

LITHOLOGIC LOG

GEO-Utah Millard -
Thermex - GeophysProject: ThermexHole: 22-2Elevation: 6140Date Drilled: 11/14/83Location: NW of NW Sec 2 T26S R7WMethod: churn and rotaryGeologist: Huntsman/DeymonazGamma: NR

Depth (m)	Description
0 - 5 (0-1.5)	<u>Alluvium</u> - Clayey soil with boulders of basalt.
5 - 9 (1.5-2.7)	<u>Cinders</u> - Red-brown scoriaceous cinders.
9 - 14 (2.7-4.3)	<u>Basalt</u> - Dark gray to black, fine-grained dense basalt flow rock.
14 - 28 (4.3-8.5)	<u>Basalt</u> - Dark brown to reddish brown, fine-grained dense basalt flow. The lower 2.4 meters strongly fractured. The entire flow shows evidence of oxidation and/or weathering.
28 - 35 (8.4- 10.7)	<u>Cinders</u> - Red-brown to dark brown cinders.
35 - 88 (10.7-26.8)	<u>Basalt</u> - Dark gray to black, fine-grained dense basalt flow. The interior of the flow unit appears to have had a greater number of fractures (based upon drillers log) than either the top or bottom.
88 - 102 (26.8-31.1)	<u>Cinders</u> - Red-brown to dark brown cinder layer.
102 - 146 (31.1-44.5)	<u>Basalt</u> - Dark gray to black fine-grained dense basalt flow somewhat fractured throughout.
146 - 150 (44.5-45.7)	<u>Cinders</u> - Red brown cinder layer.
150 - 158 (45.7-48.2)	<u>Basalt</u> - Red brown to brown fine-grained dense basalt flow. The rock has been oxidized and/or weathered.
158 - 195 (48.2-59.5)	<u>Basalt</u> - Dark gray to black fine-grained dense basalt which appears to represent one single flow unit.
195 - 200 (59.5-61.0)	<u>Basalt</u> - Red brown to dark brown vesicular fine-grained, dense basalt flow. The rock is somewhat oxidized and/or weathered.

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200 - 204 (61.0-62.2)	<u>Cinders</u> - Red brown to brown cinder layer.
204 - 212 (62.2-64.6)	<u>Basalt</u> - Dark brown to gray black fine-grained dense to vesicular basalt flow. The base of the flow contains some pockets of gray sand.
212 - 258 (64.6-78.7)	<u>Sandstone</u> - Gray fine-grained to very fine-grained sandstone with some clay partings; may be the top of the Tertiary sediments of Lake Bonneville age. Strong iron oxide coatings along fractures near the basalt contact.
258 - 265 (78.7-80.8)	<u>Sandstone</u> - As above, except broken fragments in brown clay matrix, possible fault zone.
265 - 281 (80.8-85.7)	<u>Sandstone</u> - Brown, soft fine-to-medium grained, abundant clay matrix material. May be air fall tuff.
281 - 295 (85.7-89.9)	<u>Crystal Lithic Tuff</u> - Brown to reddish-brown, porphyritic tuff. Abundant altered feldspar crystals with minor biotite, hornblende and magnetite. Trace of quartz. Highly fractured with abundant iron staining and trace of manganese.
300 - 408 (91.5- 124)	<u>Syenite (Monzonite) (Miocene)</u> - Fine to coarse grained, light colored volcanic with 30% dark minerals (leucoeratic), porphyritic to hypidiomorphic. Abundant plagioclase (30%) and orthoclase (30%). Minor hornblende, trace magnetite and biotite. Minor resorbed clear grains of quartz in some chips.
408 - 793 (124 -241.7)	<u>Gabbro Porphyry and Monzonite</u> - Medium gray to light pink gray. Minor fragments and phenocrysts of labradorite and clinopyroxene in a felted plagioclase matrix mixed with intermediate composition volcanics related to the monzonite above. Minor calcite (4%), talc (5%), and quartz (3%), trace magnetite (1%) and possible epidote (1%). Weak, trace of hematite staining in zones and around some grains.

