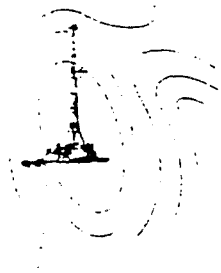

Clarence L. Harr
Consulting Petroleum Geologist

FINAL GEOLOGICAL WELL REPORT

Report Section _I_

BUREAU OF RECLAMATION
INJECTION TEST WELL NO. 1
PARADOX VALLEY
30 - 47N - 18W
MONTROSE COUNTY, COLORADO

Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

BUREAU OF RECLAMATION

Contract 4-CA-40-01660

Project 10-760

CLARENCE L. HARR

Consulting Petroleum Geologist

2024 Broadview Ct. Grand Junction, Colo. 81503 303-241-5974

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FINAL GEOLOGICAL WELL REPORT

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PARADOX VALLEY
30 - 47N - 18W
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Bedrock, Colorado

Report Section _I_

DRILL AND CORE DEPTH SUMMARY

DETAILED LITHOLOGIC DESCRIPTION OF CORE CHIPS
CORE NO. 1 - CORE NO. 23

AND

DESCRIPTION OF DRILL CUTTING SAMPLES

NOVEMBER, 1988

CLARENCE L. HARR

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DRILL AND CORE DEPTH SUMMARY

INJECTION TEST WELL NO. 1

Drilled Surface - 10881 ft.
Drilled 10881 ft.: Twisted off @ 10881 ft., picked up to 10122 ft. and kicked off for Side Track 1.

Drilled 10122 - 13177.7
Drilled 3055.7 ft.

Cored and Drilled 13177.7 - 14398
Cored 533.6 ft. and Drilled 686.7 (Core depth summary follows.)

Drilled and Cored 14398 - 16000 T.D.
Drilled 1565.5 ft. and Cored 36.4 ft. (Core depth summary follows.)

TOTAL: Drilled 16189 ft. and Cored 570 ft. (Includes 759 ft. redrilled at top of Side Track 1.)

DRILL AND CORE DEPTH SUMMARY (Cont.)

CORE NO. 1

13177.7 - 13238.2 (UPPER PARADOX SALT)

Cut 60.5 ft. - Recovered 60.5 ft.
12.3 ft. Dolomite
48.2 ft. Salt

CORE NO. 2

13580 - 13640 ft. (LOWER PARADOX SALT)

Cut 60 ft. - Recovered 60 ft.
26.3 ft. Salt & Anhydrite
33.7 ft. Shale & Anhydrite

CORE NO. 3

13702 - 13749.8 ft. (LOWER PARADOX - PINKERTON TRAIL)

Cut 47.8 ft. - Recovered 47.8 ft.
7.2 ft. Shale
4.8 ft. Anhydrite
26.3 ft. Shale & Minor Limestone
CORE BARREL JAMMED

CORE NO. 4

13848 - 13885.3 ft. (PINKERTON TRAIL)

Cut 37.3 ft. - Recovered 37.3 ft.
9.6 ft. Shale & Anhydrite
27.7 ft. Shale, Siltstone & Minor Limestone
CORE BARREL JAMMED

CORE NO. 5

14005 - 14014.5 (MOLAS)

CUT 9.5 ft. - Recovered 7.2 ft.
3.9 ft. Siltstone & Claystone
3.3 ft. Siltstone
CORE BARREL JAMMED

DRILL AND CORE DEPTH SUMMARY (Cont.)

CORE NO.6

14014.5 - 14057.2 (MOLAS - LEADVILLE)

Cut 57.2 ft. - Recovered 41.6 ft.
9.3 ft. Siltstone & Limestone rubble
32.3 ft. Limestone w. Siltstone & Claystone karst infill
(Recovered .5 ft. of core from Core No. 5 -
Core No. 6 description starts at 14014.0 ft.)
CORE BARREL JAMMED

DRILLED 14057.2 - 14071.0 (LEADVILLE)
Drilled 13.8 ft.

CORE NO. 7

14071.0 - 14092.0 (LEADVILLE)

Cut 21 ft. - Recovered 5 ft.
2.5 ft. Dolomite
2.5 ft. Limestone
CORE BARREL JAMMED

CORE NO. 8

14092 - 14113.5 (LEADVILLE)

Cut 21.3 ft. - Recovered 14 ft.
4.7 ft. Limestone
9.3 ft. Dolomite
CORE BARREL JAMMED

CORE NO. 9

14113.5 - 14124.0 (LEADVILLE)

Cut 10.5 ft. - Recovered 9.1 ft.
9.1 ft. Dolomite with trace Limestone
CORE BARREL JAMMED

DRILL AND CORE DEPTH SUMMARY (Cont.)

CORE NO. 10

14124 - 14140.7 (LEADVILLE)

Cut 16.7 ft. - Recovered 16.7 ft.
12.3 ft. Dolomite
1.3 ft. Limestone
3.1 ft. Dolomite
CORE BARREL JAMMED

CORE NO. 11

14140.7 - 14170.8 (LEADVILLE)

Cut 30.1 ft. - Recovered 11.7 ft.
10.8 ft. Dolomite
.9 ft. Limestone
CORE BARREL JAMMED

CORE NO. 12

14170.8 - 14173.8 (LEADVILLE)

Cut 3 ft. - Recovered 1.5 ft.
1.5 ft. Limestone
CORE BARREL JAMMED

CORE NO. 13

14173.8 - 14188.0 (LEADVILLE)

Cut 14.2 ft. - Recovered 13.2 ft.
13.2 ft. Limestone
CORE BARREL JAMMED

CORE NO. 14

14188.0 - 14202.7 (LEADVILLE)

Cut 14.7 ft. - Recovered 14.9 ft.
14.9 ft. Limestone
CORE BARREL JAMMED

DRILL AND CORE DEPTH SUMMARY (Cont.)

CORE NO. 15

14202.7 - 14223.3 (LEADVILLE)

Cut 20.6 ft. - Recovered 20.3 ft.
20.3 ft. Limestone
CORE BARREL JAMMED

CORE NO. 16

14223.3 - 14233.4 (LEADVILLE)

Cut 10.1 ft. - Recovered 7.4 ft.
7.4 ft. Limestone with trace Dolomite
CORE BARREL JAMMED

CORE NO. 17

14233.4 - 14243.0 (LEADVILLE)

Cut 9.6 - Recovered 2.4 ft.
1.4 ft. Dolomite and Limestone
.2 ft. Chert
.8 ft. Dolomite
CORE BARREL JAMMED

CORE NO. 18

14243 - 14244 (LEADVILLE)

Cut 1.0 ft. - Recovered .25 ft.
.25 ft. Dolomite with trace Shale
CORE BARREL JAMMED

DRILLED 14244 - 14300.1 (LEADVILLE)
Drilled 56.1 ft.

CORE NO. 19

14300.1 - 14330.7 (LEADVILLE)

Cut 30.6 ft. - Recovered 29.5 ft.
29.5 ft. Dolomite with interbeds of Limestone

DRILL AND CORE DEPTH SUMMARY (Cont.)

CORE NO. 20

14330.7 - 14333.1 (LEADVILLE)

Cut 2.4 ft. - Recovered .5 ft.
.5 ft. Dolomite
CORE BARREL JAMMED

DRILLED 14333.1 - 14338 (LEADVILLE)
Drilled 4.9 ft.

CORE NO. 21

14338 - 14398 (LEADVILLE)

Cut 60 ft. - Recovered 5.6 ft.
5.6 ft. Limestone and trace Dolomite

DRILLED 14398 - 14819.7 (LEADVILLE, DEVONIAN, CAMBRIAN, LYNCH SHALE)
Drilled 421.7 ft.

CORE NO. 22

14819.7 - 14825.9 (LYNCH SHALE)

Cut 6.2 ft. - Recovered 5.6 ft.
5.6 ft. Sandstone with some interbeds of Shale, Dolomite and Limestone
CORE BARREL JAMMED

CORE NO. 23

15600 - 15630.2 (PRECAMBRIAN DIORITE - GABBRO SCHIST)

Cut 30.2 ft. - Recovered 30.4 ft.
30.4 ft. Diorite - Gabbro schist

DRILLED TO TOTAL DEPTH @ 16000 FT.
Drilled 369.8 ft.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS

CORE NO. 1 - CORE NO. 23

Injection Test Well No. 1
Side Track 1

CORE NO. 1 13,177.7 FT. - 13,238.2 FT.
CUT 60.5 FT. - RECOVERED 60.5 FT.

13178.9	DOL	mdst., gry.-brn., brn., cpct., v. irreg. veins c. xln., yel./yel.-brn. sa., random distributed c., yel./yel.-brn. sa. xl's incased in dol.
79.4	DOL	mdst., gy.-brn., brn., cpct., v. random distributed c., yel./yel.-brn., sa. xl's incased in dol.
80.0	DOL	a.a. v. vein sa. xl's & random sa. xls. a.a.
80.8	DOL	a.a., v. sa. xls. a.a.
81.7	DOL	a.a. (sa. vein 8 mm. wide v. sa. xls. 2x3 mm.)
82.5	DOL	mdst., gy.-brn., cpct., frac. v. arg. dol. brec. up to 12x36 mm. incased in num. sa. xl. veins 7 mm. wide (sa. xls. @ 1/2 mm size.). Outside core face channeled approx. 2 mm. deep along veins. yel./yel.-brn. twinned cubic/octahedron sa. xls. are prob. carnallite (magnesium salt-KCL) which is more soluable to salt based mud in use then is halite NaCl. (Entire dol. section of core exhibits channeled appearance.) Vein sa. is contemporanious with period of salt flowage. Individual sa. xls. encased in dol. are contemporaneous with deposition and compaction.
83.4	DOL	mdst., gy.-brn., v. intrlam. blk., doltc. sh., sh. exhibits slicken sides not related to coring. Probably contemporaneous with salt flowage.
83.6	DOL	a.a., sa. vein xls. a.a.
84.3	DOL	a.a. v. blk. sh. lam.
85.5	DOL	mdst., brn./gy.-brn., cpct., v. sa. veins. & dissem. sa. a.a.
87.0	DOL	a.a., outside core face v. sa. solution channels 8 mm. wide & 3 mm. deep.
87.8	DOL	mdst., gy.-brn., v. arg., v. blk. sh. lam., v. minor sa. inclu.
88.2	SH	blk., doltc., frac. v. sh. frag. incased in yel./yel.-brn., sa. xl. veins (vert./bding).
88.8	DOL	mdst., gy.-brn., arg., cpct., v. thin sa. xl. veins.
89.6	DOL	a.a., incr. in sa.
88.8	DOL	a.a.
91.4	DOL	a.a.
92.4	DOL	mdst., dk.gy.-brn., v. arg., hi. frac., brec. v. numerous sa. vein filled frac.
92.9	SA	gy., clr., s. dk. gy. v. carb. specks, sa. xls. twinned cubic - octahedron 1/2 mm.
94.0	SA	dk.gy./blk., v. carb., s. clr.
94.8	SA	a.a.
95.6	SA	gy., c. xln.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 1 (Cont.)

13197.0	SA	gy., c. xln., v. carb. flecks.
98.4	SA	lt.gy., c. xln.
99.9	SA	lt.gy., c. xln.
200.9	SA	lt.gy./clr., c. xln.
02.5	SA	lt.gy./clr., c. xln.
03.4	SA	lt.gy./clr., c. xln.
04.4	SA	lt.gy./clr., c. xln.
05.7	SA	lt.gy./clr., c. xln.
06.7	SA	lt.gy./dk.gy., s. clr., loc. v. carb.
07.2	SA	a.a.
08.6	SA	gy./dk.gy., s. clr., loc. v. carb.
09.6	SA	a.a.
10.4	SA	a.a.
11.4	SA	gy.-brn., m. xln., sl. doltc. between xls.
12.0	SA	a.a.
12.8	SA	gy., c. xln., v. frag. gy. doltc. slt.
13.6	SA	gy.-brn., c. xln., carb., slty., v. sm. frag. doltc. slt.
14.8	SA	lt.brn., c. xln., 2-4 mm., twinned cubic-octahedron.
15.6	SA	a.a.
16.4	SA	brn., dk.gy./loc. blk., c. xln.
17.0	SA	a.a.
18.5	SA	a.a., sl. calc. between xls.
19.4	SA	brn., c. xln.
20.5	SA	brn., lt.gy.-brn. c. xln., v. frag. doltc. sltst. up to 9 mm.
21.6	SA	a.a.
22.8	SA	a.a.
23.9	SA	a.a., (Prob. flow structure.)
24.9	SA	a.a.
25.8	SA	a.a.
26.9	SA	lt.brn., c. xln., v. frac. frag. gy.-brn., slty. dol. up to 15x35 mm., calc. between xls.
27.4	SA	lt.brn., c. xln., v. frac. frag. dk.-gy. slty., doltc. sh.
28.9	SA	gy., c. xln.
29.8	SA	a.a.
31.1	SA	lt.brn., c. xln., v. frag. gy.-brn., slty. dol.
31.6	SA	a.a.
33.4	SA	a.a.
34.5	SA	brn., gy.-brn., c. xln., v. frag., dk.gy.-brn. slty. dol.
35.6	SA	gy.-brn., c. xln., v. frag., dk.gy. doltc. slty. sh.
36.2	SA	a.a.
36.5	SA	a.a. v. slty. dol. & sh. frag.
37.4	SA	a.a.
38.0	SA	lt.gy.-brn., c. xln.
38.2	SA	a.a.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS (Cont.)

