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January 12, 1977

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 Office of the Assistant Administrator
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 Administration
 Washington, D.C. 20545

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Reviewed by *[Signature]* Date 4/20/97

Dear Jim:

The Transuranium Technical Group met in Washington, D.C. on December 8, 1976 to review the data which suggest possible contamination of Bikini inhabitants with plutonium.

The TTG views the issue of transuranium element contamination of present and future residents of the Bikini atoll as consisting of four major questions:

1. Do the residents of Bikini have plutonium burdens higher than those of other persons inhabiting Pacific atolls in approximately the same latitude?
2. If the Bikini residents do have increased plutonium burdens, what is the source of these burdens?
3. What future transuranic body burdens are projected for current residents and their descendants?
4. What potential health risks are associated with current and projected transuranic burdens of the Bikini residents?

In addressing the first of these questions, data presented to the TTG indicated that urine plutonium levels of Bikini residents were 10 times greater than plutonium levels in the urine of residents of the continental United States. Unfortunately, the validity of both these sets of urine data is subject to question.

The U.S. data are based on pooled samples from New York City residents, and were not confirmed by a recent carefully collected large sample from one individual. This individual single sample was 10-fold lower than the pooled samples, and is in better agreement than the pooled samples with model estimates based on fallout plutonium burdens from autopsy data.

The Bikini data are highly suspect because the samples were not collected in a manner to avoid possible contamination of urine by plutonium-contaminated soil on the body and clothing of the person providing the sample, or from resuspended plutonium-contaminated soil in the air. Also, urine samples were generally pooled which prevented identification of possible sampling discrepancies.

The TTG concludes that the first question cannot be answered with available data and recommends that an effort be made to obtain urine samples from selected representative residents of Bikini under carefully controlled conditions that would minimize possibilities of cross contamination. This might be accomplished by use of the radiobiological research vessel R. V. Liktanur as a clean environment during one or more of its quarterly visits to Bikini. Samples should not be pooled from different individuals. Dietary, work, travel and recreational characteristics of the sampled individuals should be accurately recorded. Control samples must be similarly obtained and analyzed. These would most appropriately be obtained from nonexposed Marshallese. It would also be important to establish with greater confidence the U.S. value for fallout plutonium in urine.

With regard to the second question, the TTG was presented a brief review of information on plutonium in the Bikini environment and incomplete information on the dietary habits of the residents, and their sources of food. The TTG recognizes the need for continued monitoring of air, soil, water, and foodstuffs for plutonium and other transuranics. To minimize the cost of this effort a long range plan is needed that will consider pertinent experience from Nevada Test Site, Rocky Flats, and Savannah River studies, and which will assure identification of significant changes in transuranic levels. Samples are required that will be truly representative of the air the residents breathe and the food they eat. This effort will, of course, become more important if the answer to the first question is positive.

An answer to the third question requires answers to the first two. The TTG recommends that when answers are obtained to questions 1 and 2, estimates of current body burdens and projected future body burdens should be made for current residents and their descendants, based on the best available models. The TTG does not believe in-vivo counting offers much hope at the estimated current body burdens. However, if the revised projections indicate body burdens attaining nanocurie levels, then in-vivo counting of all residents should be reconsidered. Based upon our experiences with Spanish subjects, it is unlikely that current technology would offer much hope of quantifying low chest burdens of plutonium under field conditions.

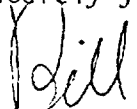
The fourth question, regarding possible health risks, depends upon current and future body burdens of transuranics in Bikini residents. Data presented to the TTG, if accepted at face value, suggests that the average burden is ~ 20 pCi $^{239,240}\text{Pu}$, but may be higher or lower by a factor of ten or more. Using risk factors in the BEIR and similar reports, estimates of the health risk associated with this level of plutonium can be calculated and would be very small. However, the TTG believes that the derivation of such estimates would be premature. Such estimates would better wait until the body burdens of the Bikini residents can be ascertained with more confidence. Also, such estimates of possible health consequences must be done in context with other radiation exposure, such as from the beta-gamma radiation from fission products dispersed on Bikini.

The TTG is aware that obtaining answers to the questions discussed above requires a considerable degree of cooperation from the Bikini people. Efforts to obtain this cooperation might result in psychological or sociological stresses

concise but comprehensive summary of information on BIKINI. Livermore, Brookhaven, HASL, the University of Washington and perhaps other laboratories have collected data which could be useful in assessing the current levels of contamination on Bikini. It would be appropriate to have this data brought together, summarized, interpreted, and used as partial guidance for establishing a long range monitoring program and for estimating health risks for Bikini residents.

While perhaps beyond the scope of our specific assignment, the TTG would like to direct attention to two ancillary problems that relate to the possible contamination of Bikini inhabitants. The extent of plutonium contamination of some islands of the Bikini atoll is much less well known than is that of Bikini itself. These islands, whatever restrictions are presently applied, might be visited or inhabited in the future. Also of concern is the impact of forthcoming EPA standards for plutonium in soil. What might be the costs of complying, or even establishing that one is in compliance, with such standards?

Sincerely yours,


W. J. Bair, Ph.D.
Chairman
Transuranium Technical Group

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cc: TTG

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