Lithologic Log

AN-A-5

When deepened to 1750', operator renamed well #78-5

6L 70 300 feet
8/24/78 (shallow)
9/7/78 70 (300-70)
9/13/78

-10
-10
Angled to rounded
-10
-10
Angular to rounded
-10
-10
Angular to rounded
-10
-10
Angular to rounded
-10
-10
Angular to rounded

50% alluvial gravel (0.1 to 0.5 inches diameter) composed of primarily basaltic and rhyolitic tuff, bandespresso, volcanic tuff, 30% clay; 20% volcanic sand.

80% gritty clay; 20% alluvial gravel and sand as in interval 10-20.

80% gritty clay; 20% alluvial gravel and sand as in interval 10-20.

Same as interval 20-30 except grains are more rounded.

70% well-rounded alluvial gravel (0.3 to 0.8 inches diameter); 30% gray gritty clay.

Same as interval 40-50 except basalt is vesicular.

60% alluvial gravel as in interval 40-50; 40% clay.

50% alluvial gravel as in interval 40-50; 50% clay.

50% alluvial sand and gravel (up to 1 inch diameter); 50% clay.

80% clay; 20% alluvial gravel as in interval 80-90.
100-110  85% clay; 15% alluvial angular to rounded volcanic gravel (up to 1/2 inch 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 inch in diameter.

130-150  70% gravel as in interval 130-150; 30% clay.

150-160  60% gritty clay; 40% alluvial gravel as in interval 130-150.

160-170  60% alluvial gravel as in interval 170-180; 40% clay.

170-180  50% angular chips of dark aphanitic basalt; 30% clay; 20% alluvial gravel as in interval 130-150.

180-190  100% basalt as in interval 170-180.

190-250  100% basalt as in interval 170-180 except reddish in color and with some zeolitic (?) mineralization. Connectivity sample taken at interval 230-240.

250-260  50% basalt as in interval 190-250 with addition of red vesicular volcanic. 50% dark, fine-grained volcanic sand showing some rounding.

260-270  70% sand as in interval 250-260; 30% gray to red basalt chips, possibly detrital.
270-280 50% fine sand to gritty clay; 50% angular to semi-rounded volcanic gravel (up to .4 inch diameter).

280-300 100% dark gray to red basalt. Conductivity sample taken.

300-310 95% a basalt; 5% quartz, SiO2 replacement; vesicular.

310-320 95% a red basalt with SiO2 replacement, 5% detrital basalt.

320-330 100% a red and black basalt with secondary replacement SiO2.

330-340 100% Massive black to gray basalt with some secondary SiO2 replacement.

340-360 80% black to gray basalt with some secondary SiO2 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.

370-380 100% a vesicular red basalt with soft buff-colored secondary mineral replacement.

380-410 100% black and red basalt with some secondary SiO2 replacement.

410-430 90% reddish-brown medium-well cemented fine-grain sandstone; 10% black basalt.

430-440 No sample, but bit was clay-coated.
440 - 450 80% brown clay; 20% black basalt.
450 - 460 70% black and red detrital basalt; 30% brown soft clay.
460 - 470 same as interval 450-460 except clay is firm.
470 - 480 70% brown firm clay; 30% black and red detrital basalt.
480 - 490 90% brown firm clay; 10% black and red detrital basalt.
490 - 500 100% brown firm clay.
510 - 520 100% brown soft clay.
520 - 540 85% brown soft and firm clay; 15% black detrital basalt.
540 - 550 90% brown soft to firm clay; 10% black detrital basalt.
540 - 620 100% brown firm clay.
620 - 630 70% brown firm clay; 30% dark brown fine-grained moderately well-cemented mudstone.
630 - 640 60% brown firm clay; 40% detrital black basalt.
640 - 660 40% dark brown fine-grained moderately well-cemented mudstone; 30% brown firm clay; 30% black detrital basalt.
660 - 670 100% clay and mudstone with minor black detrital basalt.
670 - 700 100% massive black basalt with minor brown clay.
100% massive black basalt with green secondary
mineral replacement, minor firm brown clay.

100% massive black basalt with minor firm brown
clay.

