CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Devils Hole Workshop (20.06002.01.131; 20.06002.01.071)

DATE/PLACE: May 21–23, 2003
Death Valley National Park, California

AUTHORS: J. Winterle and L. Browning

DISTRIBUTION:

CNWRA	NRC-NMSS	SwRI
W. Patrick	M. Leach	Record Copy B, IQS
CNWRA Directors	D. DeMarco	
CNWRA Element Managers	E. Whitt	
R. Green	B. Meehan	
R. Pabalan	J. Greeves	
D. Pickett	W. Reamer	
P. Bertetti	K. Stablein	
J. Prikryl	D. Brooks	
B. Werling	H. Arlt	
G. Walter	J. Bradbury	
R. Fedors	J. Schleuter	
C. Dinwiddie		
C. Manepally		
P. Maldonado		

CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Devils Hole Workshop

DATE/PLACE: May 21–23, 2003
Death Valley National Park, California

AUTHORS: J. Winterle and L. Browning

PERSONS PRESENT:

Lauren Browning (CNWRA), Hans Arlt (NRC), Jim Winterle (CNWRA), and approximately 110 other attendees with interest in the Death Valley regional groundwater flow system. A list of attendees is available for a limited time at Internet site http://hrcweb.lv-hrc.nevada.edu.

BACKGROUND AND PURPOSE OF TRIP:

The Devils Hole Workshop is an annual event that was originally organized as a forum to discuss issues related to the preservation of the endangered Devils Hole Pupfish. The Devils Hole Pupfish is found only in Devils Hole, a water-filled crevice that occurs along a fault zone in the Amargosa Desert in southern Nevada. Preservation of this species relies on maintaining water levels in Devils Hole, which occurs within the regional carbonate aquifer that is also a source of water for nearby agricultural uses and for local municipalities. Accordingly, numerous presentations on hydrology and geochemistry of the regional groundwater flow system, which includes the Yucca Mountain area, are given at this meeting. A summary of relevant presentations follows.

MEETING SUMMARY:

Andrew Remus from Inyo County, and Mike King, consultant to Inyo County, California, gave an overview of Inyo County's technical program. Inyo County is investigating whether flow paths from beneath Yucca Mountain could enter the regional carbonate aquifer and whether such flow paths could arrive at springs in the Death Valley area. Inyo County is also concerned about potential for degradation of the upward gradient in the carbonate aquifer. At present, it is believed that the hydraulic system in the southern Funeral Mountain range is fragile, whereby a relatively small change in the hydraulic head on the east side of the Funeral Mountains could significantly affect spring flows west of the Funeral Mountains. Inyo County's current U.S. Department of Energy (DOE) grant research includes the following:

- Evapotranspiration stations in Death Valley
- Installation and monitoring of stream flow gauges at Tecopa and Dumont Dunes
- Infiltration studies at Gold Valley
- Collection and analysis of spring water samples from Death Valley
- Analysis of regional data from the Lower Carbonate Aquifer

Inyo County's Yucca Mountain Regional Groundwater Program includes:

- Construct three monitoring wells in the regional carbonate aquifer on the east side of the southern Funeral Mountain range. The location of these wells is to be determined with the help of gravity data. Drill sites near major faults are sought where major hydraulic changes could take place. Drilling could begin as early as August 2003.

- Construct a monitoring well in the regional carbonate aquifer at the Echo Canyon location in Death Valley National Park. This well is also planned to be drilled near major faults where major hydraulic changes may occur.

- Construct a monitoring well at Travertine Springs location in Death Valley National Park.

- Conduct a water balance analysis of Furnace Creek alluvial fan area to determine total discharge from major Furnace Creek springs.

Additional consultants for Inyo County presented their latest findings. For example, John Jansen discussed work on the geophysical mapping of the regional groundwater flow system in Death Valley National Park. Much information seems to be coming together to help identify the extent and depth of the carbonate aquifers and other hydrostratigraphic units. John Bredehoeft presented a hydrogeologic conceptual model of the southern Funeral Mountain range.

