Geomatrix, Inc.

#4 LITHOLOGIC LOG

Site Scientist mcm

Date 12 DEC 76

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0 - 10		Vitreous bslt.	Typ unit of Deschutes; "Columbia basalt" of George Walker.
40		Dark, fn grain (black) basalt	SAMPLE
30		do	
40		do	
50		do	
60		do	
70		do	SAMPLE
80		do	SAMPLE
90		do	

LITHOLOGIC LOG

Geomatrix, etc.
Site Scientist _____
Date _____

#14

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
100 110		block, aph basalt	
110 120		do	
120 130		do	
130 140		do	
140 150		do	SAMPLE
150 160		do	
160 170		do	
170 180		do	
180 190		do	SAMPLE
190 200		do - some chips to 25 mm	
200 205	TD		

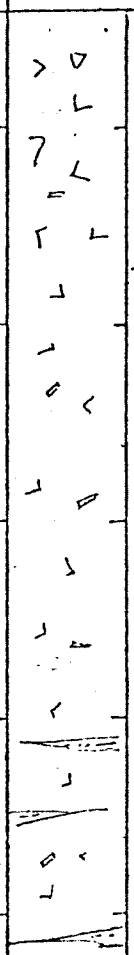
Rusty Cr.

LITHOLOGIC LOG

Site Scientist CWK

Date 12/14

#8

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0-10'		Rhyolite: med. gray; chips are sl. translucent, w/acc. opaque dust evenly distrib throughout; sev. % phen. to 2mm of qtz, fsp, Fe-oxide, some of which is weathered. Some is finely mottled gray and purple due to weathering of fine dusty opaque in patches.* Recovered cuttings are angular, 1-10mm, occas lgr.	Flow? Unit Tri of Dellechaie Note platy fracture of surface float, at c. 5cm intervals. *overall color purplish
10-20'		10-20': do.	
20-30'		20-30': do; purple mottling (weathering) scarce.	SAMPLE 0-30'
30-40'		30-50': do; purple mottling & abund. in some fragments, absent elsewhere, may associate w/ occas. veinlets of 'geothite-limonite', which are bordered by a thin (≤1mm) zone of yellow-green altn.	
40-50'			Weathering or weak hydrothermal, perhaps deuteric altn? - suspect latter.
50-60'		50-60': do., note rust-stained joint surfaces, adj yellow-green altn, as above.	
60-70'		do; plus occas. balls of yellow-orange clay-silt-sand	SAMPLE 40-50'
70-80'		do.	
80-90'		do.	
90-100'		do	SAMPLE 90-100'
100-110'		do.	
110-120		do.	c. 125 - enter black vitrophyre SAMPLE 110-120'
120-130'		Black vitrophyre; aphanitic matrix w/ pitchy, vitreous luster; fenocrysts to 1mm of fsp, augite. Cuttings recovered to 3cm long, flat, chips and plates.	SAMPLE 120-130'
130-140			
140-150		do, also recover sm. percent balls of lt. orange-brown clayey material	Fe-colloidal precipitate from cavities in rock? Have seen iden. material in basalt vesicles in drill core.
150-160		do., brown clayey mat. c. 5% of recovery, coats shear or joint surfaces. Prichstone is loc. riddled w/ fine fractures (random?) sealed w/ orange matl. also see traces of Calcite and zeolite(?) on occas surfaces of platy chips. In 170-180 and 180-190 fine fract. absent.	c 160-170 fractured rock, caving
160-170	do.		SAMPLE 150-160.
170-180	do		
180-190	do		
190-200	do	In 180-190 and 190-200 most cuttings are 4-6cm.	c 195 - caving

LITHOLOGIC LOG

Site Scientist [illegible]
Date 11 DEC [illegible]

#9

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0 - 10		chips of BSLT - vitreous black. ca. 4mm diam	SAMPLES / EACH 10' / FEW SKIPPED
10 - 20		do	
20 - 30		Tuffaceous sd; sdy tuffs lt. buff w/ clay binder; chips to 15 mm diam	Chalk Butte Fm top; 'A natural mud.
30 - 40		do	
40 50		do; stringer of gray sdy clay.	
50 60		do	
60 70		do; + gray sd., orange sd., blk bslt (vitreous) frags from uphole	
70 80		do	
80 90		do	
[illegible]			

