



# Weston Geophysical CORPORATION

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January 25, 1985  
WGC - R531-92

'85 JAN 31 P1:37

Benjamin Rice, Project Manager  
Geotechnical Branch  
Division of Waste Management  
U.S. NUCLEAR REGULATORY COMMISSION  
Washington DC 20555

WM-RES  
WM Record File  
D1003  
WESTON

WM Files 10, 11, 16  
Docket No. \_\_\_\_\_  
PDR \_\_\_\_\_  
LPDR B, H, S

Subject: DEA Review - Task Order 009  
Contract NRC-02-84-001

Distribution:

RICE

(Return to WM, 623-SS)

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Dear Mr. Rice:

Weston Geophysical has reviewed the DEA documents and generated comments as directed under Task Order No. 009. Review comments were provided to you and Weston Geophysical participated in review meetings during the week of January 14-18, 1985. Typed versions of hand-written comments [submitted January 16, 1985] for Cypress Creek and Vacherie sites have been resubmitted during this past week. With the submittal of the enclosed trip report, Weston Geophysical closes out activity authorized under Task Order No. 009.

If you have any questions or comments regarding this submittal, please call me.

Very truly yours,

WESTON GEOPHYSICAL CORPORATION

John P. Imse

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TASK 009 - TRIP REPORT

MEETINGS IN SILVER SPRING, MD  
FROM JANUARY 14 - 18, 1985  
DEA REVIEW COMMENTS

Review comments generated by the NRC staff, Weston Geophysical, Corps of Engineers, Lawrence Livermore, and independent consultants, Dick Berry and Rus Purcell, provided the framework for discussions of the DEA documents. Two overall comments were expressed by all the reviewers and applied to all of the DEA documents. First, a great deal of inconsistency is evident in each DEA, both internally and from the DEA to references. Second, the size of controlled area proposed at each site, particularly the salt sites, is minimal and is not defended in old cases.

Inconsistency with each DEA is evident when comparing Chapters 3 and 6, as well as when comparing separate sections in Chapter 6. Based on the nature of the inconsistencies, it would appear that Chapter 6 may have had separate authors from Chapter 3, and that Chapter 3 data are misrepresented in Chapter 6. In addition, inconsistencies within Chapter 6 indicate the possibility that portions of Chapter 6 may have been rewritten without assessing the impact on previous or succeeding sections. As a result, conclusions regarding favorable and adverse conditions may need re-evaluation.

It was also noted that some references were cited poorly. Conclusions in the DEA were based on only one facet of an explanation in the reference, not on the conclusion in the reference. Inappropriate referencing was also noted, particularly in the Yucca Mountain DEA. Undocumented and unreferenced geologic conclusions stated in a seismicity review paper were referenced repeatedly as definitive evidence regarding age of faulting. The references states the conclusion but does not provide evidence for the conclusion.

Size of the controlled area was a major issue discussed for the salt sites. Regulations allow a maximum of 10 kilometers from the edge of the repository to the accessible environment, a total area of at least 315 square kilometers. Less than 24 square kilometers is anticipated for a controlled area at each of the salt sites. The following concerns were raised by the reviewers regarding the stated size of controlled area:

1. Although the DEA authors state that data justify the small size of the controlled area, any conclusions regarding travel-time are based on the 10 kilometer radius [except the Dome Sites].
2. The smaller areas may not be large enough if fracture flow predominates over porous media flow at the sites.
3. Impact of the repository upon the region is based on the smaller area, not the large area used for travel time conclusions. The impact of a 315 square kilometer facility will certainly be greater than a 24 square kilometer facility.
4. If data require the maximum area allowed, sites such as Richton Dome and Davis Canyon cannot have areas that large due to proximity to National Parks, State and National forests and towns.

Although the reviewers recognized that the final size of the control area is determined based on site characterization activities yet to be conducted, the severe limitations on expansion of the areas and impact of the larger areas has not been addressed in these documents.

JANUARY 14, 1985

The Permian Basin sites were the topics of the first day of discussions. The DEA for Deaf Smith County was used as a guide for evaluating review comments, although the Swisher Site was discussed for those topics where the two sites differed.

Major technical concerns raised during the meeting consisted of the following:

1. Dissolution
  - a. Internal versus external dissolution patterns and rates.
  - b. Paleo versus ongoing dissolution.

2. Stratigraphy
  - a. Salt purity for candidate host bed.
  - b. Thickness and frequency of interbeds relating to flexibility in locating repository and fluid flow.
3. Structure & Tectonics
  - a. Pathways for fluid migration, fractures.
  - b. Seismic activity in region.
  - c. Possible offset of host bed further constraining flexibility in location.
4. Natural Resources
  - a. Potential for hydrocarbon resources, based on cited references, may be higher than presented in DEA, especially if over 300 square kilometers in controlled area.
5. Surface Characteristics
  - a. Playas and how they may impact surface facilities.
  - b. Channel deposits in surficial materials and affect on engineering design.