Frank D'Agnese and Claudia Faunt of the U.S. Geological Survey gave respective presentations on modeling efforts using the Death Valley Regional Groundwater Flow Model, and on the hydrogeologic framework model of the Death Valley region that was used to construct the regional flow model. This regional flow model, which has recently been updated to include greater structural detail, is used by the DOE to estimate boundary flows for their site-scale flow model of Yucca Mountain.

Al Eddebbarh of Los Alamos National Laboratory provided a summary of the DOE approach to modeling saturated zone flow paths at Yucca Mountain. The information presented was mostly the same information available in the previously published Saturated Zone Process Model Report and associated analysis/model reports. DOE is currently revising eight of the analysis/model reports that support the site-scale saturated zone model to be used for a license application.

Representatives from Nye County gave several poster presentations. Dale Hammermeister presented a summary of Nye County investigations of the properties of saturated alluvium beneath the Fortymile Wash area, which is along potential flow paths from Yucca Mountain. Of particular interest in this presentation was the mention of Nye County plans to conduct tracer tests in saturated alluvium at the location of Well NC–EWDP–22S. A poster presentation by David Cox of Questa Engineering (consultants to Nye County) provided results of aquifer pumping tests in two Nye County wells south of Yucca Mountain. Hydraulic conductivity at Well NC–EWDP–10S was determined to be 2 m/day [6.4 ft/day] over the 48 m [158 ft] productive thickness of the well. Hydraulic conductivity at Well NC–EWDP–22S was determined to be 13 m/day [42 ft/day] over the 112 m [369 ft] productive thickness of the well.

Hans Arlt, U.S. Nuclear Regulatory Commission (NRC), and Jim Winterle, Center for Nuclear Waste Regulatory Analyses (CNWRA), gave a poster presentation titled "Effects of Recharge and Water Table Variations on Groundwater Flow Paths and Travel Times from Yucca Mountain." Lauren Browning (CNWRA) presented a poster titled "Effects of Alternative Flow Pathways on Water Chemistries in Reactive Transport Simulations for the Ambient Unsaturated Zone at Yucca Mountain, Nevada."

Numerous other presentations were made. Abstracts for many of the presentations can be obtained from the meeting organizers at Internet site http://hrcweb.lv-hrc.nevada.edu by following the link to the Devils Hole Workshop. The organizers have also indicated that presentation slides that are submitted by the presenters will also be made available shortly through this Internet site.

L. Browning participated in a field trip hosted by the workshop organizers on Friday, May 23. There were five stops on the field trip that focused on engineered and natural hydraulic features in both Death and Amargosa Valleys. The first stop was at Travertine Springs, where pump tests were being performed to study aquifer properties and potential groundwater flow barriers. In Echo Canyon, field trip participants examined fault block escarpments that may permit flow through a conglomerate section in the limestone barrier. The third stop provided a broad view of the Funeral Mountain range, including the site of a potential subsurface hydrologic "spillway" feature, which is believed to be the cause of the large drop in water table elevation from Amargosa Valley into Death Valley. At the Crystal Springs/Ash Meadows stop, possible origins for the large spring system were discussed. The last stop of the field trip was at Devils Hole, where the livelihood of endangered pupfish is closely monitored.

CONCLUSIONS:

The conference was well attended by many researchers with interests in the Death Valley Regional groundwater-flow system. The meeting provides an excellent opportunity to stay informed about ongoing work to characterize this flow system. Especially beneficial were the opportunities to speak with Nye County staff regarding work being done to investigate the properties of alluvium along potential flow paths from Yucca Mountain, and with Inyo County staff regarding their scientific program to investigate the regional groundwater flow system.

PROBLEMS ENCOUNTERED:
None.

PENDING ACTIONS:
None.

RECOMMENDATIONS:

Attendance at future Devils Hole Workshops is highly recommended.

SIGNATURES:

James Winterle
Senior Research Scientist

6-18-03
Date

Lauren Browning
Research Scientist

6/18/03
Date

CONCURRENCE:

English C. Pearcy
Manager, Geohydrology and Geochemistry

6/18/03
Date

for B. Sagar
Budhi Sagar
Technical Director

06/18/2003
Date