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DEPARTMENT OF ENERGY & TRANSPORTATION

Watkins Building, 510 George Street  
Jackson, Mississippi 39202-3096  
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May 31, 1985

Mr. Jeff O. Neff  
Project Director  
U. S. Department of Energy  
Salt Repository Project Office  
505 King Avenue  
Columbus, Ohio 43201-2693

Dear Mr. Neff:

WM Record File  
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WM Project 1  
Docket No. \_\_\_\_\_  
PDR   
LPDR \_\_\_\_\_

Distribution: LINEHAN  
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Re: State of Mississippi Comments on  
the Annotated Contents for the  
Preparation of Site  
Characterization Plans

Enclosed are the comments prepared by representatives of the Mississippi Department of Natural Resources, Bureau of Geology and staff members of this Agency's Nuclear Waste Program on the subject document.

The comments are submitted somewhat belatedly due to transitions within this Agency during the month of May, 1985. I trust that you will favorably consider the recommendations we have suggested.

Thank you for your consideration and cooperation in this matter.

Yours truly,

John W. Green  
Interim Director

JWG:fpf  
Enclosures

cy: Mr. Joseph Bunting, NRC

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PDR WASTE  
WM-1 PDR

# DEPARTMENT OF ENERGY & TRANSPORTATION

## MEMORANDUM

TO: Ronald J. Forsythe ~~RF~~  
Manager, Nuclear Waste Program

DATE: May 31, 1985

FROM: Kelly A. Haggard *KAH*  
Nuclear Waste Specialist

SUBJECT: Annotated Outline for the Site Characterization Plan

I have reviewed the Annotated Outline (AO) for the Site Characterization Plan (SCP) and offer the following comments. This is a very general document which makes it difficult to comment. It is obvious that there is not a specific level of data the SCP must contain. It will merely contain the data that is currently available, whether the amount is sufficient to support a conceptual design or not, and a list of the data that is needed. It appears Part A will be a rewrite of the Environmental Assessment.

Supporting documents for the SCP have been mentioned. They include an Exploratory Shaft Test Plan, a Surface-Based Test Plan, an Environmental Characterization Plan and a Socioeconomic Characterization Plan. Without knowing exactly what these documents will contain it is impossible to determine if the AO is sufficient.

The one document of particular interest to me is the Exploratory Shaft Test Plan (ESTP). It is unclear whether the method of construction for the exploratory shaft will be contained in the SCP or the ESTP. The basis for the locations of the shafts and the method of construction are especially important due to the fact that if a site is chosen for a repository the exploratory shafts may be incorporated into the repository design. The SCP should contain more information about the location and construction of the exploratory shafts.

I reserve the right to comment more fully at the time when the outlines of the supporting documents and/or the actual SCP and its supporting documents are received.

KAH:pf



MISSISSIPPI DEPARTMENT OF NATURAL RESOURCES  
Bureau of Geology  
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(601) 354-6228



M E M O R A N D U M

TO: Alvin R. Bicker, Jr.

FROM: David Booth *David Booth*

DATE: May 14, 1985

SUBJECT: Review of: 1) DOE Annotated Outline for Site Characterization Plans (AO); 2) NRC Proposed Revision 1 to Regulatory Guide 4.17; and internal memoranda from M. B. E. Bograd and C. W. Stover on the AO and Regulatory Guide 4.17

I have read the memos of Stover and Bograd on the DOE/AO and NRC Regulatory Guide 4.17 and fully concur with their review of these documents. Following are additional comments and questions concerning these documents.