Geothermex, Inc.
Site Scientist MCG
Date 11 Dec. 76

LITHOLOGIC LOG

#9

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
100 110		grey t. sd. gl. grgs about 3 mm diam	
110 120		do	
120 130		do	
130 140		do	
140 150		do	
150 160		do - many variegated stringers	
160 170		do - dominant grey clay-tuff glogs to 12 mm	
170 180		mostly grey; 15% tan/buff glogs similar to tuffac. sand in 20-30' zone	
180 190		grey & tan/buff tuffac. sd. / large glogs similar to 20-30' zone	
190 200		Basalt - vitreous black aphanitic clinos tan tuff, grey fine s.lt. sd. tuff glogs to 3 mm; 10% basalt to 10 mm; 10% buff sdy tuff (salmon colored)	WATER TABLE - OR PERCHED ZONE - DRILLER BLOWING @ 1.5 SPM @ 205'
200 210		basalt - to 10 mm; 10% buff sdy tuff (salmon colored)	

Geothermex, Inc.
Site Scientist CuK
Date 12/15/76

LITHOLOGIC LOG

#13

INTERVAL ft.	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
			See back for desc. of surface geo.
0–10		Tan siltst.* and tuff(?): cryptoxalline orangy tan siltstone and aphanitic but coarser textured pale tan (creme) sed, prob. rhyolite tuff, interbanded, apparently, in layers ≥ 1 cm thick (poss to sev. decimeters)	SAMPLE 0–10' siltstone is mod. hard but softer than knife SAMPLE 10–20'
	8	Contact c. 8 ft.	
10–20		Black sandstone or tuff: .5–1mm grains qtz and black glass (or other aphanite) in scant matrix gray silt, moderately consolidated	Rapid drilling. Glass clasts resemble black vitrophyre in bottom half hole #8.
20–30		do.	
30–40		do. Many cuttings to 1cm, are porphyritic, fractured black glass, f-p. pheno.	SAMPLE 30–40'
40–50		do.	
	58	contact (60–70: Tan siltstone and creme silt-sand or tuff, as above but somewhat softer.	
50–60			SAMPLE 60–70'
60–70			
70–80		Tan siltstone, fairly weak	Can gouge siltst. w/ fingernail, break frags in hand
80–90		do.	Drilling 15 ft./5 min.
90–100		do.	
100–110		do. Note signs of wispy, tuffaceous texture in some fragments	
110–120		do	
120–130		do	SAMPLE ~~120–130~~ 130–140
130–140		do.	
	140	contact.	* most gray-green, occas. yellow grn
140–150		Pink and green* siltst., tuffaceous siltstone. Soft (breaks w/ fingers), occas balls pink clay-silt.	SAMPLE 140–150
150–160		do., plus gray siltst.	SAMPLE 150–160.
160–170		do., dominantly (90% gray)	165 ft+ cont. – 2–3 gpm water

LITHOLOGIC LOG

Site Scientist Cook
Date 12/16/76

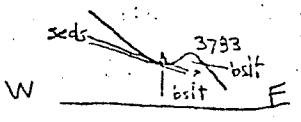
#13

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
170-180		do, c.50% tan, 50% gray.	
180-190		mix all colors, balls pink silt-clay abund.	
190-200		do.	
	200 TD		

LITHOLOGIC LOG

Site Scientist CWK
Date 12/16/76

#14

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0-20		Fine olive sandstone, brown, siliceous siltstone. Sandst 70%, siltst 30%. Ss is dom qtz-suspect tuffaceous, some siltst has wispy banding. H siltst < H knife	SAMPLE 0-20'. Rapid drilling
20-30		Black aphanite. H > H knife; dull luster; fract surfaces weathered rust color to c. .5mm depth. Occas. vesicles to 2mm.	Basalt* SAMPLE 20-30
30-40		do.	Same rock forms knob to E of site + appears to extend down to canyon bottom seen from short dist. to N+NE. Float on slope W of site appears to be blk vitrophyre, plus some 'rhy' as on top of #8.
40-50		do.	
50-60		do. Note ep. green altn of some joint surfaces.	
60-70		do. Rapid drilling cont. 15'/8 min. Some joint surfaces weathered to 2mm depth, most <<	
70-80		do.	*12/17 basalt passes into a porph. blk vitreophyre downwards in canyon, also see traces of sed. float
80-90		do	
90-100		do.	
100-110		do	
110-120		do.	
120-130		do.	
130-140		do.	
140-150	c 148 c 155?	Basalt as above plus c10% tuff: siliceous, brown, ep. grn, vitric-crystal	During drilling of 150-160 foam, lt. brown, % returns tuff prob. > than in samples taken.
150-160		do.	SAMPLE 140-160.
160-170		Basalt sim. as above. Note brown clay-silt along joint surfaces & some fragments (bit a coarser, occas. porph, cuttings less angular, chip-shaped, more rounded.	SAMPLE 160-170

LITHOLOGIC LOG . . .