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793 - 802 (241.7-244.5)	(432-436) Tholeiitic basalt, black, olivine, poor, very dense, glassy with a hardness of about 7. Erosion Surface (electric logs).
802 - 890 (244.5-271.3)	<u>Zeolitic Tuff (Miocene)</u> - White, nonwelded, ash flow tuff containing 30% lithic fragments and phenocrysts of sanidine and plagioclase with trace to minor quartz and biotite. Matrix has been almost completely converted to the zeolite mineral clinoptilolite. Steven & Morris, 1981.
890 - 985 (271.3-300.3)	<u>Tuff of Albinus Canyon (Miocene or Oligocene)</u> - Pink weakly welded, crystal poor ash flow tuff. Strong argillic alteration of feldspar to kaolinite. Moderate kaolinite and talc. The tuff contains 2-5% potassium feldspar, 0-5% andesine, 1-2% quartz, trace apatite zircon, biotite and glass shards.
985 - 1020 (300.3-310.9)	<u>Basalt</u> - Black with moderate Hematite staining around possible altered olivine grains, very dense and hard. Round inclusions of calcite.
1020 - 1320 (310.9-402.4)	<u>Three Creeks Tuff</u> - Member of Bullion Canyon Volcanics (Oligocene). Densely welded, crystal rich, vesicular ashflow tuff with 40% phenocrysts of plagioclase (25%) (some altered), hornblende (5-10%), biotite (1-4%), and trace sanidine and magnetite. K-Ar and fission-track ages indicate an approximate age of 27 m.y. (Steven & others, 1979).
1320 - 1722 (402.4-525)	<u>Volcanics of Wales Canyon (Oligocene)</u> - Reddish gray, intermediate composition lava flows and welded ashflow tuffs containing moderately abundant phenocrysts of plagioclase and pyroxene, and sparse biotite. The welded tuffs were called Wales Canyon tuff member of the Bullion Canyon volcanics by Casken and Shvey (1975), but the name Volcanics of Wales Canyon is here extended to cover the lithologically similar lava flows that overlie and underlie the tuffs from 1380' to 1690'. Poor circulation, no good samples recovered.

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1722-2445 (525-745.4)	<p><u>Needles Range Formation (Oligocene)</u> - Light gray to white, approximately 40% phenocrysts in a welded matrix of devitrified glass shards and flattened pumice. Phenocrysts of plagioclase (20-25%), hornblende (3-5%) biotite (1%). In contrast to the overlying densely welded (elec. log) and crystal-rich Three Creeks Tuff Member, the Needles Range Formation is finer grained and contains moderate amounts of pumice.</p>
	<p>1742-1758 Gabbro, dark brown gray crystal lithic flow consisting of phenocrysts of calcic plagioclase (25-40%), hornblende 5%, biotite 1%, trace magnetite. Very hard slow drilling but unit must also be highly fractured. No oxidation. Minor soft red brown clay also.</p>
2445-4000 (745.5-1219.5)	<p><u>Volcanics at Dog Valley (Oligocene) (30 m.y.)</u> - Medium gray heterogeneous assemblage of intermediate composition lava flows, tuff breccias, and local and regional ash flow tuffs. The dacite flows range from porphyritic to aphanitic with phenocrysts of plagioclase (20-50%), hornblende (5%), biotite (2%), magnetite (2%) and pyroxene. Prophyllitic alteration of the lower part of the Bullion Canyon Volcanics has produced epidote, sericite, clays, calcite after plagioclase, and magnetite, chlorite and biotite after amphibole, Moore and Sanber (1979).</p>
	<p>2890-2990 Ash Flow Tuff - Medium pink densely welded tuff (881-911.5) with lithic fragment of plagioclase, trace biotite hornblende and magnetite lower 40' of flow is jet black vitrophyre.</p>
	<p>3100-4000 Minor amounts of bright blue green clay in (945.1-1219.5) dacite flows, argillic alteration of some phenocrysts and minerals.</p>