1. Section 3.9 - Site Hydrogeologic System  
Neither the AO or the Regulatory Guide appear to make any distinction between the level of detail necessary for differentiation, testing and evaluation of geohydrologic units when proceeding from regional to site ground-water modeling programs. In discussions in Section 3.9 numerous references are made as to utilizing the "principal hydrogeologic units" in site ground-water modeling and travel time calculation efforts. The concern here is that DOE may utilize regionally-defined geohydrologic units as the "principal hydrogeologic units" of a site for near-field ground-water modeling and subsequent travel time calculation efforts. The State of Mississippi should be technically opposed to the utilization of regional hydrogeologic units to model near-field hydrology because site hydrologic models based on regional hydrologic units may fail to identify and evaluate all potential flow paths to the accessible environment. Site characterization activities should identify and investigate discrete, mappable (10' or greater) hydrologic units for each site for use in site hydrologic modeling and travel time calculations to the accessible environment.

It appears that Section 3.9 should be expanded to identify the degree of detail necessary for site hydrogeologic investigation, modeling, and travel time calculations vs. regional investigation and modeling efforts.

2. **Section 1.7 - Mineral and Hydrocarbon Resources**  
The discussions in Section 1.7 and the cited references only provide for mineral resource evaluations of "extracted" natural resource commodities. As a result, it remains unclear to what extent salt domes of acceptable depth and lateral extent for underground storage development will be evaluated. The State of Mississippi has taken the position that salt domes suitable for underground storage development should be considered as finite natural resources, and that the relative scarcity and value of these resources should receive perhaps greater emphasis than the actual by-product commodity (salt) being extracted.

It appears that Section 1.7 should be expanded and clarified to ensure that the relative value, scarcity, and rate of utilization of salt dome resources for underground storage development will be properly addressed and evaluated in site characterization plans for salt dome sites.

3. **Section 1.3.2 - Tectonic History (Candidate Area and Site)**  
In discussions in this section reference is made to identification of "major" faults and fractures. It would seem prudent that all faulting or fracturing at a proposed site should be identified and evaluated, as minor faults may affect the geohydrologic system, travel time calculations, or the waste isolation capabilities of the site. All faulting should be identified and evaluated, regardless of whether faulting or fractures are considered to be "major" by DOE.

The State of Mississippi should consider recommending that the term "major" be deleted from this section discussion.

4. **Appendix A-3**  
In this section of the AO, DOE states that it would be impossible to identify all parties involved with site characterization activities as these involved parties will change periodically during site characterization. The Site Characterization Plan has been identified as being an evolving document and present plans call for semi-annual revision of the document. Perhaps the State of Mississippi should request that this section be changed to provide for identification of all parties involved with site characterization activities "to the extent practicable" during each revision of the SCP for a given site.



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M E M O R A N D U M

TO: Alvin R. Bicker, Jr.  
FROM: Michael B. E. Bograd *Michael B. E. Bograd*  
DATE: May 13, 1985  
SUBJECT: Review of DOE Annotated Outline for Site Characterization Plans  
and NRC Proposed Revision 1 to Regulatory Guide 4.17

I have read Curtis Stover's memo to you on this subject and agree with each of his points. Following are a few additional points I would like to make.

I would like to expand on Stover's point 4. Regarding the issue of semiannual reporting (page xii of the AO and page ix of R.G. 4.17), NWPA Section 113(b)(3) states "During the conduct of site characterization activities at a candidate site, the Secretary shall report not less than once every 6 months to the Commission and to the ... Governor and legislature of the State in which such candidate site is located...." (emphasis added). The state should demand that the DOE document, if not the NRC document, specify reporting to the state as required by the Act. Also, DOE is wrong (AO p. xii and A-2) to change the phrase "site characterization" to "shaft sinking", supposedly to be in agreement with NWPA. Actually, the original language of NRC's Regulatory Guide agrees with NWPA and the DOE change does not.

A wording change was made in two places on page xi of the AO that will allow DOE to postpone resolving problematical issues. In the 11th-12th lines and in the last bullet the phrase "to obtain data" and "to obtain data to be used" were added to the language of the Regulatory Guide. These phrases should be deleted so that the SCP can be a mechanism for resolving problems, not simply for obtaining data. In addition, the new sentence added to the end of the 3rd paragraph on page xiv (beginning "The word...") also will allow DOE to defer resolution of any problems encountered during characterization.

