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JAN 11 1984

Mr. O.L. Olson, Project Manager
Basalt Waste Isolation Project Office
U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

Dear Mr. Olson:

SUBJECT: NRC BWIP SITE TECHNICAL POSITION 1.1: HYDROGEOLOGIC TESTING
STRATEGY FOR THE BWIP SITE

Background:

On March 31, 1983, the Nuclear Regulatory Commission (NRC) transmitted to DOE a copy of NUREG-0960, "Site Characterization Analysis of the Site Characterization Report for the Basalt Waste Isolation Project." In NUREG-0960 and in the cover letter, the NRC staff raised major concerns about the adequacy of DOE's plans for hydrogeologic testing of the Hanford site. Because of uncertainty in conceptual models of groundwater flow and uncertainty in the representativeness of key hydraulic parameters (including hydraulic heads, hydraulic conductivities, and effective porosity), the NRC staff concluded that a substantially revised hydrogeologic testing strategy was needed to provide necessary and sufficient information to resolve questions about groundwater flow direction and rates. In NUREG-0960 the staff outlined its position that DOE should design and implement a systematic testing program, based to the maximum extent practicable on long-term, large-scale pump tests, that is, designed to provide the information required to support rigorous, quantitative modeling for predictions of repository performance.

Following release of NUREG-0960, the hydrogeology team of the Division of Waste Management began to prepare a staff technical position on a hydrologic testing strategy that would be appropriate for the Hanford site. A draft of the site technical position (STP) on hydrogeologic testing strategy was provided to the BWIP staff in July 1983, and this draft STP was formally presented to DOE on July 11, 1983, during the July 11-15, 1983, NRC/DOE Workshop on Hydrologic Testing in Richland, Washington. The NRC draft STP was discussed in detail at that meeting and served as the basis for the modified BWIP strategy for hydrological characterization (See Attachments 5 and 6 of the Summary Meeting Notes of the July 11-15, 1983 Meeting).

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Five copies of the final version of BWIP Site Technical Position 1.1: Hydrogeologic Testing Strategy for the BWIP Site are attached. This version responds to the DOE comments presented in the July 1983 Workshop and includes some background and summary information that was not included in the version reviewed by DOE in July.

As with all steps in the prelicensing consultation process between NRC and DOE, the purpose of this STP is to provide timely guidance to the Department at what we consider to be an appropriate level of detail on a significant matter of licensing information needs. The goal of assuring that licensing information needs and issues are identified at an early time so that they can be treated fully in site characterization can be accomplished efficiently through mechanisms such as documented NRC/DOE technical workshops and NRC staff technical positions, which offer opportunities for the public, states, tribes and federal government agencies to be informed and aware of the implementation of the prelicensing consultation process.

Summary of the Technical Position:

Predictive modeling of groundwater flow will require defensible conceptual models of the flow system, defensible boundary conditions and defensible values of hydraulic parameters. The purpose of the technical position is to provide guidance to DOE on an approach that the NRC staff considers acceptable in determining the hydraulic data necessary and sufficient for complete site characterization.

A highly prescriptive approach by the NRC staff to guidance on groundwater testing strategy is not appropriate. In light of the current levels of uncertainty about the groundwater flow system and of the dynamic and exploratory nature of the site characterization process, the staff considers that the guidance should provide an "envelope" of approaches broad enough to help guide the detailed decisions that must be made in the future by DOE. Therefore, the technical position presents a logical progression of alternative testing scenarios that can be implemented at BWIP for the full range of feasible hydrogeologic conceptual models.

The basic approach for the strategy is that the hydrogeologic characterization of the Hanford site should rely to the maximum extent possible on direct testing of the hydraulic response of the site to an induced hydraulic stress through the use of large-scale pump tests with multiple observation wells. The hydraulic testing program should begin

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by testing the Grande Ronde Formation, the unit expected to be most affected by repository operations and waste replacement. Testing of the Wanapum and Saddle Mountains Basalts should follow testing of the Grande Ronde and should be concentrated along important potential pathways that have been suggested by earlier stages of the testing program.

Implementation of the proposed testing program requires that baseline piezometric conditions be established by long-term monitoring of hydraulic heads before pump testing begins. The staff considers that it would be prudent for BWIP to avoid major perturbation to the groundwater system during the period of hydraulic testing. If major perturbations do occur, for example, from the sinking of the exploratory shaft, it will be necessary for BWIP to determine the effects on the groundwater system or to demonstrate again that a piezometric baseline exists before continuing with hydraulic testing.

The hydraulic testing strategy described in this site technical position is not necessarily the only approach that would lead to an acceptable hydraulic data base and performance assessment. However, the method of arriving at a strategy is intended to be representative of the process the NRC staff expects prior to implementation of any field testing program. Because of the dynamic nature of this kind of testing program, the NRC staff considers that continuing consultation between NRC and DOE will be required over the full period of site characterization. This strategy specifically delineates stages at which such consultation would be appropriate.

Follow-Up-Action:

The NRC staff is available for continuing discussions with the BWIP and DOE staffs concerning the hydrogeologic testing program at Hanford. We consider that, following NRC's hydrologic data review of January 9-13, 1984 and your review of this site technical position, consultation concerning BWIP's implementation of the July 1983 strategy would be appropriate. Such consultation is

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an important first step in providing on-going guidance to the Department.

If you have any questions about this matter, please contact me.

Sincerely,

"ORIGINAL SIGNED BY"

Robert J. Wright, Senior
Technical Advisor
Repository Projects Branch
Division of Waste Management

cc: Those on Attached Distribution List

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that NRC is current with DOE's data base, an essential first step in providing on-going guidance to the Department.

If you have any questions about this matter, please contact me.

Sincerely,

Robert J. Wright, Senior
Technical Advisor
Repository Projects Branch
Division of Waste Management

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