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Dr. Bruce W. Wachholz
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Washington, DC 20545

Dear Bruce:

The following are comments on the review of the non-medical component of the Marshall Islands program at Brookhaven. The first part deals with the topics you asked us to address in your May 29, 1981 memo. The second part consists of comments on specific issues.

My general impression of the program was very favorable. I sensed that BNL management is directing their attention to the program and has taken steps to improve the project management, to provide guidance and to monitor the projects more closely than they apparently have in the past.

PART I

1. Scientific/Technical Approach and Content.
There are two distinct parts of this program. One is the monitoring of persons living in a radionuclide contaminated or potentially contaminated environment and the second is the reassessment of the radiation dose to the people. The efforts of the project staff appear to be appropriately directed towards attaining these objectives. I have no serious criticism of the technical approach and content.
2. The two projects seem to be dealing with the principal radiological issues in the Marshall Islands--those impacting on the Rongelap and Utirik populations, the Enewetak people and the Bikini people who returned to Bikini Atoll for several years.
3. I am concerned that the interaction between this program and the medical program may be inadequate. The results from this program should be made available to the medical program staff as quickly as possible so that the medical effort can respond promptly to possible increasing levels of radionuclides in the people, etc. Also, the staff of the non-medical program should

know the results of the medical program promptly so that monitoring and sampling efforts can be adjusted as necessary.

4. Management Practices.

I believe Charlie Meinhold has moved appropriately to gain effective control of this program by assigning John Baum to monitor the projects. I have known John for many years and have full confidence that he will take this responsibility seriously. I believe Charlie recognizes the concern that I and others have had about reviewing manuscripts to assure that irresponsible gratuitous statements are not made that would invite further unrest in the Marshalls.

5. Quality assurance procedures appear to be adequate.

6. I believe it is necessary to monitor persons who may eventually inhabit plutonium contaminated islands as a check on the Livermore assessment. However, I don't think this project should support the development of methods to increase the sensitivity of plutonium bioassays because it is not justified by the need. Also, the "tail would soon wag the dog" if this project became involved in plutonium bioassay methodology. This topic is under investigation at a number of places throughout the world, primarily to deal with potential occupational exposures where the need is much more acute. It is expensive research requiring funds well beyond the current level of effort of these two projects. I do believe the project leader should be aware of new developments in plutonium bioassay and should adopt new methods after they have been proven, but only if they would enhance this program.

7. It does not appear that there is a need for BNL to undertake environmental monitoring. Livermore has this well in hand and a duplication of their effort is not needed. Also I don't believe anything would be gained if Brookhaven collected a few samples just as a check of the Livermore effort--the likelihood of the results agreeing would be small considering the large variability of the concentrations of radionuclides in soil, plants, etc.

PART 2

1. Perhaps the only really negative aspect of the review was the emphasis on ICRP in the leadoff presentation. I still don't know what was intended.
2. I strongly urge the staff doing the dose assessment work to continually examine the reasonableness of their results. For example, as you remember I asked them if they had determined how much fish would have to be eaten to give the ⁶⁵Zn burdens they predicted.

Modelers can quickly lose credibility if their conclusions are shown to be totally impossible or even highly unlikely. The investigators on this project must demonstrate that their dose estimates are realistic with respect to levels of radionuclides in the environment and in food.

3. I still wonder if there might not be some long-lived radionuclides at Rongelap and Utirik that have been overlooked. Is theory sufficient to rule out this possibility? Perhaps this question should be directed to Livermore.
4. The model used by BNL for inhalation of large particles was not clear--especially for 30 to 100 μm particles. (My notes are also unclear so I can't remember what bothered me.)
5. Estimate of Dose to Thyroids of Rongelap and Utirik People. This effort should have top priority! What is contribution of radionuclides other than ^{131}I to thyroid dose?
6. What is bone marrow dose from ^{90}Sr in persons who lived on Bikini? Is the Livermore dose assessment for Bikini people consistent with the constant level of ^{90}Sr that is being observed in the Bikini people?
7. How do ^{137}Cs results at Bikini compare with Livermore dose assessment?
8. Frequency of Whole Body Counting.
I believe the whole body counting of the Bikini people can be terminated if they are now at background levels. Continuing bioassay measurements should be made for ^{90}Sr and the transuranics until the ^{90}Sr clearance time is determined and the amounts of transuranics in the population who lived on Bikini can be assessed. A few tissue samples from autopsy cases might be all that is needed.
9. I believe the BNL efforts (medical and non-medical) and the Livermore effort must be more closely coordinated than in the past. By assigning clearly defined "turf" to each group should eliminate competitiveness and increase the level of trust. Because of the politically sensitive nature of the Marshall Island program, the interests of all parties (U.S. and Marshallese) would be best served by identifying a single spokesman for both BNL and LLL groups or at least a "clearing house" to assure internal consistency. Publication of results in reports and the open literature should be encouraged, but great care should be taken before publication to resolve discrepancies between the results of the different projects and eliminating unsupported conclusions and gratuitous statements.

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10. Bob Conard's Forthcoming Report.

It would be a serious mistake for this report to be published with current dose estimates. If he must publish, let it appear without any dose estimates. Vic Bond should be sensitive to the implications of Conard's report being published with obsolete dose estimates and calculated or calculatable risk coefficients for thyroid cancer. The risk coefficients will be considerable overestimates, based on what we were told about the results of the reassessment of the thyroid doses. It would be irresponsible for this report to appear in the literature as Bob apparently intends.

In summary, this was an excellent review. The BNL investigators and management are to be commended for their efforts.

With best regards,



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WJB:lm