JANUARY 15, 1985

Davis Canyon and Lavender Canyon sites in Utah and Vacherie Dome in Louisiana were discussed during the meetings on Tuesday. Because the Davis and Lavender canyon sites are adjacent, review of these sites used Davis Canyon DEA as a guide for discussions.

Major comments for the Davis Canyon/Lavender Canyon DEA were the following:

1. Dissolution
  - a. Especially related to major structural features in the area.
2. Stratigraphy
  - a. Primarily surficial stratigraphy.
3. Structure & Tectonics
  - a. Pathways for fluid migration in fracture flow.
  - b. Seismic activity for region.

c. Faulting in site area; basement fault in site area, ambiguity over extent of fault into repository levels.

4. Natural Resources

a. Hydrocarbon, given that much of seismic data used for DEA is from recent [1982] speculative survey by oil companies, potential may not be as low as presented.

b. Potash resource potential may be greater, constraints presented in DEA not based on much well control.

c. Uranium resources, particularly if very large control area necessary, may be significant.

5. Springs & Surface Seeps

a. Related both to structure and geomorphic features.

b. As indications of significant fracture flow pathways for groundwater.

Major comments concerning the Vacherie Dome site included:

1. Dissolution

2. Structure & Tectonics

a. Primary overdome structure.

b. To a lesser extent, related to seismic design.

JANUARY 16, 1985

Richton and Cypress Creek domes were discussed during this day of meetings. These two sites are very close to one another, but they were discussed separately because of problems unique to each site. An editorial comment made by all the reviewers at the meeting was that many portions of the Cypress Creek DEA were poorly compiled from the Richton DEA, and resulted in Richton mentioned instead of Cypress Creek as well as incomplete sentences and paragraphs.

Major comments for Richton Dome include:

1. Structure/Tectonics/Halokinesis/Dissolution

a. Although this is a broad comment, the topics are so interrelated at the dome sites that separation is not possible. Overdome structure, dissolution, and resultant salt movement concentrated over spines of dome growth were only partially addressed. In fact, this was the only dome where dissolution rates, based on cap rock thickness, were not presented.

b. Uncertainty regarding basement faults and resultant seismic risk.

2. Natural Resources

a. Because the overhang on the dome flanks have only recently been detected, past petroleum exploration may not be a legitimate guide to resource potential.

3. Stratigraphy

a. Particularly as it relates to overdome structure and evidence for uplift/subsidence of the dome.

Major comments for Cypress Creek:

1. Human Interference

a. Existing boreholes through repository levels and within the proposed workings certainly affect an adverse condition and are a significant uncertainty for a disqualifying condition.

b. Existing petroleum production on flanks of dome.

2. Structure/Tectonics/Halokinesis/Dissolution

a. Uncertainties regarding dissolution and uplift rates as well as concurrent halokinesis.

b. Basement faulting and resultant seismic risk.

c. The origin of Perry Basin and how it might affect 'a' and 'b'.

3. Stratigraphy

- a. Related to over dome structure and evidence for uplift/subsidence at the site.

JANUARY 17, 1985

The Yucca Mountain site was discussed in great detail on Thursday. Major comments regarding the Yucca Mountain site included:

1. Structure & Tectonics

- a. Age of faulting at the site; references used as back-up were not geology studies, they were seismicity studies with unreferenced geologic conclusions.
- b. Seismic design values seemed low.
- c. Existence of Ghost Dance Fault in proposed repository area with up to 21 meters of offset. How might this affect fluid flow and how will it affect repository workings if repository host bed is offset 21 meters?

2. Hydrothermal Activity

- a. Existence of travertine and opaline silica in fault zones adjacent to the mountain regarding high temperature fluid flow from depth, potential for volcanic activity, and age of faulting.

3. Stratigraphy

- a. Particularly regarding lack of surficial geologic work and how this can be used for age dating faults and determining erosion rates.

JANUARY 18, 1985

Major comments generated during the review of Basalt Waste Isolation Project on the Hanford Reservation included:

1. Stratigraphy

- a. Vertical and lateral continuity of proposed host rock unit.

2. Structure & Tectonics

- a. Seismic design conclusions.
- b. Nature of hydrologic barrier west of the RRL.
- c. Postulated faulting in site area based on seismic reflection, breccia in drill core, and aeromagnetic data presented in ST-19.
- d. Tectonic model and prediction of faulting at depth associated with Umtanum Ridge - Gable Mtn. structure.
- e. Uplift rates based on inordinate length of time resulting in low rates.

3. Groundwater Flow

- a. Particularly related to high flow rates through fractured rock.