

○ when deepened to 1750', water renamed well # 78-5

Permit 35

Lithologic Log  
AN-A-5

Interval,  
depth,  
etc

8/24/78 (shallow)  
9/9/78 } (300-TD)  
9/13/78 }

- 0-10 clay ~~averbanded~~ 100% clay.
- 10-20 50% <sup>angular to rounded</sup> alluvial gravel (.1 to .5 inches diameter) composed of primarily of basalt and rhyolite; ~~20% sand~~ ~~30% volcanic material~~; 30% clay; 20% volcanic sand.
- 20-30 80% gritty clay; 20% alluvial gravel and sand as in interval 10-20.
- 30-40 Same as interval 20-30 except grains are more rounded.
- 40-50 70% well-rounded alluvial <sup>basaltic volcanic</sup> gravel (.3 to .8 inches diameter); 30% ~~gray~~ gritty clay.
- 50-60 same as interval 40-50 except basalt is vesicular.
- 60-70 60% alluvial gravel as in interval 40-50; 40% clay.
- 70-80 50% alluvial gravel as in interval 40-50; 50% clay.
- 80-90 50% alluvial <sup>angular to sub-rounded volcanic</sup> sand and gravel (up to 1 inch diameter); 50% clay.
- 90-100 80% clay; 20% alluvial gravel as in interval 80-90.

AN-A-5 (cont'd)

- 100-110 85% clay ; 15% alluvial angular to rounded volcanic gravel (~~with diameters up to~~) (up to .3 inches diameter).
- 110-120 75% clay ; 25% alluvial gravel as in interval 100-110.
- 120-130 50% clay ; 50% alluvial gravel as in interval 100-110, except up to 0.5 inches in diameter.
- 130-150 70% gravel as in interval 120-130 ; 30% clay.
- 150-160 60% gritty clay ; 40% alluvial gravel as in interval 120-130.
- 160-170 60% ~~alluvial~~ gravel as in interval 120-130 ; 40% clay.
- 170-180 50% angular chips of <sup>massive</sup> dark aphanitic ~~basalt~~ <sup>vesicular</sup> basalt ; 30% clay ; 20% ~~alluvial~~ gravel as in interval 120-130.
- 180-190 100% basalt as in interval 170-180.
- 190-250 100% basalt as in interval 170-180 ~~and~~ except ~~reddish~~ in color and with some zeolitic (?) mineralization. CONDUCTIVITY SAMPLE TAKEN AT INTERVAL 230-240.
- 250-260 50% basalt as in interval 190-250 with addition of red vesicular volcanic. 50% dark. ~~and~~ fine-grained volcanic sand showing some rounding.
- 260-270 70% sand as in interval 250-260 ; 30% gray to red basalt chips, possibly detrital.

AN-A-5 (cont'd)

- 270-280 50% fine sand to gritty clay; 50% angular to <sup>sub-</sup>semi-rounded volcanic gravel (up to .4 inch diameter).  
Permeability
- 280-300 100% dark gray to red ~~massive~~ basalt.  
CONDUCTIVITY SAMPLE TAKEN.
- 300-310 vesicular  
95% a basalt; 5% quartz. SiO<sub>2</sub> replacement.
- 310-320 vesicular  
95% red basalt with <sup>some dark</sup> secondary SiO<sub>2</sub> replacement, 5% detrital basalt.
- 320-330 fractured and massive  
100% a red and black basalt with secondary replacement SiO<sub>2</sub>.
- 330-340 100% MASSIVE black to gray basalt with some secondary SiO<sub>2</sub> replacement.
- 340-360 80% black, ~~to~~ gray <sup>and red</sup> basalt with some secondary SiO<sub>2</sub> replacement; 20% light colored black and red extrusive rocks.
- 360-370 90% basalt as in interval 340-360, 10% extrusive rocks as in interval 340-360.
- 370-380 <sup>red massive</sup>  
100% vesicular ~~red~~ basalt with soft buff colored secondary mineral replacement.
- 380-~~410~~ <sup>410</sup>  
100% black and red basalt with some secondary SiO<sub>2</sub> replacement.
- 410-430 90% reddish-brown medium-well cemented fine-grained sandstone; 10% black basalt.
- 430-440 No sample, but bit was clay-coated.