CORE NO. 2 13,581 FT. - 13,640 FT.
CUT 60 FT. - RECOVERED 60 FT.

13580.0	SA.	lt.gy., dk.gy., s. wh., mot., v. sh. frag., blk., sft., sooty., to 1 mm., rndd./ang.
82.0	SA.	lt.gy., clr., v. flks. blk. sh. & carb. mat., num. sa. xls. rndd. on outer face. Flowage structure.
82.8	SA.	lt.gy., clr., decr. sh.& carb. mat.
84.1	SA.	a.a., v. num. blk., slty., doltc., rndd./ang. sh. par. to 15x5 mm.
85.7	SA&SH	a.a.
87.6	SA	clr., cubic, xls. s. 2x3 mm. rndd.
89.7	SA	clr. v. minor amts. carb. mat. in sa. xls.
91.7	SA	clr./blk., v. abt. blk., carb., sooty sh. par.
93.0	SA	clr./lt.gy., v. minor amts. carb. mat.
94.0	SA	gy./blk., v. abt. blk., doltc., sft., sooty sh. par. to 15x35 mm.
95.4	SA	clr./wh., sa. par. molded against sa. par. v. no. apparent xl. structure (flowage).
97.2	SA	clr./lt.gy., v. s. carb. flks.
98.4	SA	a.a.
99.6	SA	a.a., v. s. dk.gy.-brn. sltst. frag. to 7x7 mm.
600.7	SA	clr./blk., v. patchs & chunks tar (hydrocarbon) & blk., v. carb., sooty, sft. sh.
01.9	SA	dk.gy., blk., s. clr., v. lge. chunks v. carb., sft., sooty, slty., blk.-brn. sh. impregnated v. blk. tar (hydrocarbon)
02.9	SA	lt.gy.-clr., c. xln./nodular
04.5	SA	lt.gy.-clr., m. xln./c. gran., sl.carb.,v. few sm. sh.par.
05.0	SA	gy., m. xln., v. carb. mat. & sm. blk. sh. par., v. random sulphur xls., yel., transparent/s. translucent, pyramidal, s. molded like globules.
05.8	ANHY	gy., microxln., dns., carb., v. f.-blk. sh. par.
06.3	SH	blk., v. calc., anhy., hd, conchoidal frac.
07.1	SH	blk., doltc.
08.1	SH	blk., doltc., hd., sooty appearance, v. thin seam sa. xls.
08.7	SH	blk., doltc., v. banded sa., anhy., shly.-tar & pyr. seams. (blk. sh. v. sooty texture)
09.6	SH	blk., doltc./calc., plty., sooty
10.5	SH	a.a. v. f. dissiminated pyr.
11.4	SH	blk., v. anhy. gy., v. flow structure, pyr., blk. tar impregnated along sh.-anhy. contact & loc. in sh.
12.5	SH	blk., hd., concoidal frac.
15.0	SH	a.a.
17.0	SH	a.a.
17.8	SH	a.a.
18.4	SH	blk., plty./fis., doltc., f. disseminated pyr., vert. frac., calc. lined.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 2 (Cont.)

13619.2	SH	blk., v. calc.
19.7	ANHY	gy., s. gy.-brn., calc. & doltc., stks. carb. mat.
21.7	ANHY	dk.gy.-lt.brn., v. vh./lt.gy. ang. frag. to 2 mm., carb. mat. & calc. between frag., Flow struct., pyr.
22.0	SH	blk.
23.5	ANHY	lt.gy., vh., ang./rndd. frags., up to 14x24 mm., hi. frac., v. veins blk. sh. throughout.
24.6	ANHY	a.a.
26.4	SH	blk., v. frac. frags. & veins lt. gy. anhy.
28.3	SH	blk., sl. doltc., conchoidal frac.
30.4	SH	a.a.
31.7	SH	a.a.
33.2	SH	blk., calc., m. hd.
35.2	SH	blk., plty., calc.
35.3	SH	a.a.
36.7	ANHY	lt.gy., frac. v. veins blk. sh.
38.5	ANHY	a.a.

CORE NO.3 13,702 FT. - 13,749.8 FT.
CUT 47.8 FT. - RECOVERED 47.8 FT.

13702.2	SH	blk., v. calc., hd., concoidal frac., pyr. (pyritohedron)
04.9	SH	a.a.
07.2	SH	blk., calc., hd., v. sa. filled cavities and veins lined v. pyr., 1 to 10 mm. wide.
08.8	SH	blk., calc., v. 7mm. wide anhy. vein (horiz.) v. thin laminations of blk. sh.
09.2	ANHY	vh., lt.gy., suc./f. xln., frac. v. blk. sh. infill.
12.2	ANHY	a.a.
14.0	ANHY	a.a. v. 10mm. wide sh. veins
14.8	SH	blk., calc., doltc., v. num. anhy seams
15.6	SH	blk., doltc., hd., v. inclu. sa., v. carb.
15.7	SH	blk., v. doltc., hd., frac., s. open., pt. calc. filled, loc. slty., v. carb.
17.8	SH	a.a., concoidal frac.
19.0	SH	a.a., vert. frac., 1 mm., calc. filled, hor. frac., open.
20.1	SH	a.a., v. vert. frac., calc. lined.
23.0	SH	blk., plty./fis., calc., v. num. hor. frac. pt. calc. filled, v. vert. frac.
24.4	SH	blk., v. calc., v. 15 mm. thick bed ls., wkst. v. rnd./oblong gran., slty., v. 15 mm. thick bed vh., xln. anhy.
25.5	SH	blk., v. doltc./calc., v. fos. debris, num. vert. & hor. open frac.
29.0	SH	blk., v. calc./doltc., v. irreg. vert. frac.
32.0	SH	blk., calc., hd., concoidal frac., carb.
35.9	SH	blk., v. calc., hd., v. f. dissem. pyr., v. stks. slt.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 3 (Cont.)

13741.1	SH	blk., v. calc., hd., v. lam. lmy. sltst.
44.4	SH	blk., lmy., hd., v. carb., grds./v. shly., carb., lm., v. calc. lined frac.
46.6	SH	a.a.
49.8	LS	mdst., blk., v. shly., v. carb., grds./lmy. carb. sh.

CORE BARREL JAMMED AT 13749.8 FT.

CORE NO. 4 13,848 FT. - 13,885.3 FT.
CUT 37.3 FT. - RECOVERED 37.3 FT.

13848.0	SH	blk., plty., calc., v. carb., v. tar seams, foss., gast.
51.7	SH	blk., v. calc., f. mica., carb.
53.3	ANHY	dk.gy., v. s. clr. xls., c. xln./microxln., f. veins blk. sh. & carb.mat.,pry.
54.1	ANHY	f./m. xln., microxln., dk.gy., v. thin lam. sh.
54.9	ANHY	gy., clr., f./m. xln., suc., microxln.
55.6	ANHY	a.a., v. thin wavey lam. blk. sh. or carb. mat.
56.4	ANHY	a.a., v. incr. blk. sh. par.
57.7	SH	blk., v. doltc., hd. slty., carb.
58.2	SH	blk. doltc., sl. calc.
60.1	SH	blk., calc., no apparent bdng., marl. like.
60.5	SH	blk., calc., carb., thin bd., plty.
61.9	SLTST	dk.gy., num. sh. frag., calc., fev. foss.
64.2	SH	blk., v. slty., sil., sl. doltc., blky., conch frac., hd., f. pyr.
65.5	SH	blk., doltc., carb.
68.1	SH	blk., doltc., hd., conc. frac.
69.5	SH	blk., doltc., sl. calc., carb.
70.9	SLTST	dk.gy., blk., doltc., calc., foss., crin., f. pyr., sl. mica.
71.7	SLTST	dk.gy., blk., v. doltc., grds./v. slty. dol., foss., crin, brac., v. f. mica., v. shly.
73.7	SLTST	dk.gy., blk., v. doltc. grds./v. slty. dol., v. shly., carb., abd. foss., crin., brac., v. blk. sh. lam., hd.
75.8	SLTST	a.a.
76.7	SH	blk., doltc., plty.
77.9	SH	blk., doltc., slty., hd.
79.7	SH	blk., calc., v. .5mm. lam. blk., vit., brit. tar., v. vert. dissication cracks. calc.filled.
81.0	SH	blk., calc., foss.
82.0	LS	blk., brnish.-blk., v. arg., v. carb., hd., conc. frac.
83.3	SH	blk. v. tar lam., vert. frac. calc. filled.
84.6	SH	blk., v. carb., abd. spong spic., foss., lam. v. blk., brit. tar, vert. frac. (1mm.) calc. filled, sept. frac. in tar, calc. filled.
85.3	SH	blk., v. carb., sil., hd., foss., conch. frac.

CORE BARREL JAMMED AT 13885.3 FT.

CORE NO. 5 14005 - 14014.5 FT.
CUT 9.5 FT. - RECOVERED 7.2 FT.

14005.3	CLYST	rd., mar., v. dendritic f. veins lt.gy.-gn. clyst. throughout, non-calc., m. hd., semiconch. break, v. slty.,sl.sdy.
05.9	SLTST	mar., non-calc., cly., sl. sdy., hd., sl. sil., in part sltst., mar., rd., s. ang. frags., non-calc., mud flow type struct. (marble) mix v. lt.gn., sdy. clyst, v. included qtz. nod. or veins to 4mm., calc. infill betv. qtz. gns & nod., appears as subaqueous mud flow.
06.7	CLYST	mar., noncalc., sl. slty., v. minor wavy strgrs. gy.-grn. clyst., no apparent bd.
07.0	CLYST	mar., rd., noncalc., m. hd., slty, v. thin veins dk. mar, clyst. in gy.-gn. clyst.
07.7	SLTST	mar., noncalc., cl., sl. sil., mot. gy.-grn.
08.7	SLTST.	a.a., v. dendritic type frac., part. healed.
09.5	CLYST	pale gn./gy. mot. mar., sil., hd., conch. brk.
10.6	SLTST	mar. banded v. lt.gn. clyst., sil./chty., v. frac. brec. zone, par. to 10mm., calc. healed.
10.7	SLTST	rd., mar., cly., noncalc.
11.4	CLYST	mar., v. sm. frag., rndd., ang., rust-rd. clyst., v. slty. v. vein like mot. gy.-gn. along par. open frac.
12.2	SLTST	mar., cly., slick., irr. frac. abt., healed.

CORE BARREL JAMMED AT 14014.5 FT.

CORE NO. 6 14014.5 FT. - 14057.2 FT.
CUT 57.2 FT. - RECOVERED 41.6 FT.
(Recovered .5 ft. of core from Core No.5 -
Core No. 6 description starts at 14014.0 ft.)

14014.0	SLTST	mar., loc. sdy., non-calc., hd., sl. sil.
15.8	LS	mdst., tan., frac. vert./dendritic, open, hairline.
16.9	LS	a.a. v. open frac., s. filled v. gn. sltst.
19.4	LS	mdst., gy.-tan, sol. chan. & cav. to 15mm. wide, filled v. rd., mar., sl. calc., slty., clyst.
20.6	LS	mdst., tan, v. sol. chan. & cav. filled v. mar. clyst., clyst. contains sm. rdd./ang. frag. gn. ls.
21.9	SLTST	mat., v. dendritic frac. & partings filled v. lt. gn. sl. slty. cly., non-calc.
23.3	SLTST	mar.-rd., frac. a.a.
23.5	LS	mdst., pk., tan., lge., rdd., sol. frag., incased mar., slty., clyst., v. tert. parting infill lt.gn., slty. clyst.
	SLTST	mar., v. dendritic frac. & partings infilled v. lt.gn., slty. clyst.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 6 (Cont.)

14025.2	LS	gy.-brn., microxlm, sol. cav. face w. mar. & gn. cly. coating slick.
26.4	LS	mdst., lt.tan, crpxln, lge. sol. cav. filled w. mar. sltst., w. terf. dendritic frac. filled w. lt.gn. clyst., w. quat. frac. 3mm. wide calc. filled.
27.7	LS	mdst., gy., tan, crpxln., contains lge. calc. filled vug.
28.6	LS	mdst., gy., mot. tan., crpxln., sl. arg.
31.5	LS	mdst., lt.gy.-tan., mot. pk.
31.5	LS	mdst. lt.gy.-tan., crpxln.
32.4	LS	mdst., crpxln./microxln. lt.gy., mot. pk., frac. stain. rd.
33.9	LS	brec., frac. filled w. wd. & gn. cly.
36.2	LS	brec., lt.gy., mot. pkish., w. s. brec. gy. sh. brec. infill.
38.8	LS	micrxln., lt.gy., pk., w. s. gy. sh., sol. brec. w. rd. stn. along sd. chan. & frac.
39.9	LS	gy., pk., org., crpxln./microxln., dns., w. sol. chan.-cav. fill w. rd., slty. clyst., hairline frac. partly open, partly calc. filled., vert. & diag.
44.3	LS	crpxln., gy., lt.brn., slick w. blk. coat. & s. pyr.
45.8	LS	lt.gy.-tan, crpxln., sol. chan. or cav., slick. a.a.
47.2	LS	gy.-brn., mot. gy.-tan, microxln., sol. face coated w. rd.-brn. clyst. & lt.gn. clyst.
50.1	LS	gy.-brn., crpxln./microxln.
52.3	SLTST CLYST	brec. & filler, rd.-brn., lt.gn., slick.
54.4	LS	gy.-brn., crpxln., sl. microxln., cav. face lined w. pyr., blk. dead tar, coated w. pale gn. clyst.
	CLYST	gy., sil./cav. infill.
55.6	LS	dk.gy.-brn, crpxln., tr. calc. filled vugs. & frac., cav. face lined w. pyr., blk. tar. & pale gn. clyst.

