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Hydrogeology • Mineral Resources Waste Management • Geological Engineering • Mine Hydrology

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Mr. Matthew Gordon
Division of Waste Management
Mail Stop SS-623
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Matt:

The purpose of this letter is to provide you with our team's assessment of the change in large-scale stress tests proposed by DOE at the meeting of May 22, 1985, in Washington, D.C. We believe the testing program as discussed by Steve Baker is a significant departure from the NRC's position as stated in STP 1.1.

It is evident from Steve Baker's discussion that DOE recognizes the trade-offs between collection of additional water level data to establish a quasi steady-state head configuration near the RRL and the initiation of a large scale hydrologic stress test (LHS) prior to boring the exploratory shaft. Steve Baker indicated that they are planning the first multiple well stress test to include only the RRL-2 wells without achieving significant drawdown at cluster well sites DC-19, 20, and 22. Maurice Veatch and Steve Baker described the proposed test as follows. The pumping well would be RRL-2B, completed in the Rocky Coulee flow top. Well RRL-2C would have multiple level piezometers installed similar to the DC-19C, 20C and 22C. RRL-2C would be 250 feet away from the pumping well. Mr. Veatch indicated that the pumping of RRL-2B would be implemented utilizing the maximum pumping rate possible without depleting the available drawdown to the level of the Rocky Coulee flow top. The stress test would continue until measurements of water level decline were detected in DC-19C, 20C or 22C or until the test period of approximately 60 days had been exceeded. Mr. Veatch stated that only a small drawdown would be allowed to occur in wells DC-19C, 20C and 22C in order to minimize the perturbation on the fluid potential (head) distribution within the RRL. Essentially, he indicated that DOE believes it to be more important to continue to collect baseline fluid potential data than to collect large scale hydraulic property data. The test proposed would constitute a relatively small-scale test with the primary information on aquifer hydraulic properties derived from data collected in RRL-2C.

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Steve Baker indicated two objectives for this test. The first objective is related to mine safety during the breakout from the exploratory shaft. The second objective is to provide data on the hydrogeologic characteristics of the RRL-2 area prior to the construction of the exploratory shaft. A second stress test is planned at the RRL-2B site after the completion of the exploratory shaft to evaluate any hydrologic changes because of shaft construction. In response to a question, DOE-Rockwell personnel indicated that the before and after tests probably would be similar in length and rate of pumping in order to evaluate the hydraulic effects of shaft construction. The testing program outlined by DOE on May 22 suggests that the large-scale stress test in the RRL-2 area outlined in STP 1.1 will be delayed until 1988 at the minimum.

The present design of the aforementioned smaller scale stress test utilizing RRL-2B does not facilitate evaluation of two important hydrogeologic characteristics: lateral boundary-hydraulic continuity and vertical leakage-hydraulic continuity. The test program described would stress a portion of the aquifer whose maximum extent is the radial distance from RRL-2B to DC-19, DC-20 or DC-22. This scale would not permit the detection or evaluation of lateral boundaries-hydraulic continuity on a repository scale as addressed in STP 1.1. The major observation well for the hydraulic stress test would be RRL-2C. The nearness of this observation well to the pumping well (250 feet) limits the application of the Hantush and Jacob (1955) method and Hantush (1960) method of leaky aquifer analysis. Both methods require observation wells at considerable distance from the pumping well in order to identify leakage utilizing type curve analyses. The construction of RRL-2C with monitoring zones in the Rocky Coulee flow interior and the Cohassett flow interior may allow evaluation of vertical hydraulic conductivity utilizing the Neuman and Witherspoon (1972) ratio method. The required length of the test to get water level responses in the flow interiors might not be achieved because of the limitation of having minimum water level decline in the Rocky Coulee flow top at cluster sites DC-19C, 20C and 22C. Similarly, a fairly long-term test might be required to allow measurement of water level response in the Cohassett flow top in RRL-2C.

DOE personnel indicated that repository scale stress tests would be conducted in the Wanapum Formation where well yields are considerably higher. These results certainly will be valuable in evaluating the overall hydrogeologic characteristics of the RRL site. However, the large-scale stress testing results derived from the Wanapum Formation may not be transferable to the Grande Ronde flow tops. The structural characteristics present in the Grande Ronde basalt may not be identical to those present within the Wanapum Formation. The presumption of transferability of results from the Wanapum to the Grande Ronde is contrary to the intent of STP 1.1.

We believe that one of the advantages of the BWIP site is the in-situ testability of the hydraulic properties of the hypothesized multiple flow

tops above and below the repository horizon. The test plan as presented by DOE-Rockwell on May 22 is not consistent with testing this hypothesis and the concomitant hydraulic properties as addressed in STP 1.1

Please contact us if you have questions.

Sincerely,

Roy E. Williams

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