



## ENVIRONMENTAL EVALUATION GROUP

AN EQUAL OPPORTUNITY / AFFIRMATIVE ACTION EMPLOYER

7007 WYOMING BOULEVARD, N.E.  
SUITE F-2  
ALBUQUERQUE, NEW MEXICO 87109  
(505) 828-1003  
FAX (505) 828-1062

February 1, 1996

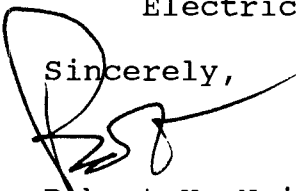
Mr. Steve Zappe  
Hazardous & Radioactive Materials Bureau  
New Mexico Environment Department  
P.O. Box 26110  
Santa Fe, New Mexico 87502

Dear Mr. Zappe:

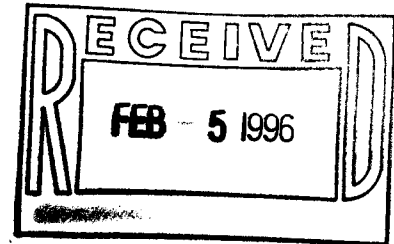
Enclosed is a copy of the letter discussed at the 53rd Quarterly Review Meeting on 25 January 1996. Note that there are test reasons for using backfill in the SPDV area.

DOE/WIPP-95 \*1341. June 1995. Westinghouse Electric Corporation, Waste Isolation Division. "Appendix 2, Letter from Wendell Weart to Mike McFadden dated October 16, 1994, on Backfill Considerations for the WIPP Facility," in the Experimental Area Management Plan Phase I. Westinghouse Electric Corporation : Carlsbad, NM.

Sincerely,

  
Robert H. Neill  
Director

RHN:BJK:pf  
enclosure



960203

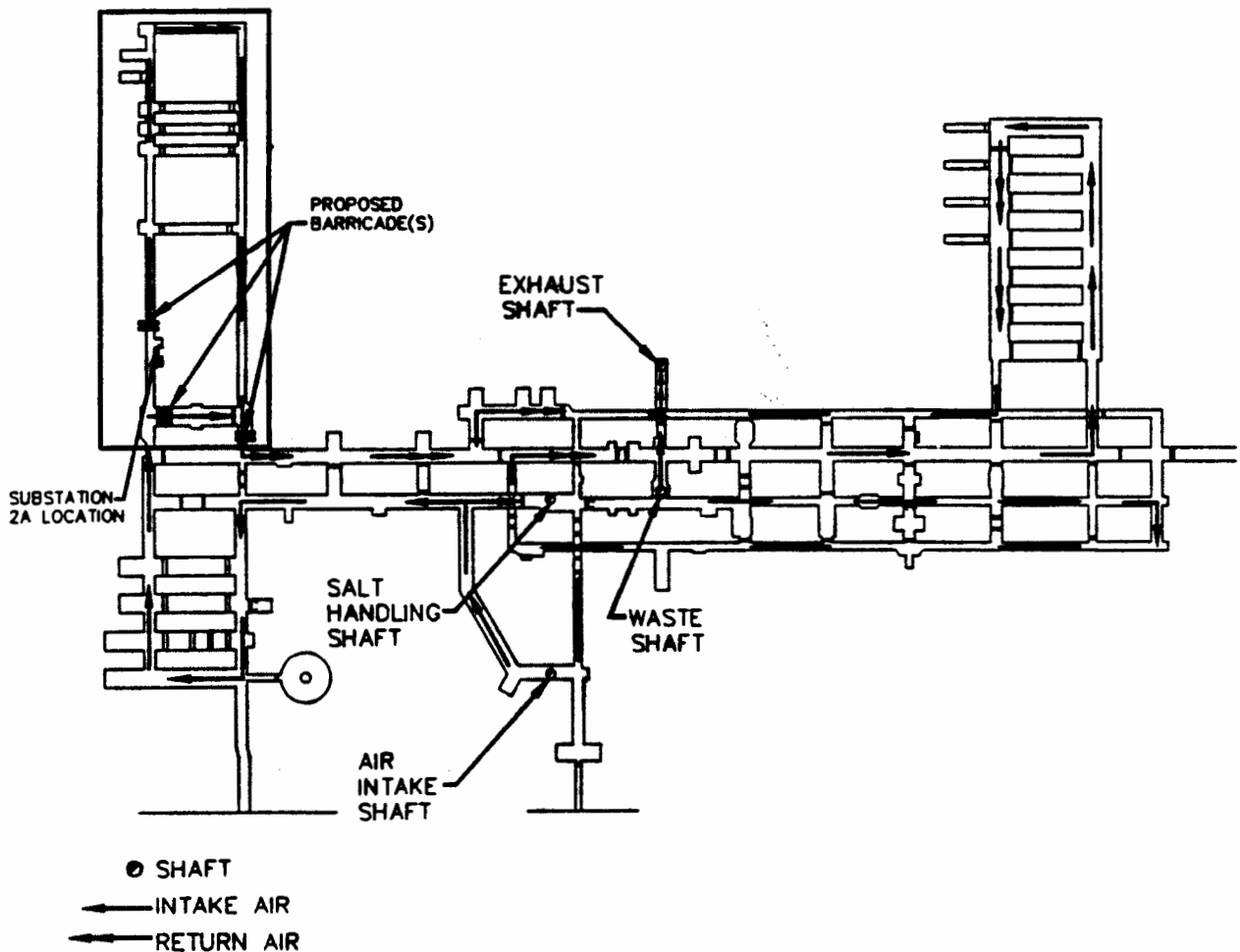


DOE/WIPP-95  
# 1341

# EXPERIMENTAL AREA

## MANAGEMENT PLAN

RECEIVED  
JUN 22 1995  
PHASE I ENVIRONMENTAL EVALUATION GROUP



June 1995

**APPENDIX 2**

Sandia National Laboratories

Albuquerque, New Mexico 87185

date: October 26, 1994

to: Mike McFadden, CAO



from: Wendell Weart, 6303

subject: Backfill Considerations for the WIPP Facility

This memo is to describe and transmit the results of a recent evaluation of potential backfill effects in the North End of the WIPP facility and to provide some qualitative comments on backfill in general.