I am afraid that Part A of the AO places too much reliance on requiring presentation only of available data. Throughout the text are found phrases such as "available results," "to the extent information is available," "if such information is available," "based on presently available data," and "will provide available information." In some cases, the available data may not provide an adequate data base upon which to design the SCP. For example, the size, shape, and boundaries of Richton Dome should be known prior to selection of characterization shaft sites.

Should Richton Dome be selected for characterization, the shaft sites may be selected before these parameters are properly defined, which they are not at present with available data. As another example, Section 1.6 Drilling and Mining "will provide available information on the effects of the active and abandoned wells, boreholes, and excavations...". The available information is inadequate to properly assess potential problems with the sulfur exploration holes over Richton Dome.

I am concerned that many sections of the AO will contain generic data rather than the site-specific data required for adequate study, or may contain inadequate site-specific data. Some of the sections with which I was particularly concerned on this point include 3.6, 3.7, 3.9 (though the text of parts of 3.9 seems to indicate that site-specific data will be used), 4.1, 4.2, 5.1, 6.1.5, and 7.1 (which contains the following: "Uncertainties in these characteristics will be quantified to the extent possible. A reasonable expected range for each characteristic will be established, either through quantitative analysis or engineering judgment."). Site-specific data must be used where necessary; generic data could be misleading in some cases.

Many sections state that both generic and site-specific data will be presented (for example, section 2.2.2). Other sections just mention "data," without specifying whether site-specific or generic. It is very important throughout the Annotated Outline and the SCP written from it that site-specific data and generic data be clearly labelled as to which they are, and differentiated from each other. I noticed only one place, in section 6.1.2, where it was stated that the source of the data will be discussed.

MBEB:cd



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M E M O R A N D U M

TO: Alvin R. Bicker, Jr., Bureau Director  
FROM: Curtis W. Stover *Curtis W. Stover*  
DATE: May 13, 1985  
SUBJECT: Review of U.S./DOE Annotated Outline For Site Characterization Plans, February, 1985, and U.S./NRC Proposed Revision I to Regulatory Guide 4.17, February 1985.

The above referenced documents along with the U.S./NRC Draft Generic Technical Position on Design Information Needs in the Site Characterization Plan were submitted to this bureau under a cover memorandum from Kelly Haggard to Nuclear Waste Technical Review Committee, dated April 19, 1985, requesting comments by May 14, 1985.

Submitted below are comments only on the two subject referenced documents.

1. The Annotated Outline For Site Characterization Plans (AO) does not specify how many site characterization plans will be prepared.
2. The format and contents of the AO closely follow and in many places are word for word the same as the NRC's Regulatory Guide 4.17 (RG-4.17).
3. Part A, in particular chapters 1-5, will summarize data collected prior to site characterization activities. It appears this will be the bulk of the AO and in effect will be a repeat of the Environmental Assessments (EA's).
4. Page xii of the AO and page ix of the RG-4.17 provide for semi-annually reporting to the NRC after "commencement of site characterization activities". No such provision is made for reporting to the states. There is a difference of language here, noted in table 1 of attachment A-2. The AO states "after commencement of shaft sinking" and RG-4.17 states "after commencement of site characterization". The DOE claims their language is in conformance with the NWA. This should be verified.

5. Page xv of the AO and xii of RG-4.17 provide for the sharing of original raw data with NRC, accessible either at the site or other appropriate locations. There is no provision for sharing such data with the states.
6. Page xvi of the AO and page xiv of the RG-4.17 address the quality and color of paper and ink density to be used in the SCP. There is no mention of any special ingredients to be used in the ink nor any specifications for longevity and legibility of paper and ink.
7. Introduction pages 1 and 2 intends to discuss history of site investigation, the NWPA, and EA's. It is not clear why these well-known documents cannot stand on their own without being reprinted here. Certainly the purpose of the NWPA is familiar to all reviewers.
8. Chapter 1, Section 1.8.3, page 14, is the only part pertinent to a site characterization plan.
9. Chapter 2 - \*Geoengineering, page 15 states "...site-specific information", if available." The asterisk explains that site specific information does not imply that a shaft has been sunk. I would hope that at this late stage some site specific information has been generated. Also, it seems unnecessary to explain that a shaft has not been sunk prior to site characterization.
10. Chapter 8, 8.3.2.3-2, "In evaluating overall repository performance, no credit is taken for the near field host rock that cannot be characterized adequately." This should disqualify a site.
11. Neither the AO nor the RG-4.17 gives much insight into what site characterization will actually be.