CORE BARREL JAMMED AT 14057.2 FT.

CORE NO. 7 14,071 FT. - 14,092 FT.
CUT 21 FT. - RECOVERED 5 FT.

14071.0	DOL	mdst., lt.gy.-brn., lmy., tr. open frac. lined w. s. sm. vugs filled w. pyr. & brn. min. (dd.0), s. microxln. w. conch frac. lined w. f. dissem. pyr., most cpct. xln., s. p. por. (2% por.)
72.0	DOL	mdst., lt.gy.-tan, lmy., cpct.xln., few. hairline frac.& few. sm. vugs. filled w. pyr. & dd.0 (2% por.)
72.5	DOL	mdst., gy.-brn., mot., lmy., arg., few hairline frac. w. rd.-brn., atz. & pyr. along sides of frac., dol. brec. zone cmt. w. ls./calc., (2% por.)
73.5	DOL&LS	brec., dk.gy. lt.tan/wh., calc. fill between frag., loc. v. pyr., s. gy. sh., spt. qtz.xln., calc. filled vugs., brec. frac. filled w. dd.0

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 7 (Cont.)

14074.2	LS	mdst., lt.gy.-tan, microxln., sl. dru., v. dol., tr. frac., (3-4% por.)
75.2	LS	mdst., lt.gy.-tan, microxln./ea., v. doltc., no vis. por. (3-4% por.)
76.0	LS	brec. gy., doltc., v. sltst. frag. (35x20 mm.) rd., mar., sil.

CORE BARREL JAMMED AT 14092 FT.

CORE NO. 8 14,092 FT. - 14,113.5 FT.
CUT 21.3 FT. - RECOVERED 14 FT.

14092.0	LS	gy., mot. lt.brn., m./c.xln., foss., crin., intxln por., ble. sa. wtr., (4% por.) Fair Por.
93.1	LS	lt.gy.-tan, v. f./m. xln. cpct., sl. foss., crin., stl. seam. w. dd.O. (2% por.) Poor Por.
94.6	LS	lt.gy.-tan, buff, gran., s. v. f. xln., s. foss. hash, few. scat. p.p. vugs. (5-6% por.) Fair Por.
95.2	DOL	lt.gy.-tan, gran., num. vugs. (.5-1mm.) connected by calc. lined channels, s. intrxln. por. (7% por.) Fair Por.
96.7	LS	lt.gy., gran., s. intrxln por (3% por.) Poor Por.
97.0	DOL	lt.gy.-tan, f. xln./suc., hairline frac. ble. sa. wtr., abd. pp./1mm. vugs. through 1"x3"x1" chip, s. mol. por., (12% por.), (chip is rdd. due to tumbling), Good Por.
97.4	DOL	lt.gy.-tan., f. xln./s. gran., scat. intrxln. por., scat. vugs., pp./1mm., few. frac. (5% por.) Fair Por.
97.7	DOL	lt.gy.-tan, v. f. xln./s gran., s. intrxln. por., scat. vug. por. (pp. to 1.5 mm.), num. dentr. hairline frac., 1 rdd chunk due to core action had abd. vug por., up to 2 mm., (10% por.) Fair/Good Por.
98.3	DOL	lt.gy., f. xln./gran., s. intrxln. por., scat./ loc. num. pp./1.5 mm. vug por., sol. chan. devel. along bdg. plan frac., num. hairline bdg. plane & vert. frac. (shatter frac.?) ble. sa. wtr., lge. vugs calc. filled, (10% por.) Fair/Good Por.
98.6	DOL	lt.gy.-tan,c. suc./gran., intr. dol. romb. por., lge. vugs. up to 1.5 x 3 mm., por. in 100% of 2 chips, (18-20%), Excellent Por. & Perm.
99.4	DOL	lt.gy.-tan, gran./c. suc., intrxln. por., num. scat. p.p./ .75 mm., (10-12%), (chip rdd. from core action), Good Por.
100.6	DOL	lt.gy.-tan, f. xln./gran., s. intrxln. por., good vug. por. (1-2 mm.), (15% por.) Good Por.
01.2	DOL	lt.gy.-tan, f.xln./gran., s. intrxln. por., fair vug. por. throughout chips, (10% por.) Fair/Good Por.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 8 (Cont.)

14102.4	DOL	brec., lt.gy-tan, m. gy., v. f. xln. cpct., s. gran., brec. cavity filled w. anhy., wh., suc.
03.2	DOL	lt.gy., v. f. xln./suc., g. vug. por. (.5-1 mm), (12%) Fair/Good Por.
03.5	DOL	brec., lt.gy.-brn., v. f. xln./sl. gran., cavity infill w. wh. gyp. (or anhy.), suc./m. xln., dol. w. vug. por. (7%), Fair Por.
04.1	DOL	lt.gy., f. xln./s. gran., g. vug. por. (.25-1 mm), (12%) Fair/Good Por.
04.5	DOL	lt.gy., f. xln./m. gran., g. vug. por. through out, (13-15%) Good Por.
05.4	DOL	lt.gy., v. f. xln., s. gran., cpct., few vugs.,(3% por.), Poor Por.
05.6	DOL	lt.gy., f. xln./s. gran., scat. vug. por. up to .5 mm., (5% por.) Poor/Fair Por.
06.0	DOL	lt.gy., f.xln./m. gran., num./scat. vugs, p.p./ .75 mm., (5% por.) Fair Por.

CORE BARREL JAMMED AT 14113.5 FT.

CORE NO. 9 14113.5 FT. - 14124 FT.
CUT 10.5 FT. - RECOVERED 9.1 FT.

14113.5	DOL	lt.gy., suc., fr. intrxln. por, .2/.5 mm. vug. por. through out chip, (10-12% por.), Good Por.
14.6	DOL	lt.gy., f. xln., cpct./gran. w. s. intrxln. por. loc p.p. vug. por., (4% por.) Poor/s. Fair Por.
15.4	DOL	lt.gy., f. xln., cpct., s. gran., foss., hairline frac. partly healed, (2-3% por.), Poor Por.
16.6	LS	lt.gy.-tan, lt.gy.-brn., m. xln., cpct. tr. intrxln. por., (2% por.), Poor Por.
17.6	DOL	lt.gy.-tan., v. f./f. xln., pt. cpct., s. loc./ gran., scat. p.p. vugs, (3-5% por.), Poor Por.
18.9	DOL	lt.gy.-tan, v. f. xln., cpct., loc. scat. p.p. vugs., (3% por.), Poor Por.
19.8	DOL	m. gy.-brn., v. f. xln., cpct., Tight
20.6	DOL	m. gy.-brn., v. f. xln., cpct., Tight
21.5	DOL	m. gy.-brn., arg., v. f. xln., cpct., sol. cavity w. dol. brec., filled w. f. xln. calc., anhy., s. frac. por., V. Poor Por./ Tight
21.9	DOL	m./dk.gy.-brn., v. f. xln., cpct., v. arg., sol. chan. pt. open, pt. sealed w. dd. O & tr. wh. xln. anhy., V. Poor Por.
22.4	DOL	m./dk.gy.-brn., v. f. xln., cpct., Tight

CORE BARREL JAMMED AT 14124 FT.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS (Cont.)

CORE NO. 10 14124 FT. - 14140.7 FT.
CUT 16.7 FT. - RECOVERED 16.7 FT.

14124.0	DOL	lt.gy.-tan, m. gy., f. xln., cpct., calc. infill along frac., Tight
24.3	DOL	m. gy.-brn., v. f. xln., cpct., num. frac. w. abd. anhy. & s. calc. infill, Tight
26.1	DOL	gy.-brn., v. f. xln., cpct., num. frac. w. abd. anhy. infill, Tight
26.8	DOL	gy.-brn., v. f. xln., cpct., sol. chan. along old frac. open 3 mm/hairline, s. calc. filled. s. intrxln. por. along. fracs., Tight/Fair Por. along frac. (3% por.)
27.1	DOL	gy.-brn., f. xln., s. intrxln. por. (3% por), hor. frac. pt. calc. lined/open. few. scat. p.p. por., Poor/Loc. Fair Por.
28.2	DOL	m. gy.-brn., f. xln., cpct., tr. p.p. vug por. along hair-line open frac., Poor Por.
29.0	DOL	dk.gy.-brn., f. xln., cpct., lt. gy., v. f. xln./gran., s. intrxln por., s. fr. p.p. vug. por., pt. infilled w. xln. anhy., (4% por.), Tight/Poor Por. (abd, frac., 2 sets, open/calc. lined)
30.5	DOL	lt.gy.-tan, v. f. xln., cpct., Tight
30.9	DOL	lt.gy.-tan, v. f. xln., cpct., s. w. scat. p.p. por. (3% por.), Poor Por.
31.3	DOL	lt.gy., v. f. xln., cpct./sl. gran. w. p.p. vug por. (5% por.) Poor/Fair Por.
31.6	DOL	lt.gy.-tan., f. xln./gran., scat. p.p. por., w. s. intrxln. por., (5% por.), Poor/Fair Por.
31.7	DOL	lt.gy., v. f. xln./s. gran., scat./num. pp./.5 mm. vug. por. (7% por.) Fair Por.
32.1	DOL	lt.gy., f. xln./gran., s. intrxln. por., scat. p.p. vug. por. (7% por.) Poor/Fair Por.
35.5	DOL	lt.gy.-tan, v. f./f. xln., cpct., loc. mot. dk.gy-brn., sil. Tight
36.3	LS	lt.gy.-tan, m. brn, v. f. xln., cpct., Tight
37.1	LS	lt.gy-tan, doltc., cpct. Tight
37.6	DOL	lt.gy., v. f. xln., cpct./gran., tr. intrxln. por. (2% por.) tr. lge. vugs filled w. tan cly. & dd. O stn. Tight/Poor Por.
38.4	DOL	lt.gy. v. f. xln./s. gran., cpct./sl. intrxln. por. (2% por.) Tight

CORE BARREL JAMMED AT 14140.7 FT.

CORE NO.11 14140.7 FT - 14170.8 FT.
CUT 30.1 FT. - RECOVERED 11.7 FT.

14140.8	DOL	lt.gy., v. f. xln., cpct., frac. w. anhy. infill.
	ANHY	lt.gy., wh., mot. dk.gy., wh. m. xln./suc., Tight
41.5	DOL	gy., gy.-brn., v. f./f. xln., cpct., arg., Tight
42.4	DOL	m. dk. gy.-brn., v. f./f. xln., s. sl. gran., v. arg., tr. scat. p.p. por., (2% por.) Tight/Poor Por.
43.7	DOL	m. dk.gy.-brn., f. xln., s. gran., cpct./2% intrxln. por., v. arg., 2 sets open calc. lined fracs. @ 45 deg. intersection.
45.0	DOL	m. dk.gy.-brn., f. xln., s. gran., v. arg. cpct./2% intrxln. por., Tight
46.8	DOL	m. gy./s. lt.gy., v. f. xln., cpct., fracs. & lge. vugs filled w. anhy., wh. xln. anhy., scat. p.p./.5 mm. vug por. (3% por.) Tight/Poor Por.
47.1	DOL	gy., v. f. xln., cpct., few. scat. p.p. vugs., Tight
48.0	DOL	gy., v. f. xln., cpct., few scat. p.p. vugs, Tight
49.9	DOL	lt.gy., v. f. xln., cpct., v. few scat. p.p. vugs, Tight
50.4	DOL	lt.gy.-tan., v. f. xln., cpct., tr. pp. vugs., styo. seam., Tight
50.9	DOL	lt.gy.-tan., v. f. xln., cpct., old frac. filled w. wh. xln. anhy., sealed. Tight
51.4	DOL	lt.gy., lt.gy.-brn., v. f./f. xln., cpct., lmy., frac. and/or sol. chan. filled w. wh./clr. xln. anhy., Tight
51.6	LS	lt.gy., v. f. xln./m. xln., cpct., Tight
52.1	LS	lt.gy.-tan., gy., v. f. xln., arg., doltc., Tight

CORE BARREL JAMMED AT 14170.8 FT.

CORE NO. 12 14170.8 FT. - 14173.8 FT.
CUT 3 FT. - RECOVERED 1.5 FT.

14171.0	LS	lt.gy., lt.gy.-brn., v. f. xln./m. xln., cpct., Tight
71.4	LS	lt.gy.-brn., mot., m./c. xln., s. v. f. xln., cpct., (2-3% por.), frac. calc. filled, Tight.
72.0	LS	lt.gy.-brn., mot., v. f./c. xln., cpct., crin. abd., (2-3% por.), Tight
72.3	LS	lt.gy.-brn., mot., m./c. xln., cpct., (2-3% por.).

CORE BARRELL JAMMED AT 14173.8 FT.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS (Cont.)

CORE NO. 13 14173.8 FT. - 14188.0 FT.
CUT 14.2 FT. - RECOVERED 13.2 FT.