**Background Information:**

Previous considerations related to backfilling the experimental area were documented in a memo from Joe Tillerson to Vernon Daub (2/6/91). Previous statements in project documents were reviewed. Considerations offered in that memo were that "no documents have been found which explicitly discuss general backfilling of all experiment drifts" but "there is a long history of general statements which can be readily interpreted as an implicit commitment to backfill all underground openings within the mine." Performance assessment concerns were identified in that memo. It was recognized that numerous analyses could be done to attempt to quantify the potential behavior of the underground formation as regards amounts of surface subsidence or displacements at aquifer or shaft seal locations. The impossibility of credibly relating the predicted displacements to changes in flow led to the conclusions that such calculations would serve no qualitative purpose related to reducing uncertainty in repository performance. It was concluded that it is unlikely that any of the PA concerns would result in a substantial change in the predicted performance of the repository system but that uncertainty in the predictive calculations would undoubtedly be increased if no backfill were emplaced. The recommendation offered in that memo was:

"Consistent with the implied commitments of previous documents and the suggested DOE policy of limiting the impact of underground construction and operation, it is recommended that the drifts and accessways in the North End of the WIPP facility be backfilled as soon as practical after experiment completion."

### Recent Evaluation:

The recent evaluation consists of a series of calculations done to assess if the North End of the facility could provide sufficient storage volume to significantly impact the gas pressures that might exist during postclosure. A brief review of performance considerations was also completed and considerations from international programs were identified.

The results of calculations related to available storage volume are in attachments 1 and 2. Attachment 1 (Butcher and Bingham to Tillerson 8/29/94) interprets the potential importance of the creep closure calculations presented in Attachment 2 (Arguello to Butcher 8/29/94). These results indicate that, for the presently-anticipated inventory:

- the North end (without backfill) can provide enough storage space to accommodate only 10-16% of the volume of gas generated in excess of lithostatic pressure
- specialty backfilling with strong, high porosity material is not warranted even if you could assure communication between the north and south ends of the facility because of the relatively small storage volume,
- it is unlikely that the North End of the WIPP facility can play a significant role in reducing gas pressures within the repository.

Changes in the inventory to reduce the gas generation potential of the waste would potentially make the use of the North End as a storage volume more attractive.

Performance considerations related to backfilling the North End have changed only since the previous evaluation. One additional consideration is that shaft seal designs now include a lower short-term component placed just above Marker Bed 136 (about 100 feet above the repository horizon) to retard gas flow; if the North End is not backfilled, there is a greater chance of establishing a flow connection between the repository and Marker Beds above this seal component. While this connection could lead to a flow path that bypasses the seal component, no estimates have been made as to flow related to this potential scenario.

The regulations for WIPP require the need for qualitative as well as quantitative enhancements to performance as part of the assurance requirements. It may be that credit can be taken for the use of backfill as part of the assurance requirements. Since the WIPP will be a "first-of-a-kind" facility for disposal of radioactive waste, it is anticipated that these "assurance" measures will be desired if they can be practically implemented. Qualitative arguments are that the use of backfill will mitigate fluid flow within the repository horizon, will reduce subsidence which could affect overlying aquifers, and will limit damage to the formation caused by the closure of the repository excavations. Performance calculations planned as part of the systems prioritization activity will consider the effects of some alternative backfill materials within the waste rooms (such as getter effects or the effects of bentonite) but will not consider a large number of possible materials or combinations (i.e. will not be a full sensitivity analysis). It

was the intense effort on S.P. that precluded an earlier sensitivity study for the backfill of experimental areas.

The final consideration I will offer is from comparisons with international programs. It is my understanding that all international repositories are planned to have the open space filled to the extent practical; none are planned to be left open or unfilled. A recent study was required by the regulator of the Asse facility in Germany regarding backfilling of the facility as part of the closure activities. The regulator indicated that the empty regions of the Asse facility must be backfilled if the waste already stored in the facility is to be allowed to remain in place. Because of the huge amount of open space in the Asse facility that resulted from decades of salt mining unrelated to nuclear waste disposal, this requirement is very impactful on the costs of closing the facility. The position taken within the international programs will certainly impact deliberations related to WIPP and could be used to assert that the WIPP program is not committed to taking practical steps that can reduce uncertainty in repository performance. Any decision to not place backfill in the WIPP waste rooms and excavations should be based on positive results from calculations and informed judgement that the absence of backfill would be an asset to long-term performance.

**Recommendation:**

**My recommendation is that backfill be placed in the open areas in the North End of the WIPP facility as part of meeting the letter and spirit of the assurance requirements.**

**cc:**

K. Hunter, DOE/CAO

R. J. Lark, DOE/CAO

J. Mewhinney, DOE/CAO

MS1322 J. R. Tillerson

MS1335 S. Goldstein

MS1337 D. E. Ellis, 6300

MS1341 D. Schafer, 6347

MS1345 P. Davis, 6307

SWCF FACILDSN/511 WBS 1.1.1.2.1

6121 File 511

960203