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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Technical Discussion on Infiltration Processes (Account No. 20-5704-191)

DATE AND PLACE: Bureau of Economic Geology (BEG), in Austin, TX August 12, 1994.

AUTHORS: S. Stothoff, G. Wittmeyer, and R. Bagtzoglou

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BACKGROUND AND PURPOSE OF TRIP:

Although the Bureau of Economic Geology (BEG) is involved in many activities, their work on the characterization and design of low-level waste sites in west Texas was the primary reason for this trip. The trip consisted of a meeting with Bridget Scanlon discussing existing and potential work performed by the BEG that might be relevant to characterizing infiltration at the Yucca Mountain site. This was followed by meetings with several members of the BEG staff, in which their current research efforts towards developing field methods for site characterization were presented.

The purpose of the trip was to keep the CNWRA staff abreast of infiltration characterization methodology, as well as to examine the possibility of collaborating on developing site characterization methodology.

SUMMARY OF PERTINENT POINTS:

The discussion of potential collaboration revealed that the Center for Nuclear Waste Regulatory Analyses (CNWRA) staff and the BEG staff had complementary skills, with the CNWRA emphasizing modeling skills and the BEG emphasizing field skills.

SUMMARY OF ACTIVITIES:

Approximately half of the time at the BEG was spent discussing the BEG approaches to infiltration characterization at the proposed low level waste sites in West Texas and southeastern California. Bridget discussed infiltration measurements made in the Hueco Bolson for a proposed Low-Level Waste (LLW) facility, and in a new site for the LLW facility east of the Hueco Bolson.

The remainder of the time was spent listening to informal presentations: (i) S. Laubach, on fracture characterization at the now-discontinued Superconducting Supercollider (SSC) site at Waxahatchie, Texas; (ii) J. Yeh, on implementation of Stratamodel site representations; and (iii), R. Mace, on field methods for determining the hydraulic properties of the fractured Austin chalk formation near the site of the SSC.

IMPRESSIONS/CONCLUSIONS:

Overall Impressions

It appears that there is significant complementarity between the CNWRA and the BEG in terms of infiltration characterization. The work that is being performed at the BEG appears to be of high quality, B. Scanlon is enthusiastic about possible collaboration, and it is anticipated that significant enhancements to CNWRA technical capabilities may occur due to such collaboration.

Informal Presentations

(i) B. Scanlon discussed design and characterization work at sites in west Texas. In these areas, precipitation is about twice that at Yucca Mountain. Faults can be quite obvious, due to the line of mesquite bushes taking advantage of the local break in the caliche layer. Heterogeneity is one of the big difficulties she faces; however, a number of natural tracers are providing significant tools for dating infiltration pulses, even in the face of heterogeneity.

(ii) S. Laubach had a number of observations about patterns of faults and fractures at the Waxahatchie site. He was able to examine several miles of curving tunnel, thereby getting a feel for fractures in perpendicular directions. Steve showed how the dip of faults and fractures mapped at the SSC decreased in steepness when they crossed beds in the Austin chalk that were composed primarily of marl, a softer material.

In instances where these faults dissected a bedding sequence of chalk-marl-chalk, downdip movement resulted in the development of large vugs at the bedding interfaces within which secondary calcite was precipitated. He noted that relatively few of the discontinuities yielded water; those that did, however, were quite significant sources of water.

(iii) J. Yeh gave an overview of BEG work with Stratamodel, with emphasis on their current efforts to develop a hydrostratigraphic model of the entire Edwards aquifer. The CNWRA is currently considering purchasing a license to use Stratamodel, in order to develop representations of hydrostratigraphic parameters that are suitable for input into site models. He was quite enthusiastic about the ease of using the Stratamodel code, noting that it was easy enough to generate a model that it was not necessary to keep old files around.

(iv) R. Mace demonstrated some of the field instrumentation developed for packer testing. Mace plans to conduct a series of crosshole packer tests near portions of the SSC in which the fractures have been carefully mapped and will try to correlate fracture orientation with directional hydraulic conductivity.

PROBLEMS ENCOUNTERED: None.

PENDING ACTIONS: None.

RECOMMENDATIONS: None.

SIGNATURES:

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