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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

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WM Record File

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WM Project 16

Docket No. \_\_\_\_\_

PDR

LPDR

MEMORANDUM FOR: Robert E. Browning, Director  
Division of Waste Management

FROM: Tilak R. Verma, Senior On-Site  
Licensing Representative  
Salt Repository Project (SRP)

Distribution:

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MRK

SUBJECT: SRP SITE REPORT FOR THE WEEK OF MAY 7, 1984

1. Reviewed a draft of the report of the QA audit conducted at USGS by DOE and ONWI in early April. The results of the audit indicated some improvements that have been made by USGS; however, continued efforts are needed to bring the program to a satisfactory level. I shall send you a copy of the report when it is finalized.
2. On May 8-10, 1984, I attended (as an observer) an ONWI QA audit of Woodward-Clyde Consultants (WCC) at their office in Walnut Creek in California. An audit checklist is attached.

While in Walnut Creek, I met most of Woodward-Clyde's geotechnical staff, on a one-on-one basis. Attached is a list of WCC reports for ONWI for the period of 1979-1984.

3. A draft copy of the Paradox Basin Project QA Manual is also attached for your information.

*Tilak R. Verma*

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Senior On-Site  
Licensing Representative  
Salt Repository Project

TRV:2502B

Attachments

- cc: M. Bell  
J. Bunting  
H. Miller  
M. Knapp  
J. Greeves  
F. Cook  
P. Prestholt  
J. Linehan  
R. Johnson  
N. Numark

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WCC Reports for ONWI (1979 - 1984)

Characterization Reports

Woodward-Clyde Consultants, 1983. Overview of the Regional Geology of the Paradox Basin Study Region, ONWI-92, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio. (Files in storage and in drafting; report in PBP library.)

Woodward-Clyde Consultants, 1982. Geologic Characterization Report for the Paradox Basin Study Region, Utah Study Areas, ONWI 290, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio. (5 Volumes - files in activity leader officed, report in library.)

Decision Reports (prepared jointly by Woodward-Clyde Consultants and Bechtel Group, Inc.)

Bechtel Group, Inc. and Woodward-Clyde Consultants, 1982. Summary Characterization and Recommendation of Study Areas for the Paradox Basin Study Region, ONWI-36, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio. (Files in storage and drafting; report in library.)

Borehole Completion Reports

\* Woodward-Clyde Consultants, 1982. Completion Report for Gibson Dome No. 1 Borehole, Gibson Dome Study Area of the Paradox Basin Region, ONWI 388, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

\* Woodward-Clyde Consultants, 1982. Completion Report for Elk Ridge No. 1 Borehole, Elk Ridge Study Area of the Paradox Basin Region, ONWI-401, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

\* Woodward-Clyde Consultants, 1982. Completion Report for E. J. Kubat Borehole, Elk Ridge Study Area of the Paradox Basin Region, San Juan County, Utah, ONWI-403, prepared for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

\* - Files in Jack Hardin's office, reports in Library (or drafting room store room.

Topical Reports

Quaternary/Geomorphology (see N. Biggar for files and reports)

Biggar, N., 1984 Quaternary Studies in the Paradox Basin, Southeastern Utah, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

Biggar, N., and Bettancourt, J. L. 1984. Late Quaternary Vegetation and Climate for the Canyonlands of Southeastern Utah, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

#### Stratigraphy

McCleary, J., Rogers, T., and Ely, R., 1983. Stratigraphy, Structure and Lithofacies Relationships of Devonian Through Permian Sedimentary Rocks of the Paradox Basin and Adjacent Areas in Southeastern Utah, ONWI-485, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

McCleary, J. 1984. Stratigraphic and Structural Configuration of the Navajo (Jurassic) through Ouray (Mississippian-Devonian) Formations in the Vicinity of Davis and Lavender Canyons, Southeastern Utah Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

#### Structural Geology (See I. Wong for files and report)

Kitcho, C. A., Seismic Reflection, Gravity, and Aeromagnetic Studies of Geologic Structure in the Gibson Dome Area, Southwestern Paradox Basin, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

#### Seismology (See I. Wong for files and report)

Wong, I. G.. Seismicity of the Paradox Basin and the Colorado Plateau Interior, ONWI-492, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

