimation are warranted. It is true, of course, that the LLL dose estimates were obtained under what the authors considered to be conservative assumptions. Hence, the computed doses may be higher than actual conditions will produce.

I would like to suggest the following actions:

(1) Estimate the dose separately (using LLL's model) for each 1/4 or 1/2 hectare unit on each island. This can be done since each such area has an estimated surface (0-3 cm) soil concentration obtained using the IMP, soil samples, and kriging. Once these dose estimates for an island are in hand, the total dose to an indurdual can be computed assuming various time utilizations in the various areas over an island. This approach is the same as Item 4 in my memo to you dated April 18, 1978 regarding suggested recommendations to DOE. Estimated time to accomplish: 2 months.

(2) Evaluate whether a "probability" approach to the estimation of doses would be helpful. Let me explain with an example. There is currently great uncertainty concerning the most appropriate value to use for the gut transfer coefficient. The present approach has been to compute doses using various possible values for this parameter and to see how dose estimates are affected. It is generally assumed that there is one "true" gut transfer coefficient (a constant) that should be used, but due to inadequate data there is uncertainty as to which value is correct.

A probability approach would not consider that there is only one true value for the transfer coefficient. Rather, the coefficient would be considered to be a random variable with a statistical distribution.

Using this concept a simple approach might involve assigning probabilities to various values of the gut transfer coefficient. This would result in a distribution of dose estimates, i.e., different doses result with probabilities assigned to the liklihood of each. The distribution of dose estimates depends, of course, on the assigned probabilities to the various gut transfer coefficients. An important aspect of the study would be to determine the sensitivity of the distribution of dose estimates to the distribution of transfer coefficients. Estimated time: 1-2 months.

(3) The dose estimates are based on average soil concentrations obtained using the IMP and soil samples. The conversion of IMP readings into soil concentrations is obviously an important link in obtaining dose estimates. Also important is the calibration of the IMP with Am sources to insure that correct readings are being obtained. The entire calibration and conversion procedure should be reviewed to evaluate whether brases are present in the procedure that could materially affect dose estimates. As you know, I am attending a general review of these aspects in Las Vegas April 26. Estimated time to complete: 1 month.

(4) EPA proposed guidelines using a soil screening level concentration that is applicable to the top 1 cm of soil, < 2 mm soil size fraction. To my knowledge, the thinest layer sampled on the atoll has been 0-2 cm (profile samples collected during the 1972-73 survey). I suggest that a soil sampling study be conducted to evaluate the transuranic concentrations in the 0-1, 1-2, and 2-3 cm regions. It may be advisable to take IMP readings in conjunction with these samples. I expect to obtain more information on these points at the meeting on April 26. Estimated time to complete: 2 weeks.

(5) The version of the LLL dose assessment handed out to us at the Las Vegas meeting on April 13-14 contained recommendations for additions or continued research to better define parameters for the dose estimation model. I urge that these be implemented as soon as possible, particularly since some are long range studies. These studies involved (in the order of importance assigned by the authors) estimating gut transfer coefficients, resuspension and dust loading factors, terrestrial and marine food concentration factors, residence times of transuranics in the atoll environment, impact of vegetation removal on groundwater quality, transport of "hot" Pu particles from the lagoon to the terrestrial environment, concentrations in clams and shellfish, and the expected diet for each island and population group with some idea of potential variation over time. Estimated time to complete: greater than 2 months for most studies.

Question 2: If the above (and other) activities suggest the "40 pCi/g soil level" approach result in doses above EPA guidelines, what do we recommend?

The answer to this will depend on the answers to the research. I, personally, cannot give an informed opinion at this point in time.