14173.8	LS	lt.gy., f./s. c. xln., cpct., foss. shad., Tight
76.6	LS	lt.gy.-brn., v. f./s. m. xln., cpct., foss. shad., crin., sponge spic., Tight
77.3	LS	lt.brn., m. xln.,m cpct., gy. sil. dol. mod. in clu. Tight
79.1	LS	lt.gy.-brn., v. f./m. xln., cpct., crin., Tight
80.7	LS	lt.gy.-brn., v. f./c. xln., cpct., crin. abd., (2% por.) Tight
81.5	LS	lt.gy.-tan, v. f./c. xln., cpct., crin., (2% por.) Tight
82.8	LS	lt.gy.-tan, m. xln., cpct., crin., (3% por.)
85.0	LS	lt.gy.-tan, m./c. xln., cpct. crin., (3% por.) Poor Por.
86.0	LS	lt./m. gy., v. f. xln., cpct., styo. seam w. lt.gy.-gn. clyst., Tight
87.0	LS	gy., m. xln./v. f. xln., cpct., styo. seam w. 2 mm. thick lt.gy.-gn. clyst. lam., Tight

CORE BARREL JAMMED AT 14188 FT.

CORE NO 14 14188.0 FT. - 14202.7 FT.
CUT 14.7 FT. - RECOVERED 14.9 FT.

14188.1	LS	gy.-brn., m./c. xln., w. v. f. xln. mat., cpct., separated along styo. seam w. gy., lt.gn. clyst., thin crust pyr. between clyst. & ls. Tight
90.4	LS	lt.gy., f./m. xln., s. c. xln., near vert. & hor. styo. seams, (2% por.) Tight
91.9	LS	lt.gy.-brn., m./c. xln., cpct., abd. crin., crinoidal limestone, (3% por.), Poor Por.
93.9	LS	lt.gy., f./s. m. xln., cpct., crin., Tight
94.9	LS	lt.gy., f./s. m. xln., cpct., sol. chan. along frac., hairline/15+ mm. filled w. pyr. coating next to ls., next thin layer of lt.gy. clyst. w. thicker inner filler of gy. clyst., Tight
95.4	LS	lt.gy., f. xln./s. c. xln., s. gran., cpct., crin., calc. filler frac., (3% por.) Tight
97.4	LS	lt.gy., f. xln./s. c. xln., cpct., crin., (2% por.) Tight
99.4	LS	lt.gy., v. f./m. xln., cpct., prob. sol. cavity w. lt.gn. clyst. filler.
201.0	LS	lt.gy., m. xln., w. v. f. xln. mat., cpct., Tight
02.7	LS	lt.gy., f. xln., s. m. xln., s. gran., cpct. (3% por.)

CORE BARREL JAMMED AT 14202.7 FT.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS (Cont.)

CORE NO. 15 14202.7 FT. - 14223.3 FT.
CUT 20.6 FT. - RECOVERED 20.3 FT.

14203.2	LS	lt.brn., mot., c. xln., gran., crin. abd., (5% intrxln. por.), Poor/Fair Por.
05.1	LS	lt.gy., v. f. xln., s. m. xln., cpct. (2% por.) frac. face clean, Tight
06.4	LS	lt.gy.-tan, m. xln., gran., (3% por.) Poor Por.
08.6	LS	lt.gy.-tan, m. xln., gran., cpct. (3% por.) Poor Por.
09.2	LS	lt.gy.-brn., f. xln./m. xln., cpct. (2% por.) Tight
12.7	LS	tan., m. xln., gran., s. c. xln., cpct., (3% por.) Poor Por.
15.2	LS	lt.gy.-tan, m. xln., gran., cpct., (2% por.) Tight
17.0	LS	lt.brn., c./m. xln., crin. abd., tr. brac., (5% por.) Poor/ Fair Por
18.0	LS	lt.brn., c. xln., (5% por.) Poor/Fair Por.
20.3	LS	lt.brn., m. xln., v. f. xln. mat., (2% por.) Tight
21.2	LS	lt.gy., v. f. xln., s. gran., cpct., fev. crin., Tight
21.4	LS	lt.gy.-tan, lit./v. f. xln., Tight
22.0	LS	lt.gy., mat. brn., m. xln./v. f. xln., Tight
23.0	LS	lt.gy.-brn., m. xln./s. c. xln., crin., (2% por.) Tight
23.4	LS	lt.gy., v. f. xln., cpct., Tight

CORE BARREL JAMMED AT 14223.3 FT.

CORE NO. 16 14223.3 FT. - 14233.4 FT.
CUT 10.1 FT. - RECOVERED 7.4 FT.

14223.5	LS	lt.gy., m. xln./gran., s. v. f. xln., cpct., Tight
24.0	LS	lt.gy., m. xln., s. v. f. xln., cpct., (2% por.) Tight
25.8	LS	tan, gy., brn., lit./v. f. xln., v. sil./cht., wh., xln. anhy. filler in sol. chan., blk. tar resid. in sol. chan., Tight
27.1	LS	lt.gy., v. f. xln., cpct., open frac., mat. Tight
28.4	LS	lt.gy.-brn., m. xln./c. xln., cpct., crin., (3% por.)
29.0	LS	lt.gy-brn., m. xln., s. v. f. xln., cpct., Tight (chips well rdd. from core action)
30.0	LS	pale gy.-buff., f. xln., cpct., Tight
30.7	DOL	lt.gy.-brn., v. f. xln., cpct., Tight

CORE BARREL JAMMED AT 14233.4 FT.

CORE NO. 17 14233.4 FT. - 14243.0 FT.
CUT 9.6 FT. - RECOVERED 2.4 FT

14233.9	DOL	brn., f. xln., frac. w. calc. in fill., (2% por.), Tight
34.2	LS	wh. lt.gy.-buff. lit., s. chky., s. v. f. xln., sil., hd., Tight
	DOL	brn., f. xln.,
	LS&DOL	pt. brec. along styo. seam
34.5	DOL	brn., v. f./f. xln., v. arg., Tight
34.8	CHT	tan, buff, earthy surface, hi. frac., filled w. brn. dol.
35.0	DOL	brn., v. f. xln./lit., sil., w. brn., tanslu. cht., w. buff. earthy cht.
35.1	DOL	brn., lt.gy.-buff, v. sil., w. tan cht.
35.3	DOL	gy.-brn., v. f. xln., s. gran., lmy., v. sil., p.p. vug. por., (3% por.), Poor Por.
35.8	DOL	lt.gy., f. xln., num. crin., scat. p.p. por., s. to .25 mm., v. sil. Poor Por., (foss. deb. dolomitized, then silicified.)

CORE BARREL JAMMED AT 14243 FT.

CORE NO. 18 14243 FT. - 14244 FT.
CUT 1 FT. - RECOVERED .25 FT.

14243.25	DOL	brn., v. f. xln., cpct., sil.
	DOL	buff, earthy, suc., inclu. steel-gy. mineral w. metallic luster (marcasite, FeS2)
43.25	SH	dk.gy.-blk., doltc., molded along a large styo. seam, up to 10 mm. thick.

CORE BARREL JAMMED AT 14244 FT.

CORE NO. 19 14300.1 FT. - 14330.7 FT.
CUT 30.6 FT. - RECOVERED 29.5 FT.

14300.6	DOL	lt.gy.-tan., suc, (3% por.)
01.8	DOL	lt.gy.-tan., f. xln./suc. (3% por.)
03.4	DOL	lt.gy., lt.gy.-tan, v. f. xln./sl. suc. (2% por.)
04.4	DOL	lt.gy.-brn., v. f. xln. (2% por.)
06.8	DOL	lt.gy.-brn., v. f. xln., f. xln., (2% por.)
07.3	LS	lt.gy.-tan, mot. brn., v. f. xln., s. m./c. xln. styo. seam coated w. dd.
09.0	DOL	lt.gy.-tan, v. f. xln., (2% por.)

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 19 (Cont.)

14311.0	DOL	lt.gy.-brn., v. f. xln., xln. anhy. on frac.
12.5	DOL	brn., v. f. xln., sl. arg., v. scat. p.p. vugs. (3% por.)
14.9	DOL	lt.brn./tan, v. f. xln., v. anhy. inclu., scat. p.p. vugs., (2% por.)
15.8	DOL	lt.tan, f. xln./sl. suc. (3% por.)
18.6	LS	lt.gy.-brn., v. f./f. xln., crin., (3% por.)
19.4	DOL	lt.gy.-brn., v. f. xln., (3% por.)
20.5	DOL	lt. tan, v. f. xln./sl. chky., abd. foss. hash. (3% por.)
21.4	DOL	brn., v. f. xln., frac. v. calc. infill, thin bed dk. gy. sh., pyr., conch. breaks, slick. on sh.
22.8	DOL	m. gy.-brn., v. f. xln., cpct., frac., gy. sh., brk. cutting across core chip
24.4	DOL	gy.-brn., v. f. xln., arg., frac. calc. lined
24.9	SH	m. gy., gy.-gn., gn., hd., conch. break, sl. sil./chty., slick. (poss. fault gauge)
25.8	DOL	tan, v. f. xln., cpct., foss. hash
26.4	DOL	lt.gy.-tan, v. f. xln., microxln., lmy., foss. hash., sil., chty.
26.8	DOL	gy.-brn., v. f. xln., microxln., sil.
28.4	LS	gy.-brn., v. f. xln., microxln., arg., stylo. seam. v. gy. sh., poss. slick.
28.7	LS	buff, lt.tan, v. f. xln./microxln., v. sil.
29.6	DOL	lt.gy., buff, gy.-brn., sil., brec. v. sil. anhy. infill.

CORE NO. 20 14330.7 FT. - 14333.1 FT.
CUT 2.4 FT. - RECOVERED 0.5 FT.

14330.7 - 31.0	DOL	gy.-brn., v. f. xln./sl lit., sl. sil., cpct.
31.0 - 31.2	DOL	brn., f. xln./sl. lit., sl. sil., cpct.

CORE BARREL JAMMED AT 14333.1 FT.

CORE NO. 21 14338 FT. 14398 FT.
CUT 60 FT. - RECOVERED 5.6 FT.

14338.0	LS	brn., gy.-brn., sl. lit./v. f. xln., cpct., num. sponge spic. along stylo. seam, blk. residue along stylo. seam., sl. arg.
38.6	LS	brn., gy.-brn., mot., sil./chty. along stylo. seam (or altered algal band), pyr. along seam, mar./rdish., v. sealed frac.
38.9	LS	lt.gy.-brn., sl. lit./v. f. xln., cpct.
39.0	LS	gy., gy.-brn., sl. lit., arg., cpct., nodular surface, hd., sil., v. brn.-rdish brn. cht bands, v. inclu. anhy.
39.5	LS	gy., gy.-brn., sl. lit., arg., cpct., nodular surface, hd., sil., v. brn.-rdish. brn. cht. bands, v. inclu. anhy.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 21 (Cont.)

14340.6	LS	buff, chky./v. f. gran., sl. sil., cpct., frac. calc. lined (2% por.)
41.5	LS	buff, chky./v. f. gran., sl. sil., cpct. frac. calc. lined (2% por.)
42.0	LS	buff, chky./ v. f. gran., sl. sil., cpct., sponge spic., frac. calc. lined, (2% por.)
42.6	LS	buff, lit./sl. v. f. xln., sil., glautic., cpct.
43.0	LS	lt.gy., buff, lit./sl. v. f. xln., sil., sponge spic., cpct.
43.6	DOL	gy., gy.-brn., v. f. xln., sl. sil., hd., conch. break, calc. lined frac.

CORE NO. 22 14819.7 FT. - 14825.9 FT.
CUT 6.2 FT. - RECOVERED 5.6 FT.

14819.8	SS	gy., v. f. g., subang./ang., lmy., gds./v. sdy. lm., hd., ti., v. glau., (bed thickness 9mm.), intrbd. w.-
	SH	blk., v. carb., slty., v. foss., crin. hash, doltc./v lmy.-gds./blk., v. arg., v. carb. ls.
20.8	SS	gy., v. f. g., subang./ang., lmy. glau., hd. ti., (bed thickness 25mm.), intrbd. w. dk. gy. calc., carb., mica. sh.
21.9	SS	gy., v. f. g. subang./ang., v. lmy., gds./v. sdy. lm., intrbd. w. dk. gy./blk., calc. mica. sh., (turbidite flow pattern on top bottom of core slab).
22.4	SH	gy., plty., hd., mica., intrbd. w. gy., carb., v. lmy. ss.
23.1	SS	gy., v. f. g., subang., v. lmy., intrbd. w. thin lam. of gy. mica., sh. (SS 5 mm. thick) (SH 4 mm. thick).
23.9	DOL	gy., f. xln., lmy., v. sdy., carb., glau., gds./lmy., doltc. ss., rough wavy bdy., poss. turbidite flow., intrbd. w. v. carb. dol., intrbd. w. gy sh. rough. wavy bdg.(prob. turbidite flow)., diagonal frac.
24.9	SS	gy., v. f. g., lmy., doltc., intrbd. w. dk. gy.-gn., sdy., mica. sh., ss gds. to dol., v. sdy., arg., carb., vert./diag. frac. open.
25.1	SS	gy. v. f./f. g., ang./subang., v. doltc./lmy., intrbd. w. dk. gy., mica. sh. (11 mm. thick.)
25.3	LS	gy.-brn., mot., f./m. xln., v. foss., crin., corals, sdy., arg., gds. into ss.

CORE BARREL JAMMED AT 14825.9 FT.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS (Cont.)

CORE NO. 23 15,600 FT. - 15,630.2 FT.
CUT 30.2 FT. - RECOVERED 30.4 FT.

15601.2 DIORITE-GABBRO SCHIST lt./m. g. n., foliated @ 70 deg. to near vert., gnish. feldspars predominate w. inclu. specularite-hematite, rd. earthy hematite, occ. rdd. glassy olivine m./l. gs., foli. inclu. buff., granular albite, rare inclu. qtz., 7 mm. wide vain xln. dol.

