



Department of Energy

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WM Project 10

Docket No.

PDR

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Distribution:

LINEHAN LAFEVRE
HILDENBRAND WESTBROOK
(Return to WM, 623-SS)

Mr. John Linehan
Repository Projects Branch
Division of Waste Management
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Linehan:

CLARIFICATION ON STATUS OF SELECTED GEOLOGY AND GEOPHYSICS SUBJECTS

In a meeting with Dr. Wright of your staff, and Dr. D. H. Dahlem of my staff, in late June 1985, a list of geology and geophysics subjects was provided which Ms. Kristin Westbrook of your staff, requested status reports. Although the status of some of these items was discussed with Ms. Westbrook as well as with others, the status was never documented. The intent of this transmittal, therefore, with its enclosure, is to document the requested status report and bring your new reviewer, Mr. Harold Lafevre, up to date.

If you have any technical questions regarding the information contained, please contact either Mr. A. G. Lassila of the Geoscience and Technology Branch (FTS 444-6158), or Mr. J. E. Mecca, Chief of our Licensing, Environmental, and Safety Branch (FTS 444-5038).

Very truly yours,

[Handwritten signature of O. L. Olson]

O. L. Olson, Director
Basalt Waste Isolation Division

BWI:JEM

Enclosure

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STATUS OF SELECTED ITEMS ON GEOLOGY-GEOPHYSICS  
FOR THE HANFORD SITE

1. Item: Nuclear Regulatory Commission (NRC) Trip Report, November, 1981 - Seismic Refraction, grid shot over the RRL in FY 1981; Data interpretations in FY 1982 because of budgetary limitations.

Status: The seismic refraction grid shot over the RRL in FY 1981, has been submitted to the Basalt Records Management Control (BRMC) as entry #B-015828, and is available upon request.

2. Item: NRC Trip Report, November, 1981 - Seismic Reflection, program recorded vicinity of the reference repository location (RRL), Gable Mountain, Gable Butte, and the Columbia River north of Gable Mountain.

Status: The seismic reflection data referred to in the NRC Trip Report of November 1981, is reported in RHO-BWI-ST-14, Appendix B. Portions of these data were reprocessed and reported in SD-BWI-TI-177, "Reprocessing and Interpretation Seismic Reflection Data Hanford Site, Pasco Basin, South Central Washington," by Ernst Berkman, May 15, 1984, and is available upon request.

3. Item: NRC Trip Report, November, 1981 - Magnetotelluric Data, (MT) collected in the third and fourth quarters of FY 1981.

Status: Magnetotelluric data collected in the third and fourth quarters of FY 1981, is reported in RHO-BWI-ST-19, "Preliminary Interpretation of the Tectonic Stability of the Reference Repository Location, Cold Creek Syncline," Chapter 4, and a report, SD-BWI-TI-173, "Magnetotelluric Survey in the Hanford Area," by David Halprin, January, 1984. There is also a package of supporting data, #B-032364, in the BRMC. All these items are available upon request.

4. Item: NRC Trip Report, November, 1981 - High Altitude Imagery (U-2, Skylab, and Landsat), "A substantial report on the results of this work (along with maps, imagery, and overlays) is in draft form and will be released in early 1982."

Status: High altitude imagery (U-2, Skylab, and Landsat) is discussed in the report RHO-BWI-CR-133 (P/PNL-3140), "Report on Geologic Remote Sensing of the Columbia Plateau," by G. A. Sandness et al., May, 1982.

5. Item: Basalt Waste Isolation Project (BWIP) Bulletin, January, 1984 - Seismic Reflection, gridded survey planned to more fully

characterize: top of basalt; overlying sediments; and structure within the RRL. The emphasis is on the area near the current Exploratory Shaft (ES) site.

Status: The seismic reflection/refraction testing referred to in the BWIP Bulletin of January 1984 was done in FY 1985. Two meetings were held with NRC staff to discuss these tests. The subcontractor's report and supporting data will be released in the second quarter of FY 1986.

6. Item: NRC/Department of Energy (DOE) Workshop, March, 1984 - Weston Report, Magnetotelluric data from 1981, continues to be assessed by Rockwell Hanford Operations (RHO) and Emerald Exploration (EMEX). Data not released.

Status: MT collected in the third and fourth quarters of FY 1981 is available as indicated in Item 3. A subcontractor's analysis of the BWIP's MT data was released as SD-BWI-TI-233, "Interpretation of Magnetotelluric Data, Pasco Basin, South Central Washington."

7. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Magnetotelluric, site-specific work planned in FY85 and perhaps FY86.

