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CENTER FOR NUCLEAR WASTE REGULATORY ANALYSES

TRIP REPORT

SUBJECT: Trip to Yucca Mountain (YM) and Solitario Canyon
20-5708-861

DATE/PLACE: January 8–10, 1997
Beatty, NV

AUTHOR: G. Wittmeyer and J. Winterle

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PERSONS PRESENT:

The visit to Mercury Ridge, on January 8, 1997, was attended by J. Winterle, G. Wittmeyer, and D. Woolhiser (CNWRA Consultant). The trip to Solitario Canyon on January 9, 1997 was also attended by J. Winterle, G. Wittmeyer, and D. Woolhiser. On the morning of January 10, 1997 J. Winterle and G. Wittmeyer were accompanied into the Exploratory Studies Facility (ESF) by C. Glenn and B. Belke (NRC) and led by D. McNeeley (Morrison Knudsen/YMP).

BACKGROUND AND PURPOSE OF TRIP:

It has been proposed that long duration stormwater runoff in the channel draining Solitario Canyon may rapidly infiltrate into the repository horizon through faults or fracture zones in the upper Topopah Spring unit. The CNWRA retained D. Woolhiser as a consultant to develop a detailed watershed model of Solitario Canyon using the KINEROS distributed model. The watershed model developed by D. Woolhiser will be used to determine stage and discharge hydrographs for specified locations in the Solitario canyon watershed under current climatic conditions as well as pluvial conditions. The effect of channel flow in Solitario canyon on focused infiltration will be evaluated using the BREATH code. The primary purpose of the trip was to provide D. Woolhiser with firsthand knowledge of the topography and fluvial geomorphology of Solitario Canyon. A secondary purpose of the trip was to familiarize J. Winterle with the YM area including details of YM stratigraphy and structure visible in the ESF.

SUMMARY OF ACTIVITIES:

D. Woolhiser has used hydraulic conductivity measurements obtained from rainfall simulator experiments conducted at the base of Mercury Ridge as input to KINEROS. A brief reconnaissance-level study of the Mercury Ridge area was conducted on January 8, 1997 so that its similarity to Solitario Canyon could be assessed.

On January 9, 1997 reconnaissance-level studies of Solitario Canyon, its main channel and side channels were conducted. The main channel and some of the side channels were surveyed for evidence of recent runoff events. Rough estimates of channel bottom widths were made along reaches not surveyed during the May, 1996 field trip.

On the morning of January 10, 1997 G. Wittmeyer and J. Winterle were transported by train to the end of the ESF (approximately station 72+50) where they were briefed on Tunnel Boring Machine (TBM) operations by D. McNeeley. On the ride out the ESF the train was stopped at several locations including: (i) a moist fracture zone in the Boundary Ridge fault zone, (ii) the southern splay of the Ghost Dance fault, (iii) a fracture adjacent to the Drill Hole Wash fault where high bomb-pulse ^{36}Cl measurements were obtained, and (iv) Alcove 5 where thermomechanical and thermohydrologic tests are being conducted.

CONCLUSIONS:

According to D. Woolhiser, the field trip greatly improved his understanding of the Solitario Canyon watershed. Soil texture and vegetation at the Mercury Ridge rainfall simulator site appeared to be fairly similar to those in Solitario Canyon. However, reported detailed textural analyses of the limestone-derived Mercury Ridge soils indicate a slightly lower clay content than the soils found in Solitario Canyon, which are derived from tuffaceous rock. This information would suggest that the saturated hydraulic conductivity of the soil cover in Solitario Canyon should be less than that measured at the Mercury Ridge rainfall simulator site.

The morphology of the main channel repeatedly changes from being well incised in some reaches to being braided and poorly-defined in other reaches as one proceeds up the watershed from the USGS stream gaging station near Plug Hill. In the upper reaches of the watershed the active portion of the main channel is generally well defined. There was little evidence of recent runoff events in the lower third of the main channel. In the upper two-thirds to half of the main channel there were numerous areas where water-borne brush had been stranded in shrubs and rock crevices. Alluvium in the upper reaches of the main channel is composed of clean coarse sands and gravels while alluvium in the lower reaches is generally composed of silty sands and gravels.

According to D. Woolhiser, the Solitario Canyon watershed model simulations he has conducted to date predict a higher frequency of runoff events than one would expect based on field evidence. Actual channel bottom infiltration rates are probably larger than those determined by the watershed model. Simulated channel bottom infiltration may be increased by increasing both the saturated hydraulic conductivity and Manning's n.

PROBLEMS ENCOUNTERED:

None

PENDING ACTIONS:

None

RECOMMENDATIONS:

None

SIGNATURES:

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Senior Research Scientist

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Date

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Research Scientist

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