Site Scientist CSK
Date 12/17/76

#14

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
170-180		do. Sev. lg balls brown clfs w/ basalt sand (paleosoil?)	SAMPLE 180-190
180-190		Basalt, some glassy, some foss tuff.	
190-200		do.	
200-210		do.	
210-220		Basalt as above; blk, aphanitic, some bears fine phens fsp, ol(?) appears unaltered, but occas. contains dissem. sulfide and sulfide + silica(?) in fractures. Some is glassy.	SAMPLE 210-220.
			SAMPLE 220-230
220-230	c 230	do., fewer signs sulfide	
230-240		Gray-brown tuffaceous siltst. 70%, basalt 30% H siltst < H knife	SAMPLE 230-240
240-250		do.	Small amount water gained during drilling below c. 248 ft.
250-260		do.	
260-270		Gray-brown, dk. gray, med. gray tuffaceous siltst and tuff, v. fine gr., some blk glass	SAMPLE 260-270
270-280		do.	
280-290		do., also some olive, v dark greenish brown.	SAMPLE 280-290
290-300		do.	
	TD 300		

#16 LITHOLOGIC LOG

Site Scientist [illegible]
Date _____

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
		Page 1 missing when xeroxed	
0-120		Tf. sd.	
120-130		Block basalt @ 125. add, oxidized scoriaceous, in Tf. sand	
130-140		do pebbles, glass oxidized bslt, chert nodules, tuffo sd	
150		RD'd pebbles of basalt, chert, dk glassy tf. sand	
160		do; some clayey sd	
170		do. more, larger tf. sd grags to 2cm; black basalt in 175 - appearance of lithic sd fragments	
180		BSLT & TUFF. SD FRAGS TO 1cm 35% 65%	
190		BSLT	
200		BSLT	
210		DO - string of grayish @ 206 TD	

Geothermex, Inc.
Site Scientist UK
Date 12/13

LITHOLOGIC LOG

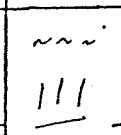
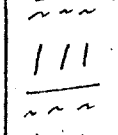
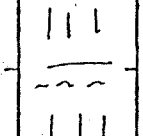
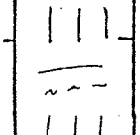
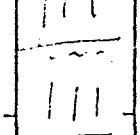
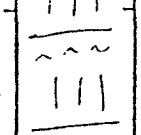
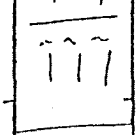
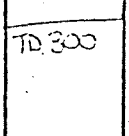
#17

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0-10		Weathered porphyry (?) - Identif. not certain, could be volcaniclastic sed. Yellow-orange.	SAMPLE 0-10 + hand Spec. from surface float.
10-20		crude laths to sev. mm of altd fsp(?) in wispy, cloudy, dark matrix w/ signs of Volc (or tuff?) texture. May contain fine qtz.	
20-30		10-20: do. 20-30: do.	Rapid drilling
30-40		do.	
	c.45		
40-50		c. 50% above; c. 50% greenish blk aphanite, an altered volcanic, prob basalt.	SAMPLE 40-50'.
50-60		Volcanic as above, black, locally gray, some altd greenish black. Appears glassy; cloudy, aph. text. w/ fine structures scarcely discernable. Basalt, or silicic vitrophyre? See poss. qtz.	SAMPLE 50-60'
60-70			15'/10 min
70-80		60-70 do	SAMPLE 70-80'
80-90		70-80: do. note cloudy gray uncommon, altd green v. rare; all fresh, unaltd. Doubt presence of qtz. less 'glassy' when dry, see fine igneous text dk laths in lt. matrix - prob Basalt. → or rhyolite, see below 80-90'	
90-100		80-90: do., much is glassy, bears gray fragments of banded glass (hand lens), faint signs tuff texture in black matrix	SAMPLE 80-90'
100-110		90-100: do. (tuff) 100-110: do.	
110-120		do: high % is glass (black)	Rapid drilling
120-130		do:	
130-140		do.	15'/9 min.
140-150		do.	
150-160		do.	
160-170		Black pyroclastic (tuff), cont.	

LITHOLOGIC LOG

Site Scientist Cuff
Date 12/10

#17

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
170-180		do.	
180-190		do.	
190-200		do.	
200-210		do.	
210-220		do.	SAMPLE 210-220
220-230		do. c. 10% gray	
230-240		do.	
240-250		c. 20% gray, pyrocl. text. clearly vis.	
250-260		do.	Water in hole at c. 250 probable (judging from
260-270		do.	SAMPLE 260-270 air line pressure increase)
270-280		do.	
280-290		do.	
290-300		do.	SAMPLE 290-300 ft.
	TD 300		

Geochemics, Inc.