01.6 DIOR-GAB. SCH. lt./m. gn., foli. dip @ 70 deg., gnish., feld. predominate, w. incr. inclu. rd. earthy hem., foli. inclu. buff. crpxln. albite or labradorite, loc. sl. doltc.

03.6 DIOR-GAB. SCH. lt./m. gn., foli. dip @ 70 deg., gnish. feld. predominate, secondary minerals a.a.

04.8 DIOR-GAB. SCH a.a.

06.1 DIOR-GAB. SCH m. gn., foli., gn. feld. predominate, w. 3 mm. wide inclu. c. xln. dol., inclu. rd. earthy hem., tr. glassy olivine granuals.

07.0 DIOR-GAB. SCH. dk.gn., dk. gy.-gn., foli. @ 70 deg., dk.gy.-gn. prob. epidote, minor foliated inclu. buff. albite or labradorite, chip contains open diag. frac.

09.2 DIOR-GAB. SCH. a.a.

11.9 DIOR-GAB. SCH. m./lt.gn., w. foli. lt.gn., buff. mnrl. inclu., abd. rd. earthy hem. inclu., num. glassy gn. olivine gs., foli. inclu. of labradorite, w. minor inclu. dol.

13.4 DIOR-GAB. SCH. lt./m.gn., foliated., gnish. feld. predominate, buff mnrl. prob. labradorite, num. glassy gn./clr. olivine gs., slick.

13.5 DIOR-GAB. SCH. m.gn., foliated, but low grade metamorphism, minor lt.gn., buff. mnrl. inclu., diag. frac. open w. slick., num. assoc. hairline frac., s. healed.

14.2 DIOR-GAB. SCH. m/dk.gn., foliated, mnrl. suites not recognizable, healed hor. frac.

17.6 DIOR-GAB. SCH. lt./m. gn., foli. dip @ 70 deg., w. s. iron blk., tabular hem., num. rdd. gs. glassy gn. olivine, limonite inclu.

20.1 DIOR-GAB. SCH m./dk.gn., foli. dip @ 80 deg., predominate dk.gn. mnrl. prob. pyroxene group (augite?), inclu. soft, buff talc, s. inclu. hem.

21.4 DIOR-GAB. SCH. a.a. w. inclu. rdd. olivine gs.

22.3 DIOR-GAB. SCH. m. gn., foli. dip @ 70 deg, foliated m. gn. mnrls. prob. labradorite, incl. rd. earthy hem. in line of foliation, inclu. gn. glassy rdd. olivine.

23.6 DIOR-GAB. SCH. m. gn., predominate mnrls. prob. pyroxene group, foliated wh./buff mnrls. prob. plagioclase feldspars, inclu. specularite-hem., inclu. rd. earthy hem., incl. gn./clr. glassy rdd. olivine.

25.6 DIOR-GAB. SCH. lt.gn., well foliated.

27.6 DIOR-GAB. SCH. lt./m. gn., well foliated, predominate dk. mnrls. pyroxene, lt. mnrls. plagioclase feldspars, 12mm. x 7mm. inclu. gn. glassy olivine w. assoc. rd. hem.

DETAILED LITHOLOGIC DESCRIPTION CORE CHIPS - CORE NO. 23 (Cont.)

28.4 DIOR-GAB. SCH. m. gn., well foliated, predominate dk. mnrls. pyroxene group, lt. mnrls. plagioclase, iron black micaceous hem. & red earthy hem. along frac., v. assoc., dol. or doltc.

28.8 DIOR-GAB. SCH. m. gn., mod. foliation, dk.gn. mnrls. predominately pyroxene group, lt. feldspars aliened w. foliation., inclu. hem. & olivine.

29.7 DIOR-GAB. SCH. m. gn., well foliated, mnrls. a.a., v. abd. inclu. rd. hem. & gn./clr., rdd. glassy, gs. olivine.

Core No. 23 was classified as a Diorite-gabbro schist upon field examination. Subsequent detailed petrographic examination which included microscopic viewed thin section and oil immersion and x-ray diffraction analyses defined the Precambrian as an aphanitic, chlorite-sericite-quartz schist (greenschist).

DESCRIPTION OF DRILL CUTTING SAMPLES

INJECTION TEST WELL NO. 1

DRILLING MEDIUM AIR

10000 - 10	LS	40	gy-brn., pkst/xln, w. mdst, cpct, arg., loc. sdy.
	SH	40	m. gy.-brn., calc., slty.
	SS	20	clr., lt.org., m. g., subang.,lse.
20	SH	65	a.a.
	LS	25	a.a.
	SS	10	a.a.
30	SS	100	clr., wh., lt.org., m./s. c/g., subang.,w. sort., lse., w. s. kao. cmt.
40	SS	100	a.a.
50	SH	70	m. gy.-brn., calc.
	LS	30	mdst., gy.-brn., org., cpct.
60	SH	60	a.a.
	LS	40	a.a.
70	LS	75	mdst., lt.gy.-tan., s. gy.-brn., cpct.
	SH	25	m. gy./m. gy.-brn., calc., loc. sdy.
80	SH	70	a.a.
	LS	30	a.a.
90	SLTST	60	gy.-brn., loc. sdy., calc.
	LS	30	a.a.
	SH	10	a.a.
90 - 10100	SLTST	80	gy.-brn., calc.
	SH	15	gy., calc.
	LS	5	mdst., lt.gy.-tan. cpct.
10100 - 10	SLTST	80	rd.-brn., sdy., calc.
	LS	5	mdst., gy.-tan., cpct.
	SS	15	rd., lt. org., f. g., lse.
20	SLTST	90	gy.-brn., rd.-brn., calc.
	SS	10	a.a.
30	SS	70	lt.brn., lt.org., f. g.
	SLTST	20	a.a.
	SH	10	gy., calc.
40	SLTST	70	gy.-brn., s. rd.-brn., calc., sdy.
	SS	20	lt.brn., org., f./s. m. g., subang., lse., s. kao.
	LS	10	mdst., lt.gy.-tan., cpct.
50	SLTST	90	rd.-brn., gy.-brn., sdy., calc.
	SH	5	gy., calc.
	LS	5	mdst., lt.gy.-tan cpct.
60	SS	35	rd.-brn., s. clr., ang./sub. ang. f./m. g., v. lmy., grds./ls.
	SLTST	35	rd.-brn., gy.-brn., sdy., calc.
	LS	30	mdst./pkst, lt.gy., buff., rd.-brn., cpct.
70	LS	100	pkst./mdst., gy.-brn., lt.gy., lt.gy.-buff. cpct., sdy. tr. foss.

DRILL CUTTINGS (Cont.)

10170 - 80	LS	100	a.a.
90	LS	80	mdst., lt.gy., arg., loc. slty.
	SH	20	dk.gy., blk. blky., slty., calc., m. hd.
90 - 10200	LS	60	a.a.
	SH	40	a.a.
10200 - 10	SLTST	45	dk.gy., gy.-brn., lmy., loc. sdy.
	SH	45	dk.gy., slty., calc./sl. calc., m. hd., (brks. easy.)
	LS	10	mdst., lt./dk.gy., cpct.
20	SH	65	dk.gy.-brn., blk., blky./plty., s. splin., calc., m. h. d.
	SLTST	30	a.a., hd.
	LS	5	a.a.
30	SH	65	blk., plty., s. splin., calc., m. sft., sh. smallest chips in samp.
	SLTST	30	a.a.
	LS	5	a.a.
40	SH	55	a.a.
	SLTST	30	a.a.
	LS	15	a.a.
50	LS	75	mdst./pkst., m/lt. gy., arg., loc. sl. sdy., hd.
	SH	15	dk.gy., blky., calc.
	SLTST	10	dk.gy., calc., hd.
60	LS	50	mdst., m./lt.gy.-brn., arg.
	SH	40	dk.gy., blky., calc., slty.
	SS	10	vh., vf./f. g., subang., ang., lse., clus. v. calc.
70	LS	50	pkst./mdst., m./lt. gy., s. slty. brn., sdy.
	SH	30	dk.gy., blky., calc., slty.
	SS	20	vh., clr., v. f./m. g., subang., lsc.
80	LS	50	mdst., s. pkst., m. g., arg., cpct.
	SS	35	a.a.
	SH	15	a.a.
90	SH	80	a.a.
	LS	20	a.a.
90 - 10300	SH	75	dk.gy., calc., slty.
	LS	25	mdst., gy.-lt.brn., arg.
10300 - 10	LS	75	pkst., gy.-brn., slty., sdy., cpct.
	SLTST	25	gy., gy.-brn., lmy., sdy.
20	LS	60	a.a.
	SLTST	45	a.a.
	SH	5	dk.gy., blky., calc.
30	LS	45	a.a.
	SLTST	45	a.a.
	SH	10	a.a.

DRILL CUTTINGS (Cont.)

10330 - 40	LS	60	pkst., gy.-brn., slty., cpct.
	SLTST	30	gy./gy.-brn., lmy.
	SS	5	wh., clr., v. f. g.
	SH	5	dk.gy.
50	SLTST	65	a.a.
	LS	35	a.a.
60	SLTST	85	brn., gy.-brn., calc., sdy.
	LS	10	mdst., lt.gy., arg.
	SH	5	dk.gy.
70	LS	65	mdst./pkst., lt.gy., lt., gy.-brn., sdy.
	SLTST	20	gy.-brn., brn., lmy., sdy.
	SS	15	clr., wh., ang./subang.,vf/f. g.
80	LS	85	pkst., gy.-brn., sdy. cpct., foss.
	SLTST	15	brn., gy.-brn., lmy.
90	LS	100	mdst., lt. gy., wh., lt.gy.brn., arg., foss.
90 - 10400	LS	100	a.a.
10400 - 10	SLTST	90	dk.gy., calc., loc. sdy.
	LS	10	mdst., gy., arg. cpct.
20	SLTST	75	a.a. lmy.
	SH	15	dk.gy./blk., lmy.
	LS	10	mdst., gy., arg./slty.
30	SLTST	60	a.a.
	SH	30	a.a. plty.
	LS	10	a.a.
40	SLTST	55	a.a.
	SH	35	a.a.
	LS	10	pkst./mdst., gy., lt.gy.
50	SLTST	45	dk.gy./blk., shly, v. calc.
	SH	50	dk.gy./blk., slty., v. calc.
	LS	5	a.a.
60	SLTST	50	dk.gy./blk., v. calc., s. doltc., shly.
	SH	45	dk.gy./blk. v. calc., s. doltc., foss., crin., slty.
	LS	5	pkst., gy.-brn.
70	SH	50	a.a.
	SLTST	45	a.a.
	LS	5	mdst., lt.gy., cpct.
80	SH	55	a.a.
	SLTST	35	a.a.
	LS	10	mdst./s. pkst., lt.gy., wh., gy.-brn., s. suc.
90	LS	65	pkst., gy., gy.-brn., slty., cpct., sdy.
	SS	20	wh., m. g., subang., lse.
	SH	15	dk.gy., blky., calc., slty.
90 - 10500	LS	60	a.a.
	SLTST	35	dk.gy.,/my.
	SH	5	a.a.

DRILL CUTTINGS (Cont.)

10500 - 10	LS	85	pkst., gy., gy.-brn., slty.
	SS	10	clr., vh., c. g., subang. lse.
	SLTST	5	dk.gy., calc.
20	LS	65	a.a.
	SS	20	a.a.
	SLTST	15	a.a.
30	LS	80	vkst. lt.gy.-brn.
	SS	20	clr., lt.org., v. f.
40	LS	60	a.a.
	SS	25	a.a.
	SH	15	dk.gy., calc.
50	SLTST	65	gy.-brn., lmy. grds./ls.
	LS	30	a.a.
	SS	5	a.a.
60	SLTST	100	lt.gy.-brn., lmy.
70	SLTST	80	a.a.
	LS	15	mdst., lt.gy.
	SH	5	dk.gy., calc.
80	SLTST	50	a.a.
	LS	45	vkst., lt.gy.brn.
	SS	5	clr., v. f. g., s. f. g.
90	SLTST	75	a.a.
	LS	15	a.a.
	SS	10	a.a.
90 - 10600			a.a.
10600 - 10	SLTST	90	gy., m. gy.-brn., lmy., sdy., grds. slty/m., mica., foss.
	LM	5	vkst., m. gy.-brn., slty., foss.
	SS	5	vh., org., f./m. g., lse.
20	SLTST	90	a.a.
	LM	5	a.a.
	SS	5	a.a.
30	SLTST	85	a.a.
	LM	10	a.a.
	SS	5	a.a.
40	SLTST	70	gy., m. gy.-brn., lmy., sdy., mica.
	LS	20	mdst., lt.gy., cpct.
	SS	10	clr., org., f./m. g., subang./subrdd.
50	SLTST	65	gy., m. gy.-brn., lmy., sdy., mica.
	SS	10	clr., org., v. calc., cmt., subang., lse./clus.
	LS	25	mdst., gy.-brn., cpct.
60	SLTST	90	gy.-brn., lmy., sdy., v. loc. m. gtz. qs.
	LS	10	mdst., gy.-brn., cpct.
70	SS	80	brn., v. f./f. g., ang./subang., v./my., grds./m. v. sdy.
	SLTST	15	a.a.
	LS	5	mdst., gy., gy.-brn.
80	SLTST	70	gy.-brn., lmy.
	SS	20	a.a.
	LS	5	a.a.
	SH	5	blk., plty., mica.
90	SLTST	70	a.a.
	SS	20	a.a.
	LS	5	a.a.
	SH	5	a.a.

DRILL CUTTINGS (Cont.)