AN-A-5 (cont'd)

- 440-450 80% brown clay; 20% black basalt.
- 450-460 70% black and red detrital basalt; 30% <sup>soft brown</sup> ~~known~~ clay.
- 460-470 same as interval 450-460 except clay is firm.
- 470-480 70% brown <sup>firm</sup> clay; 30% black and red detrital basalt.
- 480-490 90% brown <sup>firm</sup> clay; 10% black and red detrital basalt.
- 490-500 100% brown <sup>firm</sup> clay.
- 510-520 100% brown <sup>soft</sup> clay.
- 520-<sup>540</sup>~~530~~ 85% <sup>90% soft to firm. brown to</sup> ~~soft and firm~~ clay; 15% black detrital basalt.
- 530-540 90% brown <sup>soft to firm</sup> clay; 10% black detrital basalt.
- 540-620 100% brown <sup>firm</sup> clay.
- 620-630 70% brown <sup>firm</sup> clay; 30% dark brown fine-grained ~~moderately~~ moderately well-cemented mudstone.
- 630-640 60% brown <sup>firm</sup> clay; 40% <sup>black detrital</sup> ~~detrital black~~ basalt and mudstone as in interval 620-630.
- 640-660 40% dark brown fine-grained moderately well-cemented mudstone; 30% brown <sup>firm</sup> clay; 30% black detrital basalt.
- 660-670 100% clay and mudstone with minor black detrital basalt.
- 670-700 100% massive black basalt with minor <sup>firm</sup> brown <sup>firm</sup> clay.

ANA-5 (cont'd)

- 700 - ~~710~~<sup>740</sup> 100% massive black basalt with green secondary mineral replacement; minor firm brown clay.
- ~~710 - 720~~<sup>740</sup> 100% massive black basalt with minor firm brown clay.
- ~~740 - 760~~ 80% black basalt; 10% red basalt; 10% very fine grained green mineral.
- 740 - ~~760~~<sup>780</sup> 80% partly vesicular black basalt; 10% <sup>PARTLY</sup> vesicular red basalt; 10% very fine grained <sup>soft</sup> green secondary mineral replacement.
- ~~780 - 790~~<sup>820</sup> 95% black basalt with some secondary mineral replacement; ~~5%~~<sup>5-10%</sup> firm brown clay; ~~minor~~ <sup>0-5%</sup> gray mudstone.
- ~~790 - 800~~ 85% black basalt; 10% firm brown clay; 5% gray mudstone.
- ~~800 - 820~~ 95% black basalt; 5% firm brown clay.
- 820 - ~~850~~<sup>860</sup> ~~95%~~ Same as interval ~~800-820~~<sup>780-820</sup> with addition of minor quartz.
- ~~850 - 860~~ ~~90%~~ black basalt; ~~10%~~ firm brown clay and quartz.
- 860 - ~~870~~<sup>880</sup> Same as interval ~~850-860~~<sup>780-820</sup>, but without quartz.
- ~~870 - 880~~ 90% black basalt; 10% firm brown clay and soft gray mudstone.
- 880 - 890 Same as interval 870-880 with addition of some reddish basalt.
- 890 - 900 50% black and red mostly detrital basalt; 50% firm brown clay and gray mudstone.

ANA-5 (cont'd)

- 900-910 50% black basalt ; 50% gray to brown fine-grained rock with hardness greater than 5 and containing small particles of quartz ; minor clay and mudstone.
- 910-920 50% black basalt ; 50% firm brown clay with some quartz.
- 920-940 70% black basalt ; 30% <sup>firm</sup> brown clay and gray mudstone.
- ~~940-950~~ 90% black basalt ; 10% <sup>brown firm</sup> brown clay and gray mudstone with some quartz.
- <sup>940</sup> 950-960 95% massive (?) black basalt ; 5% firm brown clay and gray mudstone ; minor white ~~hard~~ quartz.
- 960-980 No SAMPLES
- 980-990 95% massive (?) black basalt ; 5% firm brown clay and gray mudstone ; minor quartz and unidentified yellow rock.
- 990-1000 No SAMPLE.
- 1000-1010 95% massive (?) black basalt ; 5% firm brown clay ; minor quartz.
- 1010-1020 70% black basalt ; 30% firm brown clay ; minor quartz.
- 1020-1080 95% massive black basalt ; 5% firm brown clay ; minor quartz. SAME AS INTERVAL
- 1080-1090 95% massive (?) black basalt ; 5% firm brown clay and mudstone ; minor quartz.
- 1090-1100 No SAMPLE.