Status: MT data were collected in the spring of 1985 across Rattlesnake Mountain. The subcontractor's report was submitted to BRMC in three volumes; #B-066283, #B-066284 and #B-066285, Z-Axis Exploration, Inc., 1985, "Magnetotelluric Survey, Hanford Nuclear Reservation, Rattlesnake Hills, Washington." The interpretation of these data will be submitted in the second quarter of FY86.

8. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Gravity Data, Rockwell will collect gravity data at MT stations as well as fill in data along Yakima Ridge - Post FY85 as informally scheduled. An analog area along the south slope of the Saddle Mountains where basalt structures are known to exist will be surveyed for comparison. Gridded gravity and magnetic, Rockwell will finish survey in FY84 and FY85 including analog area.

Status: Gravity data under this item, as mentioned in the workshop of March 1984, was collected in FY 1985.

9. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Cold Creek Barrier, (geologic structure) Aeromag, groundmag, gravity, stratigraphic.

Status: Gravity and magnetic data were collected north of the potential field gradient about 1/2 mile east of the Yakima Barricade. The subcontractor's report of these data will be submitted to BRMC in the second quarter of FY86. Boreholes have been drilled on either side of the gradient and have been deepened through the Selah interbed. FY 1986 drilling plans include

boreholes to further identify the source of the geophysical gradient.

10. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Seismic Reflection by EMEX - Key element in the reprocessing was the development of synthetic seismograms.

Status: The report, "Reprocessing and Interpretation Seismic Reflection Data Hanford Site, Pasco Basin, South Central Washington," by Ernest Berkman, SD-BWI-TI-177, has been transmitted to the NRC. Additional copies are available upon request.

11. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Seismic Reflection/Refraction, RRL area- gridded surveys, both refraction and reflection simultaneously planned for FY84-85; if successful additional gridded surveys in FY86.

Status: The plans for refraction and reflection seismic test surveys were completed in FY 1985. See Item #5.

12. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Seismometer network down boreholes. (Network installed in October 1984, data release?).

Status: The earthquake catalog for seismometers installed in boreholes will be issued in the last quarter of FY 1986.

13. Item: NRC/DOE Workshop, March, 1984 - Weston Report, Compilation of geophysical "anomaly status file."

Status: The geophysical anomaly status file is an ongoing working file to track assessment of geophysical anomalies. It continues to be developed as new data and interpretations are available.

14. Item: NRC/DOE Workshop, March, 1984 - Weston Report, External Peer Review Group FY85.

Status: The external peer review group used by BWIP has been expanded in this fiscal year as a part of the BWIP Technical Review Group.

15. Item: NRC/DOE Workshop, March, 1984 - NRC Notes. Two planning documents: Lithologic Characterization Plan and Tectonic Characterization Plan, FY84.

Status: The Lithologic and Tectonic Characterization Plans are currently being developed as part of the BWIP Site Characterization Plan (SCP).

16. Item: NRC/DOE Workshop, March, 1984 - NRC Notes, oil wells as possible magnetotelluric base stations.

Status: Petroleum and natural gas exploration wells will be considered for sites to collect MT data. Nonexclusive MT data at or near deep boreholes may also aid in data interpretations and the NRC will be informed of BWIP decisions regarding these wells.

17. Item: DOE/RHO - Workshop Presentation, March, 1984 - Lithologic studies - Lateral Variation study will be initiated April, 1984.

Status: Only limited lateral variation work was conducted during FY 1984, due to work on the BWIP Environmental Assessment (EA) and the SCP. Field work on the lateral variation study in the Sentinel Gap area is now complete. The principal purpose of this work is to provide data on the thickness variations of the dense interiors of basalt flows for input to geostatistical estimates of variability of flows in the RRL. A report on the lateral variation study is to be issued in the third quarter of FY 1986.

18. Item: DOE/RHO - Workshop Presentation, March, 1984 - Analysis of currently available fracture data is under way; plans for collection of new data are being formulated.

Status: Analysis of fracture data from the previously collected geomechanical logs should be completed during the second quarter of FY86. Analysis of more recently collected data on fracture widths is completed. A report on this subject will be issued during the second quarter of FY 1986.

19. Item: DOE-RHO - Workshop Presentation, March, 1984 - Work is under way to better characterize interbeds and secondary minerals in flow tops.

Status: Work on mineralogical characterization of interbeds and secondary minerals in flow tops continues. A status report on secondary minerals in flow tops is currently in the process of being released and should be available by the end of January 1986.

20. Item: DOE/RHO - Workshop Presentation, March, 1984 - Plans for reevaluating the preferred candidate are being made.

Status: The Cohasset flow has been designated as the preferred candidate horizon for BWIP. (Reference: Letter, June 5, 1985, W. J. Purcell to O. L. Olson, "Designation of a Preferred Candidate Repository Horizon for the Basalt Waste Isolation Project"). Reevaluation of the preferred candidate horizon will likely be done only if data indicates that such a reevaluation is needed.