#### Hydrogeology (See J. Thackston for files and report)

Thackston, J. W., Preslo, L. M., Hoexter, D. F., and Donnelly, N., 1983. Results of Hydraulic Tests at Gibson Dome No. 1, Elk Ridge No. 1, and E. J. Kubat Borehole, ONWI-491, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

Thackston, J. W. Mangarella, P. A., and Preslo, L. M., 1983. Preliminary Hydrologic Budget Studies, Indian Creek Watershed and Vicinity, Western Paradox Basin, Utah, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

Dunbar, D. B. and Thackston, J. W., 1984. Status Report: Numerical Modeling of Ground Water Flow in the Paleozoic Formations, Western Paradox Basin, Utah, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

#### Geochemistry (see J. Thackston for files and reports)

McCulley, B. L., 1983. Marble Canyon Spring Sampling Investigation, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

McCulley, B. L., Thackston, J. W., and Preslo, L. M. 1984. Status Report: Geochemical Interactions Between Ground Water and Paleozoic Strata, Gibson Dome Area, Southeastern Utah, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

Geotechnical (see J. O'Rourke for files and reports)

Nelson, R. A., Kocherhans, J. G., and Schnapp, M. R., 1982. In Situ and Laboratory Geotechnical Test Results from Borehole GD-1 in Southeast Utah, ONWI-400, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

O'Rourke, J., 1984. Rock Index Properties for Geoengineering at Paradox Basin, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

Alternate Study Areas (see T. Grant for files and report)

Grant, T. A., 1983. Investigation of Potential Alternate Study Areas in the Paradox Basin Region, ONWI-482, Draft prepared by Woodward-Clyde Consultants for the Office of Nuclear Waste Isolation, Battelle Memorial Institute, Columbus Ohio.

LETTER REPORTS

Hydrogeology (see J. Thackston for files and reports)

Woodward-Clyde Consultants, 1982. Preliminary Results of Computer Modeling of Ground Water Flow Systems.

Woodward-Clyde Consultants, 1982. Results of Laboratory Measurements of Porosity and Permeability on Core Samples from Gibson Dome No. 1 Borehole and Comparisons With Field Measurements, Paradox Basin, Utah.

Woodward-Clyde Consultants, 1982. Hydrogeologic Testing at E. J. Kubat Government No. 1 Borehole.

Woodward-Clyde Consultants, 1982. Hydrogeologic Testing at Elk Ridge No. 1 Borehole.

Miscellaneous

Woodward-Clyde Consultants, 1982. Land Status Study, Davis Canyon/Lavender Canyon Area. (see T. Rogers for files)

Woodward-Clyde Consultants, 1983. Borehole Resistivity Study, Phase I. (see J. Hadin for files and report)

- ① Alternate Study Areas - Grant - final
- ② Lithofacies - <sup>McClary</sup> ~~Thackston~~ - final August 1983  
OHWI-485  
file no. 2364
- ③ Geophysics - Kitcho/wong - ONWI review
- ④ Pock Rat/paleoclimate - Biggar - final being prepared
- ⑤ Seismology - wong - final
- ⑥ ER-1, Kubat, GD-1 hydro testing - Thackston - final
- ⑦ Quaternary dating - Biggar - in ONWI review
- ⑧ Stratigraphy - McClary - ONWI review
- ⑨ Water Balance - Thackston - final
- ⑩ <sup>100%</sup> Salt Valley ACR - Biggar - final 2079
- ⑪ Rock-Water - McCulley/Sayala - in <sup>ONWI</sup> review 2051
- ⑫ Marble Canyon - ~~McClary~~ <sup>McCulley</sup> - being revised <sup>per ONWI</sup> comment
- ⑬ Hydro Modeling - Thackston - about ready for ONWI review
- ⑭ GD-1 geotechnical test - O'Rourke - just starting
- ⑮ Cataract Canyon - Sayala - just starting

**BPMD QUALITY ASSURANCE AUDIT CHECKLIST**

ORGANIZATION AUDITED: Woodward-Clyde Consultants

DATES OF AUDIT: May 8 through 10, 1984

AUDIT NO: 84-E-11

PREPARED BY [Signature]

DATE 5/4/84

CONCURRED BY [Signature]

DATE 5/4/84

APPROVED BY [Signature]  
BPMD QAD MANAGER

DATE 5/4/84

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
1.	<p><u>Organization</u></p> <p>Have there been any organizational changes since the last audit. If so, have they been included in the revised documents?</p>	Q.A. spec.				
2.	<p><u>Program</u></p> <p>Have any new personnel been assigned (since the last audit) to the project. If so, have they undergone the necessary training (TP-40)?</p>	TP. 40.				