# DEPARTMENT OF ENERGY & TRANSPORTATION

## MEMORANDUM

TO: Mr. Ronald J. Forsythe   
Manager, Nuclear Waste Program

DATE: May 15, 1985

FROM: Don Christy 

SUBJECT: Review of DOE's "Annotated Outline for Site Characterization Plans" (AO) and NRC's "Proposed Revision 1 to Regulatory Guide 4.17, Standard Format and Content of Site Characterization Plans for High-Level Waste Geological Repositories" (SFC)

I have reviewed above listed documents and found them to be very similar. The AO has reorganized some sections and provided clarification of presented information in others. The outline has also added sections pertaining to the repository design basis and current design description. The following comments reference pages in the "Annotated Outline".

1. Page xvi - DOE indicated that a nonproprietary summary will be provided for proprietary documents from which information is obtained or referenced. A nonproprietary summary calls for an interpretation and is therefore very subjective and based on the author's opinion. It is not stated that this data or documents would be available for independent review by NRC/State contractors who could hold this information proprietary and generate their own evaluation of the material.

2. Page 17 - Section 2.5 THERMAL and THERMOMECHANICAL PROPERTIES - LARGE SCALE needs to add a section to be entitled, "Changes in Geoenvironmental Properties due to Thermomechanical Effects". This subject is implied under Section 2.7 SPECIAL GEOENGINEERING PROPERTIES. This subject is significant enough to have its own section describing the field and laboratory tests done on this aspect.

3. Page 26 - Section 3.94 Ground-water Velocity and Travel Time should present a list of the assumptions made and the parameters used to estimate the ground-water travel times. The State of Mississippi has objected to DOE's predicted travel times because not all of the possibilities of travel media, modes and directions have been taken into account to provide the shortest travel times.

4. Page 33 - Section 4.2 GEOCHEMICAL EFFECTS OF WASTE EMPLACEMENT should include sections entitled, "Changes in Water Chemistry Due to Gamma Radiolysis" and "Effects of Gamma Radiolysis on Radionuclide Migration". The effects of radiation on the surrounding environment can cause several geochemical changes which could produce problems in radionuclide migration and water chemistry.

MEMORANDUM to Ronald J. Forsythe  
May 15, 1985  
Page Two

This document (AO) is a generalized document that is yet to have a specific application. Until the actual Site Characterization Plan (SCP) is issued, very little substantive comment can be made. I reserve the right to comment further on the above listed issues or on any other issues when the SCP is released.

It should be noted that in DOE's refinement of NRC's format, DOE has refined areas to specifics. By doing this they may have ignored the interconnection that these issues have with one another.

It should also be noted that a strict definition of the "accessible environment" must accompany this plan. This is called for in Section 3.9.3.1. Ground-water Flow System Conceptual Model.

Section A of the SCP calls for known data, but uses words and phrases like "assumption", "estimates", "if available", "data from similar sites" and "general". NRC is apparently not expecting much site specific data in Section A, but is expecting plans to obtain needed data in Section B. I believe that Section A will be a restatement of Chapter 3 of the Environmental Assessment.