21. Item: DOE/RHO - Workshop Presentation, March, 1984 - DC-19C, 52 foot thick zone of diktytaxitic vesicular or fractured rock within the dense interior below main vesicular zone. This interpretation is based on geophysical log response.

Status: A more detailed interpretation of the diktytaxitic, vesicular or fractured zone in DC-19C has been conducted. Based on

a review of available data from the rotary borehole (suite of geophysical logs, drilling information, and borehole television pictures), five plausible interpretations of the zone are possible: (1) tectonic fracture zone or fault with no laterally extensive vesicular zone present; (2) tectonic fracture zone or fault that possibly obscures a thin, laterally extensive vesicular zone; (3) relatively thick, horizontal platy fracture zone that may also be diktytaxitic; (4) primary flow unit emplacement feature; and (5) area of stress release that has fractured the rock adjacent to the borehole during drilling. Interpretation (1) is currently preferred and was assumed in the development of the current Cohasset flow interior isopach maps. However, the other four interpretations cannot be entirely ruled out based on available data.

22. Item: DOE/RHO - Workshop Presentation, March 1984 - In DC-20C, Geophysical logs indicate that low density zones are interspersed with high-density zones where the dense interior of the Rocky Coulee was predicted to occur.

Status: In DC-20C the occurrence of low density zones interspersed with high-density zones in the Rocky Coulee is apparently due to multiple lobes as discussed in SD-BWI-TI-226, Rev. 1.

23. Item: DOE/RHO - Workshop Presentation, March, 1984 - Revised Basalt Core Logging Procedure; relog core from selected boreholes, log all core from new core holes.

Status: The revised basalt core logging procedure is currently being used to log core from all new cored boreholes. Relogging of Grande Ronde basalt flows in the McGee well and in part of the Grande Ronde basalt flows in DC-16A has been completed. Relogging of selected cored boreholes is continuing at a relatively low level of effort. Relogging data will be incorporated into the Site Department data base and will be analyzed as part of intraflow structure, fracture characterization and mineralogy-petrology studies.

24. Item: DOE/RHO - Workshop Presentation, March, 1984 - Seismic Velocity Data from Boreholes Proposed; verification seismic line, additional reflection data in RRL - based on results of verification studies.

Status: The response to this item is the same as the response to Item 11.

25. Item: DOE/RHO - Workshop Presentation, March, 1984 - Tectonic Breccia, Analog Study; baseline Mapping of the Analog Area completed; analysis of field and borehole tectonic fractures and breccias in progress. Quantitative analysis and synthesis of data.

Status: Little progress was made on the tectonic breccia study until the last quarter of 1985 due to work on the EA and the SCP.

Work includes descriptions of breccias and comparison to the data from Cold Creek syncline borehole data. Field work was curtailed in early November 1985 due to snow cover.

26. Item: DOE/RHO - Workshop Presentation, March, 1984 - Pomona flow sampled at 32 sites in the Central Pasco Basin; plans: sample structural rotation at additional sites to confirm and refine findings.

Status: Paleomagnetic sampling of the Pomona flow has been reported in Tectonics, Vol. 3, No. 2, April 1984, "Post-12 Million Year Clockwise Rotation in the Central Columbia Plateau, Washington," by Reidel, et al. Additional sampling was completed in the first quarter of FY 1986.

27. Item: DOE/RHO - Workshop Presentation, March, 1984 - Magnetotellurics; acquire regional data, detailed surveys on selected structures.

Status: As noted in the response in Item 7, MT data has been collected across Rattlesnake Mountain, and in addition, regional data is being assessed using nonexclusive surveys.

28. Item: Note from Jo Ludwick (Rockwell) to R. Wright (NRC) 10/84, Rockwell, 1984 - Assessment of Rock Mass Condition in a Candidate Horizon for Nuclear Waste Repository in Basalt, in preparation, Richland, "This document is not yet completed and will not be used as a reference for the Public Draft EA."

Status: The document "Appraisal of Several Imperical Rock Mass Classifications for Estimating Tunnel Stability Requirements in a Geologic High-Level Waste Repository in Basalt," by C. Yoss, SD-BWI-ER-011, December 16, 1984, contains the material which would have been used in the document, "Assessment of Rock mass Conditions in a Candidate Horizon for Nuclear Waste Repository in Basalt."

29. Item: Report number RHO-BW-ST-19P, 1983 - Geodetic data from the individual surveyed line segments shown in Chapter 6.

Status: The geodetic data from individual surveyed line segments shown in Chapter 6 of RHO-BWI-ST-19P are reported in U.S. Geological Survey, Open-File Report 84-797, "Crustal Deformation Near Hanford."