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Dr. Lake Barrett,
Acting Director,
Office of Civilian Radioactive Waste Management
US Department of Energy
1000 Independence Avenue, SW
Washington, D.C. 20585

Dear Lake,

Please find enclosed Dr. Yuri Dublyansky's [final report prepared for IEER on his examination of fluid inclusions](#). Copies of five reviews of the draft have been included as appendices to the final report, including the review that you arranged by Joe Whelan, James Paces, Brian Marshall, Zell Peterman, John Stuckless, Leonid Neymark (all of the USGS) and Edwin Roedder (Harvard University). The final report also contains a detailed reply by Dr. Dublyansky to the Whelan et al. review. The final report also contains the detailed exchanges between Dr. Dublyansky and Dr. Diamond. IEER believes that these exchanges exemplify the kind of scientific discourse that is essential to sound research and healthy scientific discourse on what is, admittedly, an exceedingly complex subject.

We were dismayed by the personal remarks, derogatory tone, and factual inaccuracies and misrepresentations in the Whelan et al. review. Furthermore, we found many of the charges made in the review to be illogical and unfounded. If Dr. Dublyansky's motive had been to mislead the public by making "shrewd and nonscientific arguments that seem to be crafted for readers unfamiliar with the specific Yucca Mountain geologic relations," as alleged (see the cover memorandum), why would he have allowed IEER to send you his *draft* report for review? If he were not in fact interested in careful examination of the issues (as is implied in the memorandum) why would he have sent some his samples to an independent researcher (Dr. Larryn Diamond) for examination? Why would he have gone the laboratory of Dr. Robert Bodnar, who is an expert consultant on fluid inclusions to the Congressionally-mandated Nuclear Waste Technical Review Board, for further study and documentation of his samples?

We found other serious problems with the Whelan et al. review related to the data as well. It contains a gross misrepresentation of some of the reviewers' own work that is relevant to the one calculation regarding dating of a calcite sample presented in Dr. Dublyansky's draft report. The review also derides other people's work and implicitly misrepresents both Dr. Dublyansky's draft report and the paper by Grow et al.

Since you arranged for the review, I am requesting you to ask the reviewers to issue a public correction of some of their comments on the draft report and to issue a retraction of their personal remarks on the following specific points:

1. The reviewers misrepresented their own data on the concentration of uranium in calcite (please see page 12 of Dr. Dublyansky's reply). Whether done deliberately or in haste, the effect was to falsely undercut the indicative evidence of relatively young calcite deposits discussed in Dr. Dublyansky's report. The reviewers should correct the public record about the range of values in calcite deposits shown by their own research. They should also note that the one value cited in Dr. Dublyansky's report from his samples is within that range.
2. Whelan et al. state that "the coarse crystal forms of calcite found in the Yucca Mountain unsaturated zone do not occur along steep flowpaths that would be analogous to water films producing flowstones" (point number 14, page 7). This is incorrect. Figure 1 of Dr. Dublyansky's report clearly shows evidence of flow along steep flowpaths. I am enclosing additional photographs showing the same thing for your information. The reviewers' comment is particularly puzzling because, as you can see from the photographs, two of the locations examined by Dr. Dublyansky were marked by Dr. Zell Peterman, one of the reviewers.
3. The reviewers derided an article by Mattson et al. cited by Dr. Dublyansky as "an unknown reference" (point number 19, p. 8). In fact, [*Geotimes*](#), the magazine cited, is published by the [American Geological Institute](#), a non-profit organization that represents scientific societies of geoscientists. Further, the authors of the specific article on Yucca Mountain in question were from Science Applications International Corporation (SAIC), the DOE, and the US Geological Survey. If the authors or the magazine were unknown to the reviewers that was their problem -- and one that could have easily been corrected -- and not a defect in Dr. Dublyansky's work.
4. The reviewers state that, instead of using Mattson et al., Dr. Dublyansky should have referred to Grow et al. on the potential of the Yucca Mountain site for oil and gas deposits (page 8, paragraph 9). Dr. Dublyansky has looked at the Grow et al. paper. The paper presents evidence of hydrocarbon deposits in the general area, though these are not thought to be *commercially* viable. The presence of oil and gas even in small amounts is compatible with Dr. Dublyansky's finding of minor amounts of hydrocarbons in some of the calcite samples. A figure from the Grow et al. paper is included in Dr. Dublyansky's reply to the review. Even if there was a misunderstanding of the draft report as referring to commercial deposits, this is very clearly not the main point of the report or the data. Dr. Dublyansky has clarified the matter in his final report. The reviewers comments imply that the Grow et al. paper contradicts Dr. Dublyansky's data about hydrocarbons, which is clearly incorrect.
5. The reviewers should retract the following personal remarks and innuendoes:
 - o The allegations about Dr. Dublyansky's intentions made in the cover memorandum, which are discussed above.
 - o The allegation that Dr. Dublyansky was "trying to misrepresent geologic information to those unfamiliar with the Yucca Mountain area" by citing the Paintbrush fault when he possibly intended to invoke the Bow Ridge Fault (point 10, page 4 of the review). Dr. Dublyansky re-asserts that he did intend to refer to

the Paintbrush fault. The reviewers and Dr. Dublyansky may disagree on his interpretation, but the allegation of attempted misrepresentation was an incorrect speculation by the reviewers.

- o In view of the discussion above of the Mattson et al. and the Grow et al. papers, the reviewers should withdraw the comment that "Dr. Dublyansky seems to know little about this [hydrocarbons in relation to the study of Yucca Mountain] subject." In addition, their comment that his failure to review the Grow et al. paper before "may represent another example of the selective use of information" (point 19, p. 8) is inappropriate. It is quite normal for reviewers to refer researchers to additional papers or contrary evidence. It is not at all normal for them to speculate on the motives of the researchers. This remark is especially unwarranted inasmuch as the reviewers themselves were unaware of an article in a readily-available magazine that contains the work of researchers from institutions centrally involved in investigating Yucca Mountain, including the USGS, where all but one of the reviewers currently work.

If the reviewers other than Dr. Whelan are not responsible for the comments in the cover memorandum, then they should publicly disassociate themselves from them.

I know that the subject of fluid inclusions is one on which are widely differing views that are strongly held. Indeed, that is one of the main reasons that I sent the draft report to you for review. Scientific disagreements are common and, in an area as complex as the geology of Yucca Mountain, they are to be expected. But these disagreements can and should be addressed through respectful discussion of the issues. For instance, despite our different points of view, you and I have had a fruitful exchange of views. I really appreciate the openness with which you have approached our discussions and the scientific integrity that has led you to propose joint sampling and study of fluid inclusions in which Dr. Dublyansky would be among the principal researchers.

We owe electricity ratepayers, taxpayers, and future generations the benefit of honest, open, and respectful scientific discourse. The review by Whelan et al., because of its *ad hominem* remarks, seems aimed at stifling debate. This is a disservice to the public. I sent you the report for review, trusting that we would get a response that would do justice to the gravity of the task at hand. In that spirit, I look forward to hearing from you and from the reviewers.

Yours sincerely

Arjun Makhijani, Ph.D.
President