AN-A.5 (cont'd)

- 1100-1110 100% fractured black and red basalt with green secondary mineral replacement ; minor quartz.
- 1110-1120 100% ~~fractured~~ black basalt ; minor firm brown clay and quartz.
- 1120-1130 100% black to dark gray aphanitic basalt ; trace <sup>soft</sup> brown claystone.
- 1130-1140 100% dark gray aphanitic basalt ; minor green secondary chalcedony.
- 1140-1160 95% dark gray basalt ; 5% soft brown claystone ; minor chalcedony.
- 1160-1170 70% dark gray aphanitic basalt ; 30% reddish-brown slightly porous volcanic rock ; minor green chalcedony.
- 1170-1180 75% dark gray basalt ; 25% ~~reddish~~ <sup>slightly vesicular</sup> reddish-brown volcanic rock with occasional phenocrysts of green mineral and partial filling of ~~vesicles~~ <sup>vesicles</sup> with white mineral.
- 1180-1190 90% dark gray basalt ; 10% red volcanic ; minor chalcedony.
- 1190-1200 85% dark gray basalt ; 15% red volcanic with phenocrysts (< 0.05 inches) of chalcedony (?) ; minor free chalcedony.
- 1200-1210 90% dark gray <sup>aphanitic</sup> basalt ; 10% red volcanic with secondary quartz phenocrysts ; minor free secondary chalcedony.
- 1210-1220 90% dark gray aphanitic aphanitic basalt with occasional blue-gray coating ; 10% red volcanic ; minor chalcedony.

AWA-5 (cont'd)

- 1220-1230 100% dark gray aphanitic basalt ; minor blue-gray rock with conchoidal fracture.
- 1230-1240 95% dark gray basalt ; 5% hard brown claystone ; minor green chalcedony.
- 1240-1250 100% dark gray basalt ; minor red volcanic and green chalcedony.
- 1250-1260 same as interval 1230-1240.
- 1260-1270 60% dark gray aphanitic basalt ; 40% light brown claystone.
- 1270-1280 100% dark gray to dark brown aphanitic basalt.
- 1280-1290 50% greenish-gray aphanitic basalt ; 50% reddish-brown volcanic rock with occasional dark gray inclusions (?).
- 1290-1300 90% greenish gray to dark gray basalt ; 10% light brown claystone.
- 1300-1310 100% greenish gray aphanitic basalt.
- 1310-1320 60% dark gray basalt ; 35% hard reddish-brown volcanic rock with occasional phenocrysts (<.05 inch) of quartz (?); 5% light blue to colorless chalcedony.
- 1320-1330 50% gray to dark gray basalt ; 50% <sup>hard</sup> reddish-brown volcanic with vesicles (<.05 inch) <sup>aphanitic</sup>
- 1330-1340 75% reddish-brown to pink volcanic with up to 0.1 inch vesicles ; 25% greenish-gray basalt ; minor chalcedony.
- 1340-1350 90% reddish-brown to pink volcanic with occasional dark gray basalt (?) inclusions and wh. t. qua



ANA-5 (contd.)

- 1350 - 1360 60% reddish-brown volcanic ; 40% dark gray basalt.
- 1360 - 1370 same as interval 1350-1360 with minor light brown claystone.
- 1370 - 1380 Most of sample consisted of lost circulation material. Rock material consisted of dark gray <sup>aphanitic</sup> fine-grained basalt and a <sup>hard</sup> green aphanitic volcanic rock.
- 1380 - 1390 75% fine-grained green volcanic rock with OLIVINE(?); 25% dark gray aphanitic basalt with abundant blue chalcedony.
- 1390 - 1400 100% (hard aphanitic) green to greenish-gray volcanic rock with minor light blue chalcedony and olivine(?).
- 1400 - 1430 70% greenish gray aphanitic basalt ; 30% reddish-brown volcanic.
- 1430 - 1440 <sup>1450</sup> 100% <sup>hard</sup> greenish-brown to greenish-gray basalt (?), minor quartz
- ~~1440 - 1450~~ 100% aphanitic greenish-gray basalt ; minor quartz.
- 1450 - 1470 <sup>50% greenish-gray aphanitic basalt, 50% reddish-brown volcanic</sup> Same as interval ~~1280-1290~~ rock w/ OCCASIONAL dark gray inclusions.
- 1470 - 1480 75% greenish gray to dark gray basalt ; 25% reddish brown volcanic.
- 1480 - 1490 75% reddish-brown <sup>vesicular</sup> volcanic, ~~with~~ <sup>vesicles</sup> partially ~~vesicle~~-filling with dark greenish gray mineral, <sup>and</sup> occasional ~~phenocrysts~~ <sup>clear</sup> colorless quartz phenocrysts ; 25% dark greenish-gray fine to medium-grained basalt.

