

ACNWC-0036

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Jan. 18, 1996

Ms. Lynn Deering
US Nuclear Regulatory Commission
Advisory Committee on Nuclear Waste
Washington D.C.
FAX: 301-415-5422

Dear Lynn:

This letter, which I am faxing to you, is my response to your letter to George Hornberger and me on January 15, 1996, in which you asked for comments on the letter which the ACNW received from NRC Staff on Dec. 22, 1995. This letter in turn was a response from NRC Staff to the letter to Shirley Jackson from the ACNW which was dated November 6, 1995, and was entitled "COMMENTS ON THE HIGH-LEVEL RADIOACTIVE WASTE RESEARCH PROGRAM IN HYDROLOGY".

I read the first draft of the "COMMENTS--" and gave my input to Dr. Hinze. I also read the final letter to Dr. Jackson, dated Nov. 6, 1995. I have listed below my comments to the above request as well as comments upon a letter from Dr. Shlomo Neuman, dated Nov. 14, 1995, as you requested.

Comments Upon Letter From NRC Staff

(1) Cover letter from James Taylor: He states that budget constraints will necessitate evaluation of all activities of HLW program, including the research program in hydrology. This portends bad news. I fear that the NRC may sacrifice more of the hydrology investigations than those aimed at PA, IPA, modeling and other regulation-driven and less expensive activities. The ACNW should watch out for this, because the hydrology aspect, in my opinion, is the most crucial investigative part of the program in HLW at Yucca Mountain.

(2) Response to Finding 1: Not much to comment upon here, although it seems to me that with all the discussion and communication, there is still a lot of uncertainty as to where to go next. These discussions should continue with more emphasis placed on determining the unknowns of which plenty still exist.

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(3) Response to Finding 2: Staff does seem to appreciate the importance of research to feed the PA and IPA efforts. I agree with their stated concern about the fact that questions remain about risk-based analyses and assumptions inherent in PA models. I do not believe that the science should be driven entirely by computer-generated output from PA models which have questionable assumptions. Final decisions about research directions should rely on expert judgment of the scientists. Perhaps as time goes on and more data is collected, these models may gain more credibility, and thus, become more reliable. Right now, I have serious questions about them.

(4) Response to Finding 3: It is not clear how carefully or how close the NRC is following National Research Council's recommendations, but it appears that some effort is being made. This could turn out to be a moot point if Government cutbacks and downsizing continue. It may not be possible to meet all the needs in time in such a case. But, I do believe they can make a greater effort to stay on top of the most critical research needs (GWTT, saturated flow, unsaturated flow etc.).

(5) Response to Finding 4: Although Staff states that risk-relevance of the CNWRA work has been demonstrated, and that may be true to some extent, I still believe that the flow system and the plumbing is not yet well-enough understood to lend too much credence to the risk-assessment efforts. I have stated this position before to the ACNW.

(6) Response to Finding 5: I agree that ALRS data should not be used to represent or portray Yucca Mountain, but that the data derived from ALRS, similar to Yucca Mountain, can be used to test flow and transport-modeling concepts and codes. This is the major product I see coming out of the ALRS. I still question whether or not the effort is worth it when it possibly could be done at Yucca Mountain, in the very mountain targeted for a HLW Repository. I believe that ACNW is correct in insisting upon more direct results from this research which will help to address the regulatory questions.

(7) Response to Finding 6: The "I" word (Integration) keeps cropping up. The Staff seems to agree that more integration is necessary. I think that this is an area to which I am not close enough on a consistent basis to comment usefully. So I'll pass.

(8) Response to Finding 7: The ACNW has stated what in my opinion is the most critical need today in the hydrology program at Yucca Mountain, namely, the lack of understanding of significant processes. ACNW is quite correct in recommending a greater emphasis on understanding the processes.

However, I do question Staff's response, especially their emphasis in this area. It is true that projects underway are contributing greatly to understanding of the basics, but they need to be increased significantly. This is an area where "conceptual models", PA and so forth seem to be the buzz words and yet, these models seem to be built on incomplete data. The program should have spent more on intense subsurface investigation long ago. I fear that budget constraints will greatly curtail these efforts now.

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The regulators were always trying to guide the investigations. At the other corner of the triangle, the scientific community was interested in determining the basic structure and fluid mechanics of the system.

It soon became apparent to me that the scientists were being given short shrift in the overall decision-making process. We see the results of this today. If the project leaders, years ago, had emphasized the acquisition of more basic geological and hydrogeological data, with its integration, we now would have a much better understanding of what is really going on. Unfortunately, the budget may not allow much more needed investigation.

In hydrogeology, it still comes down to solving differential equations of flow and transport with radioactive decay, dispersion and retardation added to the equations. In order to solve such equations, one first needs knowledge of the boundary conditions. In the case of Yucca Mountain, regulations and PA models can't determine the boundary conditions. The boundary conditions are GWTT, faults, fractures, flow paths, discharge rates, flow directions, chemical reactions on rocks, infiltration etc. These can only be determined by intense subsurface and laboratory investigations. No "conceptual model", an integral part of the PA model, is worth the paper it is printed on unless it is based on real (not assumed) boundary conditions.

A very great danger exists in overuse and misuse of such guidance models, especially if they are based on incomplete or questionable data; it is the danger that production-driven and regulation-driven people will begin to think of products of such models as a kind of virtual reality to which basic research must be subject. Such a philosophy may then suppress necessary scientific investigations.

Therefore, I believe that the ACNW should stress over and over again the importance of keeping up and even increasing the scientific investigative work, especially in the saturated zone, even in lieu of funding other aspects. This is especially critical in today's fiscal climate.

Finally, I was disappointed somewhat that perched water and effects of climate change were not given discussion. Can present-day risk assessment models adequately show the significance or lack thereof of these aspects; is our present knowledge of the plumbing of Yucca Mountain and its recharge/discharge relationships adequate to make trustworthy assessments in these areas?

I hope my comments will be of some use at least. Call me if you have any further questions—I'll be out of town Friday and Saturday, the 19th and 20th.

Sincerely,



Darrell I. Leap

cc: Dr. William J. Hinze