80% black basalt; 10% red basalt; 10% very
fine-grained green mineral.

80% partly vesicular black basalt; 10% vesicular
red basalt; 10% very fine-grained green secondary
mineral replacement.

95% black basalt with some secondary
mineral replacement; 5% firm brown clay;
minor 0-5% gray mudstone.

85% black basalt; 10% firm brown clay;
5% gray mudstone.

85% black basalt; 5% firm brown clay.

Same as interval 850-860 with addition of minor qua-
artz.

90% black basalt; 10% firm brown clay and quartz.

Same as interval 850-860, but without quartz.

90% black basalt; 10% firm brown clay and soft
gray mudstone.

Same as interval 870-880 with addition of some
reddish basalt.

50% black and red mostly detrital basalt; 50% firm brown clay and gray mudstone.
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% firm brown clay and gray mudstone.

940 - 950  90% black basalt; 10% firm brown clay and gray mudstone with some quartz.

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 intervals.

1080 - 1090  95% massive (?) black basalt; 5% firm brown clay and mudstone; minor quartz.

1090 - 1100  No sample.
110 - 1110 100% fractured black and red basalt with green secondary mineral replacement; minor quartz.

1110 - 1120 100% black basalt; minor fine brown clay and quartz.

1120 - 1130 100% black to dark gray aphanitic basalt; trace of 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-brown volcanic rock with occasional phenocrysts of green mineral and partial filling of vesicles 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 (3); minor free chalcedony.

1200 - 1210 90% dark gray aphanitic 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.
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 (< 0.05 inch) of quartz (?); 5% light blue to colorless chalcedony.
1320-1330 50% gray to dark gray basalt; 50% hard aphanitic reddish-brown volcanic with vesicles (< 0.05 inch).
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 aphanitic basalt (?) inclusions and white amorphous chalcedony.
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 fine-grained basalt and a 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 100% hard greenish-brown to greenish-gray basalt(?); minor quartz.

1440 - 1450 100% aphanitic greenish-gray basalt; minor quartz.

1450 - 1470 50% greenish-gray aphanitic basalt; 50% reddish-brown volcanic.

1470 - 1480 75% greenish gray to dark gray basalt; 25% reddish-brown volcanic.

1480 - 1490 75% reddish-brown volcanic, partly vesicular, vesicles filled with dark greenish-gray mineral; occasional phenocrysts, clear colorless quartz phenocrysts; 25% dark greenish-gray fine to medium-grained basalt.
ANA-5 (contd.)

1490 - 1500
100% dark gray aphantic basalt with phenocrysts (< 0.05 inch) of clear colorless quartz.

1520 - 1530
100% dark brown to dark gray fine-grained basalt.

1530 - 1550
100% dark greenish-gray basalt with occasional vesicles; minor light blue chalcedony.

1550 - 1580
100% dark gray to greenish-gray basalt.

1580 - 1600
60% reddish-brown volcanic rock; 35% dark gray basalt; 5% soft light brown claystone.

1590 - 1600
65% reddish-brown finely-porous volcanic rock; 35% brown to dark gray basalt (3)

1600 - 1640
95% brown to gray aphantic basalt; 5% reddish-brown volcanic; minor light brown claystone.

1610 - 1630
100% dark gray to gray basalt; minor light brown claystone.

1630 - 1640
100% dark gray aphantic basalt.

1640 - 1650
60% reddish-brown finely-porous volcanic rock; 40% dark gray basalt.

1650 - 1660
60% reddish brown to brown slightly vesicular aphantic basalt; 35% to dark-gray basalt; 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 points of blue chalcedony present in both rock types; minor fleck calcite.

1690 - 1700  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  50% greenish-gray basalt; 20% reddish-brown volcanic.

1720 - 1730  Same as interval 1700 - 1710.

1720 - 1750  90% green to dark-gray basalt; 10% red volcanic; 0-5% light brown claystone.

1730 - 1740  80% dark greenish-gray basalt; 20% soft light-brown claystone; minor light blue chalcedony.

1750 - 1755 TD
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

Dale White
Harney County Judge

DW: ed