90 - 10700	SLTST	65	a.a.
	LS	20	lt.gy.-brn., mdst., cpct.
	SS	10	a.a.
	SH	5	blk., plty.
10700 - 10	SLTST	60	gy.-brn., v./my., sdy.
	LS	45	mdst., wkst., lt.gy.-brn., lt.gy., cpct.
	SS	5	lt.gy., lt.brn., v. f./f. g., lmy.
20	SLTST	65	a.a.
	SH	25	gy.-brn., dk. by., v. mica., blky./plty., calc
	LS	10	a.a.
30	SLTST	60	a.a., sdy.
	SH	10	gy., brn., v. mica. calc.
	LS	30	m. gy.-brn., mdst., cpct.: ss. wh., v. f./f. g., lse.
40	SH	40	brn., m. gy., plty., mica., calc., s. blky.
	SLTST	30	gy.-brn., sdy., lmy.
	LS	20	mdst., gy., arg.,; ss.10 clr., org., lt.brn., v. f./f. g.,/se.
50	SS	80	clr., wh., s. f. g. ss. sl. calc., m. g., subang., /se., v. kao. coatings.
	SH	20	blk., s. rd.-brn., plty.
60	SS	100	wh., clr., m./c. g., subang./se., v. kao coatings. few. clus. calc.
70	SH	20	gy., plty.
	SS	50	a.a. v. f. g., calc.
	LS	10	gy.-brn., mdst.
	SLTST	20	brn., a.a.
80	SLTST	50	gy.-brn., s. rd. brn., calc./lmy.
	SH	35	gy., plty., blky., s. v. mica.
	SS	15	a.a.
90	SS	45	wh., lt.brn., gy. v. f./f. g., subang., s. cmt.
	SH	40	gy., plty., blky., s. mica.
	SLTST	15	gy.-brn.
90 - 10800	SH	45	gy., blky., s. plty., mica.
	SS	40	lt.gy., wh., s&p., v. f./f. g., subang., calc. cmt.
	SLTST	15	gy., gy.-brn., calc.
10800 - 10	SH	100	dk.gy., plty., s. blky., doltc., /calc., m. hd.
20	SH	60	a.a.
	LS	40	mdst./pkst., dk.gy., gy.-brn., cpct., cl. sdy.
30	SH	30	a.a.
	SS	40	wh., lt.gy., f. g., subang./ang., clus. calc.
	SLTST	30	gy.-brn., calc.
40	SH	55	dk.gy., s. blk., plty./blky., doltc., slty.
	SS	45	wh., gy., lt.gy.-brn., v. f/.f. g. sl. calc.
50			Hole damp - no sample recovery 10,840 - 10,881 ft. Twisted off @ 10,881 ft., prepare to mud up and side track.
60			No sample recovery.
70			No sample recovery.
80			No sample recovery.
10880 - 90			No sample recovery.

DESCRIPTION OF DRILL CUTTING SAMPLES

INJECTION TEST WELL NO. 1

SIDE TRACK 1

DRILLING MEDIUM MUD

10112			Kicked off @ 10,122' using Navi Drill Motor and 1 1/2 deg. Bent Sub from 6 deg. hole; @ 10,146 5.25 deg. hole angle, .75 deg. departure angle; @ 10,437 3.8 deg. hole angle, 2.2 deg. departure angle with a departure of 10.7'. (5' samples to 10,220').
10122 - 30	CMT	95	
	SLTST	5	rd.-org.
40	CMT	50	
	SLTST	30	rd. brn., s. gy.-brn. calc.
	SH	10	gy./blk., blky.
	LS	5	gy. mdst.,arg., cpct.
	SS	5	lt.brn., lt.org.,calc.
50	SLTST	40	brn., sdy., calc.
	CMT	30	
	LS	15	pkst., lt.gy., gy.-brn., foss.
	SH	15	dk.gy.brn.
60	LS	70	pkst., lt.gy., mot. lt. brn., foss., mdst. gy. -brn. arg.
	CMT	20	
	SH	10	dkgy./blk.
70	LS	90	a.a., shly.
	CMT	10	
80	SH	80	blk., dk.gy.-brn., lmy., loc. sdy.
	LS	15	a.a.
	CMT	5	(10,185 -90 samp. not circ. up.)
90	SH	60	a.a.
	SLTST	40	rd.-brn., sdy.
90 - 10200	SH	90	gy., blk., plty./blky., calc./lmy., foss.
	SLTST	10	rd.-brn., sl. sdy.
10200 - 10	SH	90	dk.gy./blk., dk.gy.-brn., s. gy.-grn., plty./blky., calc./lmy. hd./s. sft., foss.
	LS	5	mdst., dk.gy.-brn., cpct.
	SS	5	vh. lt.org.,f. g.
20	SH	95	a.a., v. s. carb. maf.
	SS	5	vh., fl/s. mg., sub. rdd., calc.
30	SH	100	a.a.
40	Sh	70	a.a.
	SS	20	vh., sub. rdd., v. sl. calc., ti
	LS	10	vkst., lt.gy. gy.-brn., cpct.

DRILL CUTTINGS (Cont.)

10240 - 50	SH	55	dk.gy./blk., gly.mica, plty./blky., calc.
	SS	40	wh., lt.gy. f./mg., subrdd. calc./lmy.
	LS	5	a.a., sdy.
60	LS	40	pkst./mdst., lt.gy., mot. lt.gy.-tan. gy.-brn., loc. sdy.& arg.
	SS	30	a.a.
	SH	30	a.a.
70			No samp. rec.; SLM @ 10262 (Depth Corr. 10,262 to 10,271)
80	SLTST	80	brn., gy.-brn., calc, sdy., lmy.
	SH	15	a.a.
	SS	5	a.a.
90	SLTST	90	brn., gy.-brn., sdy., v./my.
	LS	10	mdst., brn., cpct., s. lt.gy. chky.
90 - 10300	SLTST	85	a.a.
	LS	10	a.a.
	SH	5	blk.
10300 - 10	SLTST	75	brn. lt.brn., sdy., calc./v. lmy.-grds. slty. ls.
	SS	15	clr., subany., m. g., lse.
	LS	10	mdst., brn., mot. dk.gy. cpct., sdy., slty.
20	SLTST	80	a.a.
	LS	15	mdst./wkst., lt.gy., brn., cpct.
	SH	5	lt.gy., plty., sft., blk., blky., calc.
30	SLTST	90	a.a.
	LS	5	a.a.
	SH	5	a.a.
40	SLTST	90	a.a.
	LS	5	a.a.
	SS	5	wh., clr., f. g., subrdd., lse.
50	SLTST	90	lt.gy.-brn., calc./lmy., carb.
	LS	5	mdst., lt.gy., cpct.
	SH	5	lt.gy-gn., gy., sft.
60	LS	80	pkst., s. mdst., lt.gy.-tan, wh., lt.gy. sdy., sl. suc., tr.p .m ol.p or.
	SLTST	20	a.a.
70	LS	80	a.a.
	SLTST	15	a.a.
	SH	5	blk., plty.
80	LS	90	grst./pkst., f./m. g., s. micrxln., mdst., lt. brn., lt.gy., wh., mot., s. brn., tr. micrxln. por., sdy., ooltc., tr. rd. cht.
	SLTST	10	lt.brn., lmy.
90	LS	80	wkst., wh., lt.gy.-brn., mot., chky., loc. sdy.& slty.
	SLTST	15	lt.brn., lmy.
	SH	5	blk., plty
90 - 10400	LS	95	wkst., wh., lt./dk.gy.-brn., loc. chky., cpct., foss.
	SH	5	blk., calc., plty.

DRILL CUTTINGS (Cont.)

10400 - 10	SH	55	blk., lt.gy., calc./loc. lmy., plty./blky., loc. carb.
	LS	45	a.a.
20	SH	75	blk., gy., plty./fis., calc., hd., s. sft., carb. f. mica.
	LS	25	mdst./s. pkst., dk.gy-brn., lt, gy., wh. vot., carb.
30	SH	85	a.a., v. lmy. stks.
	LS	15	a.a.
40	SH	95	a.a.
	LS	5	a.a.
50	SH	95	a.a. becm. slty.
	LS	5	a.a.
60	SH	95	blk., gy., plty., s. fis., st. mica., v. calc./ dol., hd. becm. slty. foss.
	LS	5	pkst., lt.brn., lt.gy., mot. cpct.
70	SH	95	a.a. (10,460 - 70 samp. not circ. up befor trip)
	LS	5	a.a.
80	SLTST	75	lt.gy., calc.
	SH	25	a.a.
90	SLTST	80	lt.gy., calc., sdy.
	SS	15	wh., lt.gy., v. fig.
	SH	5	blk., gy., plty.
90 - 10500	SLTST	80	a.a.
	SS	15	a.a.
	SH	5	a.a.
10500 - 10	SLTST	80	lt.gy., dk.gy., carb., calc./lmy. stks.
	SS	15	brn., gy., lt.gy., mot., f./m. g., subang./subrdd., calc./lmy.
	LS	5	pkst./mdst., dk.gy.brn, sdy., cpct.
	SH	5	bk.,calc., plty., hd.
20	SLTST	80	a.a.
	SS	15	a.a.
	SH	5	a.a., tr.ls.
30	SLTST	90	a.a.
	SS	5	a.a.
	SH	5	a.a., tr.ls.
40	SLTST	80	gy., lt.gy.-brn., s. brn., calc., v. sdy., s. lmy.
	SS	10	lt.gy. g., s. f. g., subrdd., calc., ti
	SH	10	blk., calc.,plty., foss.,
	LS	5	mdst., slty.,cpct.
50	SLTST	75	a.a.
	LS	15	mdst./pkst., lt.gy., brn., gy.dk.gy.-brn., mot., arg., slty., v. loc. m. q. g's.
	SH	10	blk., plty./blky., s. fis., calc., s. brn.
60	SLTST	75	a.a.
	LS	20	a.a.
	SH	5	a.a., tr. lt.gy., brn., f.g. ss.

DRILL CUTTINGS (Cont.)

10560 - 70	SLTST	85	a.a.
	LS	10	a.a.
	SH	5	a.a.
80	SLTST	70	lt.brn., gy., calc., sdy.
	SS	15	lt, brn., v. f. g., calc., v. slty.
	SH	10	blk., gy.-brn., calc.
	LS	5	dk.gy.-brn., cpct.
90	SLTST	75	lt.gy.-brn., calc.
	SS	15	a.a.
	SH	10	a.a.
90 - 10600	SLTST	80	brn., lt.gy.-brn., c. rust-rd., calc., sdy.
	SS	15	a.a.
	SH	5	a.a.
10600 - 10	SLTST	100	dk.gy.-brn., lt.gy., calc., sdy., loc. lmy.
20	SLTST	100	a.a.
30	SH	50	blk./dk.gy., s. org.-brn., mica., calc., plty., hd., sft.
	SS	25	gy., v.f./v. g., mica., calc.
	SLTST	25	a.a.
40	SS	70	lt.gy., gy., f. g., s & p, anhy./subrnd, carb., calc.
	SH	20	a.a.
	SLTST	10	a.a.
50	NS		
60	SLTST	80	gy., gy.-brn., s. org.-brn
	SH	15	blk./dk.gy., plty./blky.
	LS	5	mdst., ary., cpct.
70	SLTST	90	a.a.
	SH	10	a.a.
80	SLTST	100	org.-brn., lt.gy.-brn., loc. dsy., calc.
90	SLTST	80	a.a.
	SH	20	blk., dk.gy.-brn., mica.
90 - 10700	SLTST	85	a.a.
	LS	15	mdst., tr. wkst., dk.gy.brn., blk.,cpct.
10700 - 10	SLTST	70	brn., rd.-brn., gy., calc., sdy.
	SH	25	brn., dk.gy.-brn., qlty., mica
	LS	5	mdst., dk.gy.-brn., cpct.
20	SLTST	45	brn., calc., sdy., loc. mica.
	SS	40	lt.brn., wk. mot., f. g., subrnd, calc.
	SH	10	blk., dk.gy.-brn
	LS	5	a.a.
30	SLTST	90	a.a.
	SH	10	a.a.
	LSTR		mdst., dk.gy.-brn.
40	SLTST	95	a.a.
	SH	5	a.a.
	LSTR		
50	SS	90	lt.gy., f. g., subrnd., v. kao.
	SH	10	dk.gy., gy.-brn., plty., calc./loc. lmy.
60	SS	80	lt.brn. wh., mot., f./m. g., subaug./subrnd., v. kao.
	SLTST	10	brn., sdy.
	SH	10	rd., brn., dk.gy.-brn., plty.

DRILL CUTTINGS (Cont.)