DC:pf

The Mississippi Mineral  
Resources Institute

May 10, 1985

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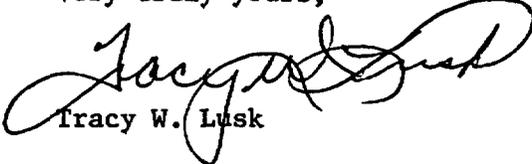
  
Mr. Ron Forsythe  
Department of Energy & Transportation  
Watkins Building  
510 George Street  
Jackson, Mississippi 39202

Dear Ron:

Herewith are two copies of the comments on the NRC Format and  
Content of Site Characterization for High-Level-Waste Geologic  
Repositories and the DOE Annotated Outline for Site Characterization  
Plans, prepared by Charles Swann.

Please keep us posted.

Very truly yours,

  
Tracy W. Lusk

nr  
enclosures

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COMMENTS ON STANDARD FORMAT AND CONTENT OF  
SITE CHARACTERIZATION PLANS FOR HIGH-LEVEL-WASTE GEOLOGIC REPOSITORIES

1.2.3 Stratigraphic Framework of Site

- 1) The stratigraphic code referenced on page 6 has been replaced by a new stratigraphic code.\* The most recent stratigraphic code should be used in all investigations concerning stratigraphy.

\* North American Commission on Stratigraphic Nomenclature, 1983. North American Stratigraphic Code: American Association of Petroleum Geologists Bulletin, Vol. 67, no. 5, pp. 841-875.

1.3.2.2 Faulting History

- 1) Often lineaments determined from satellite and high altitude photography represent surface expressions of faults. The NRC should consider lineaments as suspected faults and require that they be evaluated when present on the site.

1.7.1 Mineral Resources

- 1) We suggest that industrial rocks and minerals be included along with mineral resources in this section. Inclusion of the industrial rocks and minerals would cover such resources as clay, dimension stone, and sand and gravel which are usually not considered mineral resources.

#### 3.6.4 Hydraulic Characteristics of Principal Hydrogeologic Units

1) There is no mention of the possibility of solution cavities in calcareous beds within the site. The presence of these solution features are especially important to the domal salt sites where the salt stock has penetrated significant calcareous aquifers. For example, in Mississippi, Gandl (1982)\* illustrated the Oligocene Aquifer extending into northern Perry County near the Richton site. Gandl also states that water is produced from solution channels in limestone beds from this aquifer with conductivities up to a maximum of 60 feet per day. Therefore we suggest that the NRC consider adding a section on the characterization of solution cavities in and around the sites.

\* Gandl, L.A., 1982. Characterization of Aquifers Designated as Potential Drinking Water Sources in Mississippi. U.S. Geological Survey, Water-Resources Investigations Open-File Report 81-550. 90 p.

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MAY 13 '85

NWP

COMMENTS ON THE D.O.E.

ANNOTATED OUTLINE FOR SITE CHARACTERIZATION PLANS

1.3.2.2 Faulting History

Lineaments determined from satellite and high altitude imagery often represent surface expressions of faults. The DOE should consider lineaments as suspected faults and any lineaments present on the site should be evaluated.

1.7.1 Mineral Resources

The term "mineral resources" usually implies minerals with a significant amount of metallic ions. We suggest that industrial rocks and minerals, which include sand and gravel, clay, and other non-metallic resources, be included in the discussion of the economic geology of the site.

3.6.4 Hydraulic Characteristics of Principal Hydrogeologic Units

The possibility of solution cavities within calcareous units on the site are not considered in this section. The presence of solution cavities are especially important at the domal salt sites where the salt stock has intruded the calcareous aquifers. Gandl (1982)\* states that water is produced from solution channels within the Oligocene Aquifer and has a maximum conductivity of 60 feet per day. Therefore we suggest that characterization of solution cavities be included in the Site Characterization Plan.

\* Gandl, L.A., 1982. Characterization of Aquifers Designated as Potential Drinking Water Sources in Mississippi. U. S. Geological

8.2.1.1 Mission Plan Issues

In our opinion, Mission Plan Issues should not be included in the SCP, A review of the NRC Standard Format, although not excluding Mission Plan issues, appears to be directed to site specific needs rather than general topics. We suggest that Mission Plan issues be presented in a separate document, thereby focusing the SCP on important issues and needs relating directly to the site.