



Department of Energy

Carlsbad Area Office

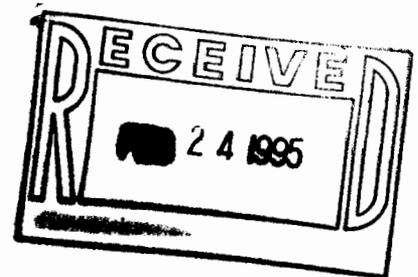
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Mr. Lindsay A. Lovejoy, Jr.
Assistant Attorney General of New Mexico
P. O. Drawer 1508
Santa Fe, NM 87504-1508

Dear Mr. Lovejoy:

This letter responds to your letter of ~~November 10, 1994~~, regarding the Repository Seals Program Position Paper. The latest revision will be sent to you shortly. We have incorporated approximately 200 comments in this latest version.

We appreciate your continued interest in the Systems Prioritization Method. If you have any questions regarding this letter or the attachment, please contact Mr. Robert Bills at (505) 234-7481.

Sincerely,


George E. Dials
Manager

Enclosure

cc w/o enclosure:
P. Brewer, SNL
J. Tillerson, SNL\AL



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Repository Seals Program Position Paper Questions and Responses

1. *There is reference to a "design requirements document" (draft at 2). Please provide a copy of this document or a citation to a publicly available source.*

Response: The pertinent information from the design requirements document is included in the other referenced documents, e.g., Van Sambeek et. al. (1993).

2. *Section 3 outlines the design concept but contains neither data as to design objectives nor data that demonstrate that the objectives can be obtained.*

Response: Section 4.3 Seal Baseline Information has been added to the document and this provides objectives and data.

3. *The assumption is made that salt in the middle column will consolidate to host rock density in 100 years. (draft at 10). What data support this assumption?*

Response: The reference cited, Nowak et. al. (1990), contains supporting information regarding salt reconsolidation. More recent calculations of shaft closure are given in Van Sambeek et. al. (1993).

4. *There is reference (at 10) to two forthcoming Sandia reports: one on the seal design and one on the materials selection and performance concerns. When will they be issued? Please provide copies as soon as possible.*

Response: A report on specifications for seal materials is due 5/95. A report on the seal design is pending. These reports are distributed to several state agencies upon publication and are available at Sandia National Laboratories.

5. *Statements are made as to the creep closure of salt creating a seal around the middle and lower short-term components (at 11). No data are provided in support; thus, the statements cannot be accepted. At present the PA does not model the performance of shaft seals. (See Performance Assessment Review Team's Independent Review of WIPP Performance Assessment Activities, Feb. 1994, at 6-23).*

Incorporation of models which reproduce water flow from overlying aquifers, the DRZ around the shafts and drifts, the reconsolidation of the DRZ salt, and Salado brine inflow in addition to the permeability and compaction of seal materials is necessary to identify the appropriate seal design parameters and to determine whether they can be met.

Response: Performance Assessment (PA) models the shaft seal as described in Section 4.1 *Revision to Shaft and Seal Systems*. The 1992 PA is contrasted with ongoing PA calculations. In the position paper a baseline for PA modeling is presented. Calculations which include brine inflow, representation of the DRZ, reconsolidation of salt and other features are being conducted.

6. *The draft states that the middle and lower salt columns are expected consolidate to the permeability of host rock within 100 years (at 11). No data are provided, and the statements cannot be accepted. One pertinent work (Van Sambeek et. al., 1993) in fact declares uncertainty as to the critical requirement as to the length of reconsolidated above the shaft station (at 96), notes unresolved concerns about the use of bentonite (at 72), crushed salt (at 76), compressed-salt blocks (id.), concrete (at 77), and quarried-salt blocks (at 85), and concludes that "a fully defensible recommendation of any of the presented alternatives cannot be made." (at 97).*

Response: We have sufficient information to conclude that are consolidated salt seal can achieve very low permeabilities - approaching that of the host rock - in 100 years. This performance is tied intimately to the ability of the short-term seal to prevent brine or gas ingress into the shaft. Tight permeabilities in the salt long-term seal are also dependent on how well the material can be placed in large volumes; i.e., if the salt is placed in the shaft at the required density, a credible seal can be assured for the repository.