10760 - 70	SLTST	45	brn., gy.-brn., lt.brn., sdy., calc.
	SS	25	lt.brn., lt.gy.-brn., f. g., subrnd., calc., kao.
	LS	15	mdst., dk.gy.-brn., v. arg.;
	SH	15	dk. gy.-brn., dk.gy. lmy.
80	SLTST	45	a.a.
	SS	45	a.a.
	SH	5	a.a.
	LS	5	a.a.
90	SS	60	a.a.
	SH	25	a.a.
	SLTST	15	a.a.
90 - 10800	SLTST	40	gy., calc.
	SS	30	lt.gy. f. g., kao., calc.
	SH	30	blk., dk.gy., plty., fly. mica.
10800 - 10	SH	100	bk./dk.gy., plty./s. tis., doltc., sh. carb.
20	SH	50	a.a.
	SS	40	gy., v. f./v. g., subang., v. calc., v. carb., kao.
	LS	10	mdst., dk.gy., shly., cpct.
30	SS	60	a.a.
	SLTST	20	dk.gy., calc.
	SH	10	a.a.
	LS	10	a.a.
40	SS	75	gy./lt. gy., f. g., subrnd., calc.
	SH	20	blk., dk.gy., blky./plty.
	LS	5	mdst.,dk.gy., arg., cpct.
50	SS	60	gy., v. f. g., calc.
	SH	35	blk., blky.
	LS	5	a.a.
60	SLTST	85	gy., lt.gy.-brn., m. rd., calc.
	SH	15	dk.gy., calc.
	LS	Tr	brn.
70	SLTST	90	a.a.
	SH	10	a.a.
80	SLTST	90	a.a. v. stks. brn. ls.
	SH	10	a.a.
90	SLTST	90	a.a.
	SH	10	a.a.
90 - 10900	SLTST	75	a.a.
	SH	25	a.a.
10900 - 10	SLTST	50	gy.-brn., s. rd.-brn., gy., calc.
	SH	50	rd.-brn., brn., plty., mica., calc./lmy. stks.
20	SH	60	a.a.
	SLTST	30	a.a.
30	SLTST	80	rd.-brn., gy.-brn., calc.
	SH	20	a.a.
40	SLTST	70	a.a. v. mica.
	SH	30	dk.gy., brn., rd., mica.

DRILL CUTTINGS (Cont.)

10940 - 50	SLTST	60	a.a.
	SH	40	a.a.
60	SS	40	lt.gy., gy., f./s. m. g., subrnd., calc., v. kao. in fill. ti
	SH	35	dk.gy., mar., blky., calc.
	SLTST	25	brn., gy., calc., sdy.
70	SS	40	a.a.
	SH	40	a.a.
	SLTST	20	a.a.
80	SS	40	a.a.
	SH	40	a.a.
90	SLTST	60	lt.brn., lt.gy.-brn., calc./lmy. stks.
	LS	30	mdst., brn., gy.-brn., v. arg.
	SH	10	brn., gy., calc.
90 - 11000	SLTST	100	a.a. v. lmy. stks.
11000 - 10	SLTST	40	lt.gy., gy.-brn., v. calc./lmy., interbd. ls.
	LS	25	mdst., gy.-brn., brn., interbd. v. sltst.
	SS	20	lt.brn., rd., f. g., calc.
	SH	15	brn., gy. plty., mica.
20	SLTST	55	a.a.
	LS	35	mdst./wkst., brn., gy., slty., cpct.
	SH	10	brn., gy., plty., mica., calc.
30	LS	95	wkst., wh. lt.gy., mot., chky./microxln., tr. por.
	SH	5	m. gy., fis.
40	LS	100	mdst., wkst., brn., gy.-brn., wh./lt.gy., s. arg., cpct.
50	LS	75	mdst. dk.gy. dk.gy.brn., v. arg., cpct.
	SH	25	blk., s. lt.gy. plty., s. fis., calc./lmy.
60	SH	70	blk. plty./blky., s. fis., tr. pyr., calc./lmy., m. hd., s. sft.
	LS	30	a.a.
70	SH	80	blk., dk.gy.-brn., plty./blky., m. hd., calc.
	LS	20	mdst., dk.gy.-brn., cpct.
80	LS	100	mdst., dk.gy.-brn., tr. nat. frac.
90	LS	100	mdst./s. wkst., dk.gy.-brn., s. buff/lt.gy., cpct. s. chky., tr. calc. lined frac., foss., pyr.
90 - 11100	LS	75	a.a.
	SS	15	lt.gy., f. g., calc., v. kao.
	SH	10	blk., lt.gy., plty./s. fis.
11100 - 10	SLTST	80	lt.gy., gy.-brn., brn., sdy., mica., calc.
	SH	10	a.a.
	LS	10	a.a.
20	SLTST	60	a.a.
	SH	30	blk., gy., m. rd., calc., blky., plty.
	LS	10	
30	SS	50	lt.gy., v. f. g., carb., mica., calc.
	SLTST	35	a.a.
	SH	10	a.a.
	LS	5	a.a.

DRILL CUTTINGS (Cont.)

11130 - 40	LS	85	mdst./s. wkst., dk.gy.-brn., s. buff., foss., loc. v. arg.
	SH	15	blk., plty., calc.
50	LS	85	mdst., wkst., l. xln., wh., dk.gy.-brn., abd. clr/. wh. cht./qtz.
	SS	10	wh., s & p., v. f. g., v. kao.
	SH	5	a.a.
60	LS	40	mdst., dk.gy.-brn., cpct.
	SH	30	blk., blky./plty., calc.
	SS	30	lt.gy., v. f./f. g., s. c. q., calc., kao.
70	SLTST	50	lt.gy., lt.gy.brn., calc.
	LS	30	mdst., dk.gy.-brn.
	SH	20	blk.
80	SLTST	80	gy.-brn., calc
	LS	20	a.a.
90	SLTST	85	rd.-brn., gy.-brn., sdy., calc.
	SH	10	blk., brn., blky./plty.
	LS	5	a.a.
90 - 11200	SH	75	rd.-brn., brn., s. dk.gy., plty., calc., mica.
	SLTST	20	a.a.
	LS	5	a.a.
11200 - 10	SLTST	60	rd., brn. s. gy.-brn., calc.
	SH	30	rd., blky., plty., mica., calc., v. stks. rd.-brn. ls.
	SS	10	wh., clr., org. & rd. grs., f./c. q., ark., sub-rnd., calc.
20	SS	90	wh., clr., org. & rd. grs., c. q., ark., subrnd., calc., por. mtr. gran. por.
	SH	10	a.a.
30	SS	90	a.a. v. sh. chips., kao. cmt.
	SLTST	10	rd., brn.
40	SS	90	a.a.
	SLTST	10	a.a.
50	LS	50	grst./mdst., dk.gy.-brn., blk, rd.-brn., v. abd. blk. cht. nod., c. qtz. gs.
	SLTST	40	rd., brn., s. gy., calc.
	SH	10	brn., calc.
60	SLTST	50	a.a.
	SH	40	a.a.
	LS	10	a.a.
70	SLTST	65	a.a.
	SH	35	a.a.
80	SH	60	brn., rd., dk.gy.-brn., dk. mar., plty./fis. calc./lmy., mica.
	SLTST	40	a.a.
90	SLTST	60	a.a.
	SH	40	a.a.
90 - 11300	SH	75	a.a. becm. v. mica.
	SLTST	25	

DRILL CUTTINGS (Cont.)

11300 - 10	SLTST	55	brn., sl. calc./lmy.
	SH	45	dk. rd.-brn., dk.gy., sl. calc., mica.
	LS	TR	brn., gy.-brn., arg. (nod.)
20	SH	60	brn., plty., calc., mica.
	SLTST	35	brn., lt.gy., calc.
	LS	5	brn., v. sdy., arg.
30	SLTST	45	a.a.
	LS	30	mdst. g. s. vkst. brn., dk.gy-brn., v. arg.
	SH	25	a.a.
40	SLTST	45	a.a.
	SH	30	brn., dk.gy., plty., calc., mica.
	LS	25	a.a.
50	SS	60	brn., gy.-brn., v. f. g., v. arg., v. carb., slty.
	SLTST	40	brn., rd., wh.-blk (s. & p.), carb., kao., sdy.
60	SS	100	gy., dk.gy., lt.gy., s. & p., f. g., subrnd., carb., v. kao. stks., cals. v. slty. & shly., ti.
70	SS	90	a.a.
	SLTST	10	brn.,calc
80	SS	60	a.a.
	SH	25	brn., gy., mica., plty.
	SLTST	15	brn., calc., sdy.
90	LS	90	mdst., s. vkst., gy., lt.gy., s. wh., arg., cpct.
	SS	10	a.a.
90 - 11400	LS	90	a.a.
	SS	5	a.a.
	SH	5	blk., gy., mica., plty.
11400 - 10	LS	55	mdst., dk.gy., lt.gy., brn., v. arg. & sdy., v. stks. v. f. g. ss.
	SH	35	blk., blky., s. plty., calc.
	SLTST	10	dk.gy., lmy., carb.
20	SLTST	45	dk.gy./blk., v. shy. & lmy., v. stks. ls., carb.
	LS	35	mdst./vkst., dk.gy./blk., v. slty. & shly., cpct., foss.
	SH	20	blk., blky., lmy., slty.
30	SLTST	45	a.a.
	SH	45	a.a.
	LS	10	a.a.
40	SH	60	blk., plty., s. blk. y., calc., carb.
	SLTST	40	a.a.
50	SH	80	blk., dk.gy., plty., s. fis., calc., carb.
	SLTST	20	a.a.
60	SH	85	a.a.
	LS	15	mdst., gy.-brn., brn., arg.
70	SH	90	a.a.
	LS	10	a.a.
80	SH	85	a.a.
	LS	15	a.a.
90	SH	90	a.a. w lmy. stks.
	LS	10	a.a.
90 - 11500	SH	80	a.a.
	LS	20	mdst./s. vkst., dk.gy., dk.gy.-brn., cptc.

DRILL CUTTINGS (Cont.)

11500 - 10	SLTST	70	dk.gy., m. gy. v. lmy.
	LS	20	mdst., dk.gy.-brn., brn., v. slty.
	SH	10	blk.,calc.
20	SLTST	75	a.a.
	LS	25	a.a.
30	SLTST	65	gy., gy.-brn., v. lmy.
	LS	30	mdst., vkst., gy./gy.-brn., v. slty.
	SH	5	blk., calc., carb., plty.
40	SLTST	50	a.a.
	SS	40	vh., gy., v. f./f.g., subrnd., calc./lmy.
	LS	10	a.a.
50	SS	50	lt.gy./dk.gy., v. f./f. g., calc./lmy.
	SLTST	40	a.a.
	LS	5	a.a.
	SH	5	blk.
60	SS	75	lt.gy., gy., lt.grn., f. g., subrnd., calc., kao.
	SH	20	blk., calc., plty., foss.
	SLTST	5	a.a.
70	SS	60	a.a.
	SH	30	a.a.
	SLTST	10	dk.gy./blk., shly., calc./lmy.
80	SS	70	lt.gy.vh., s. rd., f./s. mg., s. v. mica., calc., kao. carb.
	SH	30	dk.gy./blk., s. brn., tr. rd., v. s. stks. brn. ls.
90	SS	50	vh., lt.gy., lt.grn., v. f./f. g., subrnd., calc., kao. cmt., ti/s. v. p. por.
	SH	30	dk.gy/blk., blky./plty., lmy. loc.
	LS	20	mdst./s. vkst., m. gy.-brn., s. sdy., cpct.
90 - 11600	SH	85	dk.gy.-brn./blk., plty., fis., sl. calc.
	LS	20	mdst., dk.gy.-brn., arg., cpct.
11600 - 10	SH	75	dk.gy-brn./blk., s. lt.gy., plty./s. fis. calc./ lmy. stks., crin., sl. carb.
	LS	25	mdst., dk.gy.-brn., brn., v. arg., cpct.
20	SH	85	a.a.
	LS	15	a.a.
30	SH	90	a.a.
	LS	10	a.a.
40	SH	100	a.a.
50	SH	95	dk.gy./blk., s. m. gy., plty., s. fis., foss., calc., v. lmy. stks.
	LS	5	mdst., brn., arg.
60	LS	60	mdst./s. vkst., lt.gy., brn., arg., s. suc., s. chunky., foss.
	SH	40	blk., lt.gy., plty., lmy. stks., foss. crin.
70	SH	50	a.a., foss., crin.
	SLTST	25	lt.gy., dk.gy., sdy., calc.
	LS	15	mdst., dk.gy.-brn., lt.gy., chky. & slty., cpct.
	SS	10	lt.gy., v. f. g. calc.

DRILL CUTTINGS (Cont.)

11670 - 80	SH	50	a.a.
	SS	30	lt.gy., lt.grn., v. f. g., subrnd., calc.
	LS	10	a.a.
	SLTST	10	a.a.
90	SLTST	50	lt.gy., dk.gy., brn., calc.
	SH	30	a.a.
	SS	15	a.a.
	LS	5	a.a.
90 - 11700	SS	60	lt.gy., brn., gy., s. & p., v. f./f. g., calc., carb., mica., ti.
	SH	25	a.a.
	SLTST	10	a.a.
	LS	5	a.a.
11700 - 10	SS	55	lt.gy., lt.gn., f. g., subrnd., subang., calc., carb., v. p. por. mica.
	SLTST	20	gy., lt.brn., calc.
	SH	20	blk., plty., blky., calc., foss.
	LS	5	mdst., brn., gy.
20	SLTST	50	a.a.
	SS	30	a.a.
	SH	20	a.a., tr. ls.
30	SLTST	70	a.a.
	SS	20	a.a.
	SH	10	a.a.
40	SS	75	lt.gy., lt. fn., f. g., subang., subrnd., calc. infill. kao., carb.
	SLTST	20	a.a.
	SH	5	a.a.
50	SS	60	a.a.
	SLTST	25	a.a.
	SH	10	blk.
	LS	5	brn.
60	SS	75	wh./lt.gy., lt.gn., s. & p., v. f./f. g., ang./subrnd., biot. glanc., carb., calc.
	SLTST	20	gy., gy.-brn., calc.
	SH	5	blk., gy., plty., blky., calc.
70	SS	90	a.a. v. s. l. rd. & org. g's.
	SLTST	10	a.a.
80	SLTST	50	brn., gy., loc. calc.
	SH	30	brn., gy.-brn., blk., plty., blky., abd. biot.
	SS	20	a.a.
90	SH	45	brn.rd., gy./blk., abd. biot., plty., blky.
	SLTST	40	a.a.
	SS	15	a.a.
90 - 11800	SH	55	blk., s. brn.-rd., dk.gy., blky., plty., hd., calc.
	LS	40	mdst., dk.gy.-brn., brn., v. arg., cpct.
	SLTST	5	a.a.

