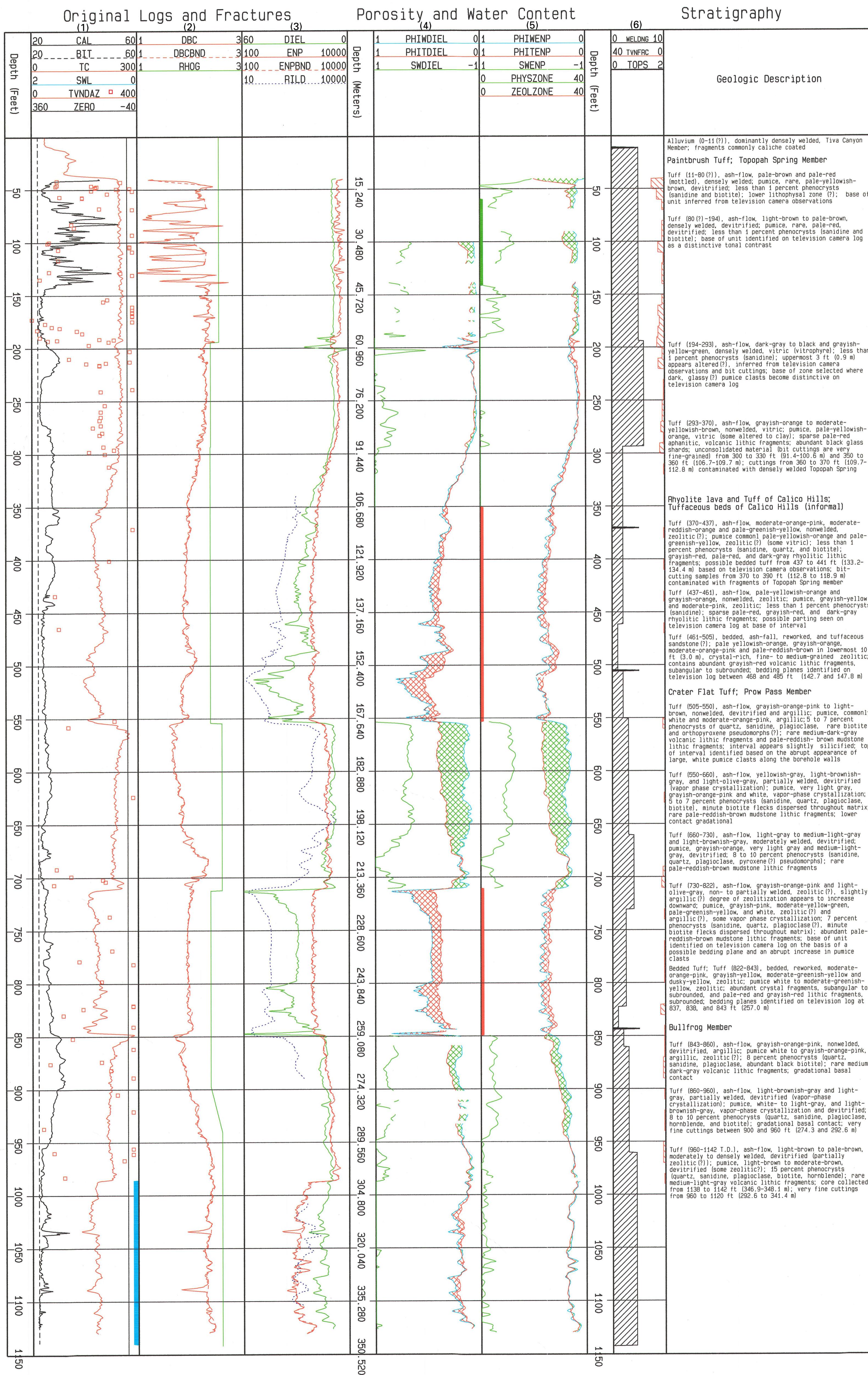


## UE-25WT#3



## Petrophysical Properties, Mineralogy, Fractures, and Flow Tests in 25 Deep Boreholes at Yucca Mountain, Nevada

By Philip H. Nelson and Joyce E. Kibler

BOREHOLE UE-25 WT#3, YUCCA MOUNTAIN, NEVADA

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Borehole UE-25 WT#3 was completed in May, 1983 to a total depth of 1142 feet. The hole was rotary drilled using air foam consisting of air, detergent, and water (Muller and Kibler, 1985). Depth on the plot is measured along hole, and has not been corrected for deviation. Hole deviation is 2.5 to 3.0 degrees, (Plate 19 in Nelson and others, 1991): at a measured depth of 1142 feet, the computed true vertical depth is 1140.9 feet, and the computed horizontal offset is 47.2 feet.

