

November 1, 2001

MEMORANDUM TO: C. William Reamer, Chief
High-Level Waste Branch
Division of Waste Management, NMSS

FROM: Neil M. Coleman and Hans Arlt, Hydrologists */RA/*
High-Level Waste Branch
Division of Waste Management, NMSS

SUBJECT: TRIP REPORT FOR OCTOBER 2001: IDAHO GROUNDWATER
CONFERENCE, YUCCA MOUNTAIN SITE VISITS, AND
APPENDIX 7 MEETING ON UNSATURATED ZONE TOPICS

During early October, 2001, staff from the High-Level Waste Branch traveled to Nevada for two site visits at Yucca Mountain. Staff also attended a groundwater conference and an Appendix 7 meeting with DOE. Details of the trips are provided in the attachment. Please contact us if you would like additional information on any aspects of the trips.

TRIP REPORT ATTACHMENT

Groundwater Conference

On October 1st, 2001, Neil Coleman attended the groundwater conference "Connections 2001: Idaho's Ground Water Technical Workshop," and presented a paper titled "Large Scale Permeability of Volcanic Rocks." Presentations at this conference covered a broad range of topics, including groundwater modeling of heterogeneity in aquifers, contaminant transport in fractured rocks, use of reactive barriers to remove uranium from groundwater, model calibration, and the roles of scientists in water supply planning and the protection of water resources.

Site visit to Yucca Mountain

On October 2nd, 2001, Neil Coleman and Robert Latta visited the cross-drift tunnel that branches off from the Exploratory Studies Facility (ESF). This tunnel includes the sealed cross-drift test, in which a long section of tunnel is isolated from the rest of the underground facility by a series of bulkheads. DOE is using the sealed cross-drift test to understand moisture migration in the mountain under ambient conditions. DOE plans to keep the tunnel open and collect data until about the end of December, 2001, for data and sample collection. We entered the tunnel with a DOE team, just four hours after ventilation had been restored to the isolated part of the tunnel. Because of concerns about mold spores, all participants had to wear plastic protective suits and respirators. No dripping water was directly observed. However, both wet and dry areas were seen in the tunnel beyond the first bulkhead, which is located at station 17+63. Conditions were relatively dry from the first bulkhead to station 18+00. Conditions were relatively wet from stations 18+00 to 19+60. This corresponds to the tunnel segment that underlies the Tiva caprock environment at the surface, which has thin soils and likely has higher infiltration than other environments. Another relatively dry tunnel section was seen from stations 19+60 to 22+00, while the tunnel beyond 22+00 was relatively wet.

Moisture was observed in the wet sections of the tunnel in the form of small puddles on conveyor belts, and as beads of water on lines, vents, and signs. Wet areas were also found on the wooden rail ties, and as muddy soil between the ties. Most of the moisture appeared to be a result of condensation. Exceptions include the water that had dripped from rock bolts, which produced rusty spots on pipes below. It appeared that the rock bolts had dripped in both the wet and dry sections of the cross drift. Some of the dripping water could consist of natural seepage from the rock matrix or fractures. DOE had installed one new drip cloth around station 24+00 in January, 2001. The cloth had been treated with a pH sensitive chemical. We found the drip cloth to be quite wet, and stained in a color that indicates elevated pH. DOE is now working on a program to sample water that drips in the cross drift, so that volumetric studies and chemical analyses can be used to resolve the sources of the water.

Site visit and Appendix 7 meeting

On October 10th, 2001, in preparation for an Appendix 7 meeting, an NRC team visited the cross-drift and Niche 3, which is located off the ESF. The team consisted of Hans Arlt, Neil Coleman, John Bradbury, Philip Justus, Randy Fedors (CNWRA), and Mary Beth Gray (consultant to CNWRA). The sealed portion of the cross drift, which was opened on October

1st, had by this time been ventilated for over eight days. Few signs of moisture remained. However, we were able to observe the stains and drip patterns caused by moisture dripping from rock bolts, overhead steel mesh, and vent lines. In addition to the cross drift, we toured Alcove 8 and Niche 3 to observe the ongoing percolation and tracer studies. Water is being applied to infiltration cells in Alcove 8 and seeps downward to produce dripping water at Niche 3. Data from this test series can be used to help validate the active fracture model that DOE relies on to simulate unsaturated zone flow.

On October 11th, 2001, we participated in an Appendix 7 meeting with DOE staff. The original intent of the Appendix 7 was to discuss DOE's plan to discontinue monitoring in three unsaturated zone boreholes. Although Nye County had offered to assume this monitoring, DOE concluded that the monitoring would be discontinued because available resources needed to focus on fulfilling various agreements with the NRC. Along with this topic the meeting agenda had been expanded to include an update on unsaturated zone testing in the ESF and cross drift. Discussions covered studies at Alcoves 1 and 7 and cross drift studies that included Alcove 8/Niche 3, Niche 5, systematic hydrologic characterization, and monitoring of construction water and moisture. Another focus of the meeting was DOE's proposal to move the first bulkhead in the cross drift. In September, DOE had proposed to move this bulkhead from its current location at station 17+63 to approximately station 24+00. This change was intended to make it easier to collect geomechanical samples in the formerly sealed-off portion of the tunnel. However, NRC staff was concerned that the change would have shortened the cross drift test by over 600 m, making it very difficult for DOE to fulfill a number of NRC/DOE agreements. DOE had predicted that the sealed drift would be dry, but on entry found several long wet sections in the tunnel. DOE no longer plans to move the first bulkhead, but instead will install a new one near station 22+01. They plan to collect geomechanical data over the next several months, install equipment to sample dripping water and measure rates of dripping, and then seal up all of the bulkheads by late December, 2001.

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