With respect to the quote from Van Sambeek et. al., (1993, SAND92-7340) "*a fully defensible recommendation of any of the alternatives cannot be made*". The key phrase is **fully defensible**. This created problems with the draft position papers that were sent to the stakeholders and that the National Academy of Sciences and the Environmental Evaluation Group rightly took the WIPP project to task for.

The definition of fully defensible was so conservative that in many instances it violated scientific laws and thus was not scientifically sound. It is the position of the project that any model, position, or data

presented to the stakeholders, oversight groups, and regulators must be scientifically sound and be traceable to quality data.

7. *The draft acknowledges that "key questions remain" about seal performance (at 12). Such situation obviously creates stakeholder concern.*

Response: If key questions did not remain about several areas of the WIPP, then instead of a draft compliance application we would be preparing a final application. It is the intent of the project, through the SPM process, to define which key questions need to be resolved and to what level to ensure that the WIPP meets all applicable regulations. We agree that it is right and proper that stakeholders be concerned and it is our intention to answer these concerns by allowing stakeholders to participate in establishing the baseline used to determine compliance. We believe that by conducting a completely open and scientifically sound process we can best answer the stakeholder's concerns.

8. *The draft notes that certain aspects of the 1992 PA are not defensible (omission of post-Culebra strata, lack of a model of the full repository, permeability values). These are other sources of stakeholder concern. We would not agree with permeability values in excess of those shown in Table 4.1, as used for SPM calculations, without additional data support. The draft notes the lack of laboratory and large-scale field tests (at 1).*

Response: See response to questions 6 & 7 above with respect to defensibility and stakeholder concerns.

9. *For clarity, the draft should indicate exactly how the modeled elements relate to the elements of the seal design. The relations at present are unclear.*

Response: We agree. The next draft has an extended discussion of the relationship between the seal components and model elements.

10. *Why is a permeability of 10^{-13} m^2 used for the upper shaft seal in current PA calculations, yet the value used in SPM is sampled between 10^{-12} m^2 and 10^{-14} m^2 ? (Table 4.1; draft at 19).*

Response: Permeabilities in the 10/94 represent overly conservative estimates. Baseline permeabilities used in the SPM 2 baseline represent a distribution from 10^{-12} to 10^{-19} m^2 .

11. *Again why do PA calculations use lower shaft seal*

permeability values which are much lower than the values than the values used for SPM purposes? (Table 4.1; draft at 20).

Response: The 1992 PA used expected values. The SPM baseline initially used the most conservative values conceivable. This has been modified in the latest version to include an expected range, but we expect these values to change based on new information, stakeholder comments, oversight group comments, or regulator comments. The evolving nature of the values used is in line with the SPM concept.

12. *Why are permeability values for the upper shaft, backfill/experimental region, and panel seals different in PA calculations than in SPM analysis? (Table 4.1; draft at 21).*

Response: The 1992 PA did not consider vertical flow past the Culebra. Therefore, no characteristics of the upper shaft were needed in 1992. See response 11.

13. *Please provide the data supporting the current assumption as to initial brine saturation, which assertedly authorizes use of the range of 0.0004 to 0.052 (draft at 21).*

Response: This is addressed in Section 3.3.3 Initial Brine Content of the Waste in the Disposal Room and Cuttings Models. Essentially, the initial liquid phase saturation, which is actually the more proper way of phrasing it, was modified based on data from several thousand drums.

14. *There is reference to "guidance received from WIPP PA" which is "documented in QA files" (draft at 22). Please provide these materials.*

Response: These "materials" represent meeting minutes over a period from 9/93 to 2/94. The pertinent data is scheduled to be included in a published SAND report and will be made available to you.

15. *The statement (at 25) which assumes that human intrusion will not occur until 1000 years after disposal is gratuitous, since such assumption is indefensible.*

Response: The statement is included to demonstrate another example of how a possible long-term seal requirement of a panel seal would be reconciled with other possible scenarios.

16. *Section 5 extensively lists "internal" and "external"*

issues which need to be examined further. The Project will have to determine its position on these issues before a final white paper on seals can be presented. When such position becomes clear, it may raise further concerns on the part of stakeholders.

Response: We agree. And it is our intention that all Position Paper updates will be sent to and briefed to the stakeholders. We feel that providing this information is the best way to alleviate the concerns of the stakeholders.