LITHOLOGIC LOG . . .

Site Scientist Rick

Date 12/19

#22

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
170-180		c.100% olive siltst.	
180-190		do, some sandst, variable grays, browns.	
190-200		90% greenish gray (olive)	
200-210		do.	
210-220		do.	% returns recoverable v.small. most is silt in foam.
220-230		Greenish gray clay-silt, and siltstone as above, single fragment fine grained sulfide (?)	SAMPLE 220-230
230-240		do - plus sev. lg pieces (2cm) fine grained pyrite (?)	SAMPLE 230-240
240-250		do. - no sulfide	
250-260		60% greenish gray, 40% pure gray ('blue' gray) - greenish gray sl. softer, finer grained than gray -	SAMPLE 250-260
260-270		100% olive	
270-280		do	
280-290		do.	
290-300		100% gray brown (or brownish gray)	
300-310		do.	c.305 ft - water
310-320		do.	
320-330		60% gray brown siltst, 40% gray, fine ss.	SAMPLE 320-330.
330-340		do	increasing water (c.30 gpm) entering hole.
	TD 341		

Bubbs Creek

LITHOLOGIC LOG

GEOTHERMEX, INC.
Site Scientist Cook
Date 12/19/76

#22

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0-10		Gray-buff fine tuffaceous sandstone	Rapid drilling, mostly cuttings from silt sized, carried away w/ foam
10-20		do.	SAMPLE 0-20'
20-30		Gray, greenish gray silt, siltstone	
30-40		Fine tuffaceous SS, sltst, cont. c. 30-35 olive color, c. 35-40 much is weathered to bright orange	SAMPLE 30-40 - note bias tuds coar grain sizes, much silt + (?) clay lost in foam
40-50		do. - brownish gray dom. silt, occas grains qtz, uncommon V matics.	c. 53 ft. foam turns chocolate brown
50-60		70% brown silt, 30% gray sandy siltst, fine SS.	SAMPLE 50-70
60-70		do - brown silt consolidated into siltst.	
70-80		do - brown siltst more grayish, less chocolate	c. 82 ft. foam turns buff for 1-2 ft.
80-90		do - plus sm. % buff siltst.	
90-100		Gray brown, some buff sandst, siltst; gray clay	
100-110		Greenish gray to brown fine sandstone, pinkish buff siltstone	SAMPLE 100-110
110-120		Siltst - buff, gray-brown	
120-130		dom. buff	
130-140		80% pale grayish pink, rest gray, buff siltst	
140-150		80% brownish gray siltstone	SAMPLE 140-150
150-160		do.	
160-170		70% greenish gray, 30% bluish gray	15'/7 min.

LITHOLOGIC LOG

#23

Site Scientist [illegible]
Date 12/21/78

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
0-10		Brown-weathered poorly sorted sandstone, clots of brown silt (soil?), lesser basalt, blk vitreophyre, gray rhyolite (flow)	Alluvium or gravelly sediment.
10-20		do.	
20-30		do.	SAMPLE ~~20-30~~ 10-30
30-40		Buff colored poorly consolidated silt-fine sandstone, buff clay.	SAMPLE 30-40
40-50		Buff-colored fine grained tuffaceous sandstone, mod. consol.	SAMPLE 40-50
50-60		Mix of types in 30-50	
60-70		do., plus some blk, aph. basalt (cave?)	
70-80		do., plus brown fine sandstone, brown silt. less basalt.	SAMPLE 70-80
80-90		brown + buff sandstones, tuffaceous	
90-100		do.	
100-110		gray silt, minor sand of above materials	SAMPLE 100-110
110-120		Buff, fine sandstone, plus sand grains of black basalt(?) + red cinder.	
120-130		do.	
130-140		do., plus lg. clots sandy brown silt	SAMPLE 110-140
140-150		do.	160-180
150-160		do.	Occas bouncing of bit => cobbles? or thin layers hard tuff
160-170		Conglomerate of variable dark brown, red-brown, blk aph. volcanics, w/ brown silt, sand matrix. Sand + pebble sizes	Driller reports possible water, not certain
170-180		do. Coarsest returns c. 1 cm dia, all angular	SAMPLE 170-180

LITHOLOGIC LOG

#23

Site Scientist CWK
Date 12/21/76

INTERVAL	SCHEMATIC OF STRATIGRAPHY	LITHOLOGIC DESCRIPTION	COMMENTS, INTERPRETATION
180-190		do.	
190-200		do. also angular sand + pebbles light siliceous volcanics, aphanitic (cherty) + w/ faint tufftext, gray + buff.	SAMPLE 190-200
200-210		do.	
210-215		do.	
	TD 215		