BPMD QUALITY ASSURANCE AUDIT CHECKLIST (Continued)

AUDIT NO: 84-E-11

PAGE 2 OF 6

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
3.	<p><u>Design Control</u></p> <p>Have the following documents been prepared as per the QA specifications of S.A.22? (INDEPENDENT REVIEWS)</p> <ul style="list-style-type: none"> <li>● Technical Program Plan</li> <li>● Activity Plans</li> <li>● Specific Work Instructions</li> <li>● PROCEDURES SPECIFIED IN ACT. PLANS.</li> </ul>	Q.A.SPEC.				
4.	<p>Are peer reviews being conducted in accordance with TP-34 (Rev. 1) spotcheck the peer review documentation for the work performed since the previous audit.</p>	TP-34.				
5.	<p><u>Procurement Document Control</u></p> <p>Verify implementation of procurement control as per TP-20 for the procurement activities performed subsequent to the issuance of TP-20.</p>	TP-20				

BPMD QUALITY ASSURANCE AUDIT CHECKLIST (Continued)

AUDIT NO: 84-E-11

PAGE 3 OF 6

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
6.	<p><u>Procedures, Instructions, and Drawings</u></p> <p>Spotcheck existence of procedures and instructions for the activities performed since the last audit.</p>	<p>Q.A. SPEC.</p>				
7.	<p><u>Document Control</u></p> <p>Verify the existence and implementation of "Approved Technical Procedures and Test Plans" since the last audit.</p>	<p>Q.A. plan Sec. 3</p>				
8.	<p><u>Inspection and Surveillances</u></p> <p>Verify implementation of inspection and surveillance activities conducted since the last audit.</p>	<p>Q.A. plan Sec 12.</p>				

BPMD QUALITY ASSURANCE AUDIT CHECKLIST (Continued)

AUDIT NO: 84-E-11

PAGE 4 OF 6

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
9.	<u>Identification &amp; Control of Samples and Items (Handling and Storage)</u>  Verify and spotcheck traceability and handling of samples.	Q.A. plan Sec. 8				
10.	<u>Control of M&amp;TE</u>  Verify the existance of calibration status list.	Q.A. plan Sec. 7				
11.	<u>Control of Nonconforming Items</u>  • Verify handling of nonconforming items if any since the last audit.   • PROVISIONS FOR N.C.R. TO BPMD FOR APPROVAL	Q.A. plan Sec -13.   NQA-1 TS.				

**BPMQ QUALITY ASSURANCE AUDIT CHECKLIST (Continued)**

AUDIT NO: 84-E-11

PAGE 5 OF 6

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
12.	<p><u>Nonconformances and Corrective Action</u></p> <p>Verify handling of NCRs (as per TP-42) issued since the last audit.</p>	<p>Q.A. plan Sec 13. TP-42</p>				
13.	<p><u>Audits</u></p> <p>Verify audits conducted by WCC since the last ONWI audit.</p> <ul style="list-style-type: none"> <li>● Audit schedules</li> <li>● Audit procedures/checklists</li> <li>● Qualifications of auditors</li> </ul>	<p>Q.A. plan Sec-13.</p>				

**BPMD QUALITY ASSURANCE AUDIT CHECKLIST (Continued)**

AUDIT NO: 84-E-11

PAGE 6 OF 6

NO.	AUDIT ATTRIBUTE	REF. DOCUMENT AND PARA. #	SATIS-FACTORY	NOT SATIS-FACTORY	N/A	COMMENTS
14.	<p>Verify implementation of corrective action on the last Audit Report No. 83-E-03.</p> <p>A. <u>Observation No. 1 - Control of Procurements</u></p> <p>Verify the distribution of TP-20 to project personnel.</p> <p>B. <u>Observation No. 2 - Internal Audits</u></p> <p>Verify the internal audit file.</p> <p>C. <u>Observation No. 3 - Organizational Charts</u></p> <p>Can be closed based on the report.</p> <p>D. <u>Observation No. 4 - Control of Drawings</u></p> <p>Verify implementation of response.</p>					