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BWIP HYDRO RESTART - GEOCHEM

- 1 -  
JUL 23 1987

MEMORANDUM FOR:

John J. Linehan, Acting Chief  
Operations Branch  
Division of High-Level Waste Management  
Distribution:

WM Record File  
101

WM Project 10  
Docket No.  
PDR ✓  
LPDR ✓ (B)

FROM:

Ronald L. Ballard, Chief  
Technical Review Branch  
Division of High-Level Waste Management (Return to WM, 623-SS)

SUBJECT:

GEOCHEMISTRY SECTION REVIEW OF DOCUMENTATION FOR RESTART  
DRILLING AND PIEZOMETER INSTALLATION AT DC-24, DC-25,  
DC-32, and DC-33

The Geochemistry Section has completed the review of the DOE documents supporting the expedited special case restart for drilling and piezometer installation for boreholes DC-23, DC-24, DC-25, DC-32, and DC-33.

The documents were reviewed in accordance with your memorandum to Ronald L. Ballard, HLTR, dated July 13, 1987, and discussions with Sandra Wastler of your branch. Your memorandum defined the scope of the review, and instructed the reviewers to focus the review on those issues and concerns relating to the installation (not the stratigraphic location) of piezometer facilities, since the DOE still has the criteria for the location of the facilities under development. The review also was to assure that the procedures and controls being proposed by the DOE for the installation of piezometer facilities would provide adequate data for licensing purposes.

Concerning the adequacy of data for licensing, we consider the proper stratigraphic location of piezometer installations to be critical in determining whether the data collected will be adequate for licensing. QA audits must also be an integral part of making an eventual determination of the adequacy of a data collection program, and finally, performance assessment requirements for the data must be defined before a determination of adequacy can be made. We have, nevertheless, focused on those geochemical issues that would affect only the installation of the piezometers. This approach was agreed to during a review team meeting held by Sandra Wastler on July 16, 1987.

Those documents that contained geochemical information, issues, or procedures were reviewed to identify issues or concerns pertaining to the installation of the piezometers. We also determined that documents that should have been a part of our review (e.g., HT-ES-203, Developmental Groundwater Sampling, GT-ES-104, Chip Sample Collection) were not included in the package of documents submitted to the NRC. Based on our scoping review, a subset of 15 documents was considered pertinent.

We found that the piezometer installation documents used geochemistry basically to address the identification and correlation of rock units at the site and site vicinity (i.e., defining the stratigraphic locations for piezometer installation). Our comments therefore appear to fall outside the scope of this

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review. Because we consider the location and correlation of stratigraphic units to be a key concern to properly installing the piezometers, we are providing comments concerning the DOE's use of geochemistry in rock identification and stratigraphic correlation as presented in the drilling restart package documents. However, since the DOE has already acknowledged that the details for this work have not yet been developed and therefore were not in the review package, we have provided only general comments.

The review was led by Tin Mo, (the lead technical reviewer for geochemistry on the BWIP team) and was supported by David Brooks, Paul Bemba, John Bradbury, Walt Kelly, and Jim Tesoriero.

If you have any questions or comments concerning our review, please contact Tin Mo (x74693).



Ronald L. Ballard, Chief  
Technical Review Branch  
Division of High-Level Waste Management

1) The DOE concedes that procedures describing their methodology to identify stratigraphic units have not yet been developed. Since the intent of the drilling restart program is to place piezometers within the flow tops of seven basalt flows, we consider accurate stratigraphic identification and correlation to be essential to the proper placement of the piezometers. In the eventual determination of whether data collected from this restart program will be adequate for licensing, the resolution of the stratigraphic identification methodology will be of prime importance (as will QA audits and procedure reviews such as this restart package assessment). It appears that the DOE is prepared to begin piezometer installation in the absence of formally established criteria to assure proper stratigraphic location of the piezometers. Thus it appears that the geochemical information would be backfitted to confirm whether the piezometers have been located properly. The DOE should consider the risks inherent in this approach.

2) Descriptions of the geochemical analyses that will be used in identifying and correlating the rock units are found in the BWIP documents included in the restart package (i.e., SD-BWI-SP-035, Stratigraphy Study Plan; SD-BWI-SP-057, Site Groundwater Study Plan; SD-BWI-TN-010, Test Data Collection Specifications - Boreholes DC-32GR, DC-24CX, DC-25CX, DC-32CX, and DC-33CX). Some of the geochemical methods suggested for use in identification and correlation include rock chemistry and discriminate analysis of rock chemistry data, hydrochemistry, and rock age dating. The NRC staff agrees that geochemical methods can provide information that will be useful in the identification and correlation of rock units. Documents specific to the restart program (such as Request for Expedited Special Case Restart Drilling and Piezometer Installation for Boreholes DC-23, 24, 25, 32, and 33) however, discuss only the use of rock chemistry data. This discussion does not provide sufficient detail for the NRC staff to determine whether this single approach will provide distinctive chemical data that can be used in the identification and correlation of rock units. In addition, it is not clear from the restart documents that geochemical methods other than rock chemistry will be used in correlations. The NRC staff considers that a combination of geochemical methods (rock chemistry and discriminate analyses of rock chemistry data, mineralogy/petrology, hydrochemistry data used in conjunction with interpretive chemical computer codes, isotopic dating techniques) will provide data that could be useful in the identification and correlation of rock units.

3) The restart package documents state that rock samples for chemical analyses will be collected as (drilling fluid) chip samples. The documents do not address how accurately the depth from which a particular rock chip originated can be determined. The DOE should determine the accuracy of such depth determinations, and consider how inaccuracy in this sampling technique could affect stratigraphic correlations using geochemical data. The NRC staff considers that more accurate discrimination of depth (if required) could be obtained by using alternative sampling methods. Such alternative methods could include coring and then reaming out the hole to accommodate piezometer installation, combining rotary drilling with coring or sidewall coring (the use

of sidewall coring is currently being planned in paleomagnetism investigations).

4) It is not clear from the review of the restart package documents the extent to which the proposed drilling and sampling program has been integrated with the sampling needs of other investigations, and vice versa. The NRC staff suggests that the DOE stress the integration of the hydrology drilling program with other disciplines (for example, mineralogy/petrology, hydrochemistry, rock mechanics) if possible. The integration of sampling programs could reduce the impacts of drilling and sampling programs on site performance (as per 10CFR60.15(d)).

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MEMORANDUM FOR: John J. Linehan, Acting Chief  
 Operations Branch  
 Division of High-Level Waste Management

FROM: Ronald L. Ballard, Chief  
 Technical Review Branch  
 Division of High-Level Waste Management

SUBJECT: GEOCHEMISTRY SECTION REVIEW OF DOCUMENTATION FOR RESTART  
 DRILLING AND PIEZOMETER INSTALLATION AT DC-24, DC-25,  
 DC-32, and DC-33

DATE: 87/07/ JUL 23 1987

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CONCURRENCES

ORGANIZATION/CONCUREE	INITIALS	DATE CONCURRED
HLWM/Paul J. Bembia	<u>PJB</u>	87/07/22
HLWM/David J. Brooks	<u>DLB for</u>	87/07/22
HLWM/Ronald L. Ballard	<u>RLB</u>	87/07/22

(Mailed by the WMBGG)  
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