Original logs in columns 1-3, acquired on May 23 and 24, 1983, were described and presented by Nelson and others, 1991. UE-25 WT#3 was drilled for the purpose of monitoring water levels; the static water level is indicated by a cyan bar in column 1 (Robison, 1984).

Porosity and water content computed from the dielectric and density logs are shown in column 4 as phidiel and phiwiel, using a method described by Nelson, 1993. Porosity and water content computed from the epithermal neutron and density logs are shown in column 5 as phitenp and phiwep (Nelson, 1994). Green hatching between the porosity and water content curves denotes air-filled porosity. Red hatching appears where water content exceeds porosity, often indicating the presence of zeolitic minerals.

Saturation (swiel in column 4, swep in column 5) is computed as the ratio of water content to porosity. It has been nulled in zones flagged as zeolone. The flags physzone and zeolone (green and red bars in column 5) denote the presence of abundant lithophysae and extensive alteration, respectively. Their depth extent is taken from inspection of the green and red hatch areas in columns 4 and 5 and from consideration of other logs, especially resistivity, rild.

Stratigraphic tops and degree of welding, given in column 6, and the geologic description, in the text column, are from R. Spengler, U.S. Geological Survey, written communication, 1995. The degree of welding (weldng) increases to the right, in accordance with the geologic description.

Plots of individual fractures, (tvndaz, column 1), observed on television logs are plotted to show the azimuth of the dip of each fracture. The same data are plotted as fracture density (tvnrc) in column 6.

## EXPLANATION OF CURVES AND SYMBOLS

Column 1  
 CAL Caliper in cm, black curve.  
 BIT Bit size in cm, black dash line.  
 SWL Static water level, vertical cyan bar.  
 TC Gamma ray in API units, red curve.  
 TVNDAZ Dip azimuth of fractures, from television, red squares.  
 Undetermined azimuth is coded as 380 or 390 degrees.

Column 2  
 DBC Density in g/cc, red curve.  
 DBCBOUND Density bound in g/cc, red dash curve.  
 RHOG Grain density in g/cc, green curve.

Column 3  
 ENP Epithermal neutron in counts/sec, red curve.  
 ENPBND Epithermal bound, red dash curve.  
 RILD Induction resistivity in ohm-m, blue dot curve.  
 DIEL Dielectric permittivity, ratio, green curve.

Column 4  
 PHIWIEL [fractional volume of whole rock, increasing to left]  
 PHITDIEL Water content, from DIEL and DBCBOUND logs, cyan curve.  
 PHITDIEL Porosity, from DIEL and DBCBOUND logs, red curve.  
 (green hatch where PHITDIEL > PHIWIEL,  
 red where PHITDIEL < PHIWIEL).  
 SWDIEL Saturation, ratio of PHIWIEL to PHITDIEL.

Column 5  
 PHIWEP [fractional volume of whole rock, increasing to left]  
 PHIWEP Water content, from ENPBND and DBCBOUND logs, cyan curve.  
 PHITENP Porosity, from ENPBND and DBCBOUND logs, red curve.  
 (green hatch where PHITENP > PHIWEP,  
 red where PHITENP < PHIWEP).  
 SWENP Water saturation, ratio of PHIWEP to PHITENP, green curve.  
 PHYSZONE Lithophysal zone, picked from logs, green bar.  
 ZEOLONE Zeolitic zone, picked from logs, red bar.

Column 6  
 TOPS Stratigraphic boundaries, black ticks.  
 WELDNG Degree of welding from core inspection, black slant.  
 TVNRC Number of fractures per 10 feet, from television, red.

## NOTES

Date of last computation: May 1996  
 Plot Date: May 1996  
 Scientific Notebook: SN-0092

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