ANA-5 (contd)

- 1530 <sup>dark-brown to</sup> DNE  
1490 - 1500 100% dark gray aphanitic basalt with phenocrysts  
( $\leq .05$  inch) of clear colorless quartz.
- ~~1500 - 1530~~ 100% dark brown to dark gray fine-grained  
basalt.
- 1580 <sup>dark gray to</sup>  
1530 - ~~1550~~ 100% dark greenish-gray basalt with  
occasional vesicles; minor light blue  
chalcedony.
- ~~1550 - 1580~~ 100% dark gray to greenish-gray basalt.
- 1600 <sup>finely porous</sup>  
1580 - ~~1590~~ 60% reddish-brown volcanic rock; 35% dark  
gray basalt; 0.5% soft light-brown claystone.
- 1590 - 1600 65% reddish-brown finely-porous volcanic  
rock; 35% brown to dark gray basalt (?)
- 1640 <sup>dark</sup>  
1600 - ~~1610~~ 95% - 100% brown to gray aphanitic basalt; 0.5%  
reddish brown volcanic; minor light brown claystone.
- 1610 - 1630 100% dark <sup>brown</sup> gray to gray basalt; minor light  
brown claystone.
- 1630 - 1640 100% dark gray aphanitic basalt.
- ~~1640 - 1650~~ 60% reddish-brown finely porous volcanic rock;  
40% dark gray basalt.
- 1640 -  
~~1650~~ - 1660 60% reddish brown to brown slightly vesicular  
aphanitic <sup>volcanic rock</sup> ~~basalt~~; 35% - 40% dark-gray basalt.  
0.5% light brown claystone.
- 1660 - 1670 75% dark gray to dark brown basalt; 25%  
reddish-brown volcanic; minor light brown  
claystone.

ANA-5 (cont'd)

1670-1680 90% dark gray aphanitic basalt ; 10% red volcanic

1680-1690 65% dark gray to greenish gray basalt ;  
35% reddish-brown volcanic ; light blue  
veinlets of blue chalcedony present in both  
rock types ; minor free calcite.

1690-1700 <sup>1710</sup> 90-  
100% dark gray and dark greenish gray  
basalt ; 0-5% minor red volcanic ; and 0-5%  
light brown claystone.

~~1700-1710~~ 90% dark gray aphanitic basalt ; 5%  
light brown claystone ; 5% red volcanic.

1710-1720 80% greenish-gray basalt ; 20% reddish-  
brown volcanic.

~~1720-1750~~ same as interval ~~1700-1710~~ <sup>1690-1710</sup>  
~~1700-1710~~.

1720-1750 <sup>80% greenish</sup>  
1730-~~1740~~ 90% green to dark-gray basalt ; 0-5%  
red volcanic ; 10%  
0-5% light brown claystone.

~~1740~~  
1750-1755 TD 80% dark greenish-gray basalt ;  
20% soft light-brown claystone ;  
minor light blue chalcedony.

# County Court for Harney County

P.O. Box 1147  
BURNS, OREGON 97720

August 31, 1978

Mr. Vernon C. Newton, Jr.  
Geologist-Petroleum Engineer  
Department of Geology and Mineral Industries  
1069 State Office Building  
Portland, Oregon 97201

Dear Mr. Newton:

Harney County has no objections to the amended request of Anadarko Production Company to drill deeper gradient holes in the Alvord Desert.

Sincerely

A handwritten signature in blue ink that reads "Dale White". Below the signature, there are some small, illegible initials or marks.

Dale White  
Harney County Judge

DW: ed