DRILL CUTTINGS (Cont.)

11800 - 10	LS	40	mdst., dk.gy.-brn., v. arg., cpct.
	SLTST	35	lt.gy., tan. calc./lmy.
	SH	20	dk.gy., calc., lmy.
	SS	5	
20	LS	55	mdst., lt.gy., gy.-brn., slty., doltc., cpct.
	SLTST	35	lt.brn., rd.-brn., lmy.
	SH	10	a.a.
30	SLTST	50	a.a.
	LS	30	a.a.
	DOL	15	mdst., dk.gy.-brn., arg. calc. cpct.
	SH	5	a.a.
40	SLTST	45	a.a.
	DOL	35	a.a.
	LS	10	a.a.
	SH	10	a.a.
50	DOL	65	a.a.
	SLTST	25	a.a.
	LS	5	a.a.
	SH	5	a.a.
60	LS	80	mdst. lt.gy./dk.gy.-brn., v. slty., doltc., cpct.
	SLTST	20	gy.-brn., lmy., gds./slty. doltc. ls.
70	LS	55	a.a. gds./sltst.
	SLTST	35	a.a. gds/doltc. ls.
	SH	10	blk., fis., calc.
80	LS	45	a.a., becm. brnish.-blk.
	SH	35	a.a.
	SLTST	15	a.a.
90	SH	80	blk., plty./fis., calc., doltc., hd., carb., foss.
	LS	20	a.a.
90 - 11900	SH	90	a.a.
	LS	10	a.a.
11900 - 10	SH	80	blk., plty./s. fis., s. blky., doltc./calc., carb.
	SLTST	15	lt.gy./dk. gy.-brn., doltc.
	LS	5	a.a.
20	SH	100	blk., gy., plty./fis., carb., doltc.
30	SH	100	a.a. v. stks. brn. ls.
40	SH	80	a.a.
	SS	20	vh., lt.gn., v. f./f. g., subrnd., glauc., calc., kao. infill.
50	SH	60	a.a.
	SS	30	vh., lt.gy., lt.gn., f. g., subrnd., glanc., v. kao. calc. p. intergram. por.
	COAL	10	
60	SS	75	vh., f./s. m. g., subrnd., calc., v. kao., v. s. p. intergram., por.
	SH	25	a.a.
70	SS	60	a.a.
	SH	40	a.a.

DRILL CUTTINGS (Cont.)

11970 - 80	SS	75	vh. f./mg., v. s. c. g's., calc., kao., p. intergram. por.
	SH	20	a.a.
	SLTST	5	a.a.
90	SS	85	vh., clr., m./c. g., calc., kao. infill, p. intergram. por.
	SH	15	a.a.
90 - 12000	SS	65	vh., lt.gy., lt.gn., v. f./f. g., subrnd., calc., kao., carb.
	SLTST	25	gy., gy-brn., calc.
	SH	10	a.a.
12000 - 10	SLTST	70	lt.gy., lt.brn., sdy., calc., lmy., v. stks. brn. ls.
	SH	20	blk., plty. blky., calc., fos.
	SS	10	a.a.
20	SLTST	75	a.a.
	SH	25	a.a.
30	SLTST	80	a.a.
	SH	20	a.a.
40	SLTST	90	a.a.
	SH	10	a.a.
50	SLTST	70	a.a.
	SH	25	a.a.
	LS	5	mdst., dk.gy.-brn., dk.brn., v. slty.
60	LS	65	mdst.,dk.gy.-brn., s. gy.-brn., v. arg.,cpct.
	SH	30	a.a.
70	LS	95	mdst., dk.gy.-brn., brn., gy., lt.gy., arg., cpct., tr. dol.
	SH	5	
80	LS	100	mdst./wkst., s. suc. lt.gy.-brn. lt.gy., dk.gy. -brn. tr. Alg. tex., tr. frac. por., F. por.
90	LS	100	mdst./pkst., s. suc., lt.gy., lt.gy.-brn., dk. gy. brn., sdy., tr. alg. tes., arg., ool., tr. frac. por., F. por.
90 - 12100	LS	100	mdst., dk.gy.-brn., arg., cpct.
12100 - 10	LS	90	dk. gy.-brn., s. blk., v. art., cpct., foss.
	SH	10	blk., blky., calc., crin.
20	LS	85	dk. gy. -brn., s. blk., lt. gy., arg., tr. ool. tr. pin-p. por.
	SH	15	blk., blky., s. plty., calc., foss., crin.
30	LS	55	a.a.
	SH	45	a.a.
40	SH	50	a.a.
	LS	50	a.a.
50	SH	60	a.a.
	LS	40	a.a.
60	SH	80	blk., plty./fis, carb., calc.
	LS	20	a.a.

DRILL CUTTINGS (Cont.)

12160 - 70	LS	75	mdst./s. vkst., s. chky./suc., dk. gy. -brn., lt. gy., fos., v. p. por.
	SH	25	a.a.
80	SLTST	55	gy., m. gy., calc./lmy.
	SH	25	a.a.
	LS	20	a.a.
90	SLTST	80	dk. gy./lt. gy., calc./lmy
	SH	15	a.a.
	LS	5	a.a.
90 - 12200	SLTST	90	a.a.
	SH	10	a.a.
12200 - 10	SS	70	lt. gy./lt. gy. -gn., s. wh., v. f. g., subrnd., doltc., kao. infill, ti.
	SLTST	20	gy., calc.
	SH	10	blk., plty./fis, calc.
20	SS	75	a.a.
	SLTST	15	a.a.
	LS	5	brn.
	SH	5	a.a.
30	SS	60	a.a.
	SH	25	a.a.
	SLTST	10	a.a.
	LS	5	a.a.
40	SLTST	50	gy., calc./lmy.
	SS	35	gy., v. f. g., calc., v. kao.
	SH	15	a.a.
	LS	5	a.a.
50	SLTST	75	gy., gy.-brn., calc., v. sdy., gds to v. f. g. ss.
	LS	15	a.a.
	SH	10	a.a.
60	SLTST	75	lt. gy., gy. -brn., calc./lmy., s. doltc.
	LS	20	mdst., gy. -brn., arg., slty., cpct.
	SH	5	dk.gy., plty.
70	SLTST	45	a.a.
	SH	25	gy./dk. gy.
	LS	15	mdst., brn., cpct.
	SS	15	gy., f. g., calc.
80	LS	60	pkst./mdst., brn., dk. gy. fos., crin., arg./ shly.
	SH	40	dk. gy./blk., calc./lmy.
90	SH	45	a.a.
	LS	30	a.a.
	SLTST	25	lt. gy., gy.
90 - 12300	SH	70	blk., blky., v. calc./lmy.
	SLTST	20	lt. gy., calc.
	LS	10	mdst., brn., dk. gy./brn., cpct.

DRILL CUTTINGS (Cont.)

12300 -	10	SH	85	dk. gy., blk., gy., plty./fis., s. blky., calc.
		SLTST	15	lt. gy., gy., s. brn., calc.
	20	SH	60	a.a.
		SLTST	40	gy., calc.
	30	SH	60	a.a.
		SLTST	35	a.a.
		SS	5	gy., f. g., calc.
	40	SS	45	lt. gy., lt. gn., f. g., s.&p., carb., calc., mica. v. kao. ti.
		SH	30	blk., carb., calc., blky., foss.
		SLTST	10	lt. gy./gy., calc.
		LS	5	mdst., brn.
		COAL	5	
	50	SS	75	a.a.
		SH	25	a.a.
	60	SS	70	a.a.
		SH	30	a.a.
	70	SLTST	60	gy., calc.
		SH	25	a.a.
		SS	15	a.a., tr. coal
	80	SLTST	75	gy./dk. gy., shly., v. calc.
		SH	20	a.a.
		SS	5	a.a.
	90	SLTST	60	a.a.
		SH	35	a.a.
		ANHY	5	clr., amor., f. xln.
90 -	12400	SH	70	blk., dk. gy., plty., fis, s. blky., doltc., anhy., carb.
		SLTST	25	lt. gy., dk. gy., calc./lmy.
		ANHY	5	wh., clr., suc./f. xln., amor.
12400 -	10	SH	50	blk., calc., blky., stks. ls.
		SLTST	30	gy./dk. gy., calc.
		SS	20	lt. gy., brn., f. g., subrnd./subang., v. calc., ti.
	20	SLTST	50	a.a.
		SH	40	a.a.
		SS	10	a.a.
	30	SLTST	70	a.a.
		SH	20	a.a.
		LS	10	mdst., dk.gy.-brn., blk., v. arg.
	40	SLTST	55	a.a.
		SH	45	a.a.
	50	SH	70	blk., blky., v. calc., s. doltc., hd., s. v. slty., carb.
		SLTST	30	dk. gy./blk., gy., calc., shly.
	60	SH	80	a.a.
		SLTST	20	a.a.
	70	SH	90	a.a.
		SLTST	10	a.a., tr. gy. anhy.

DRILL CUTTINGS (Cont.)

12470 - 80	SH	85	a.a.
	SLTST	5	a.a.
	COAL	10	a.a.
90	SH	55	a.a.
	SS	30	gy., lt. gy. -gn., v. f./f. g., subang./subrnd., calc. ti,glanc.
	SLTST	15	gy./dk. gy.
90 - 12500	SS	45	gy., wh., f. g., subang., sl. sil.
	SLTST	35	a.a.
	SH	20	a.a.
12500 - 10	SS	60	wh., lt. gy., f./s. m. g., subang./subrnd.,loc. sil., hd., s. kao.
	SH	25	blk., dk. gy., blky., plty., sl. carb., lmy. stks, calc.
	SLTST	15	gy., dk. gy.-brn., s. hd. sil.
20	SS	45	a.a.
	SLTST	35	a.a.
	SH	20	a.a., tr. coal
30	SS	60	wh./gy., f. g., subang./subrnd., loc. sil.,hd., s. kao.
40	SS	65	a.a.
	SLTST	25	a.a.
	SH	5	a.a.
50	SS	70	a.a.
	SLTST	20	a.a.
	SH	10	a.a.
60	SS	45	lt. gy., wh., clr., lt. gy.-gn., s. gy., f. g., s. v. f.g., calc./sil., firm/hd., kao, glan.
	SH	30	blk., plty., blky., calc. v. lmy. stks., sl. carb.
	SLTST	25	gy., v. sl. calc., sil., hd., doltc.
70	SS	60	lt. gy., wh., clr., lt. gy.-gn., gy.-brn.,f. g., s. v. f. g., calc./sil., hd., glau.
	SLTST	25	a.a.
	SH	15	blk., plty., blky., calc., v. lmy. stks.
80	SLTST	45	gy., dk. gy.-brn., doltc., sdy., hd.
	SS	35	a.a. s. sl. doltc.
	SH	15	blk., plty., blky., s. fis.,doltc.
	LS	5	mdst., dk. gy.-brn.
90	SH	60	blk., gy., plty., blky., s. fis., doltc., carb.
	SLTST	30	a.a.
	SS	10	a.a.
90 - 12600	SS	60	gy., lt. gy., v. f./f. g., subang./subrnd., v. kao., carb., ti.
	SH	30	a.a.
	SLTST	10	gy., sdy.
12600 - 10	SS	75	gy., lt. gy.-grn., v. f./f. g., subrnd./s. rnd., calc.,sil., ti., mica., carb.
	SH	20	blk., gy., plty., s. fis., carb., anhy.
	LS	5	mdst., pkst., brn., dk. gy.-brn., slty., arg., cpct.

DRILL CUTTING (Cont.)

12610 - 20	SH	55	a.a.
	SLTST	30	gy./dk. gy., calc., sdy.
	SS	15	a.a.
30	SH	45	a.a.
	SLTST	25	a.a.
	LS	20	mdst., v. f. xln., dk. gy.-brn., doltc., cpct.
	SS	10	a.a.
40	SH	65	blk., gy., plty., fis., blky., calc., lmy./doltc. stks., mica.
	SLTST	25	gy., dk. gy., calc., sdy.
	ANHY	5	wh., amor.
	SS	5	gy., dk. gy., v. f./f. g., subrnd., calc., carb., mica.
50	SH	60	a.a.
	SLTST	30	a.a.
	LS	10	a.a.
60	SLTST	65	lt. gy., v. calc., doltc.
	SH	15	blk. gy.
	LS	15	mdst., chky. lt.gy.-brn., v. slty., brn.
	DOL	5	dk. gy.-brn., v. slty.
70	DOL	65	mdst./wkst., dk.gy.-brn., calc., v. slty., arg.
	SLTST	25	a.a.
	SH	10	a.a.
80	DOL	45	a.a.
	SH	30	lt. gy., blk., calc., v. anhy., sft.
	SLTST	20	a.a.
	ANHY	5	gy., lt. gy., amor., v. ls.
90	SH	65	blk., dk. gy., mot. lt., gy., calc., doltc., anhy.
	SLTST	25	a.a.
	LS	10	mdst./s. wkst., dk. gy.-brn., v. slty.& arg.
90 - 12700	SH	80	a.a.
	SLTST	15	a.a.
	LS	5	a.a.
12700 - 10	LS	45	mdst./wkst.,dk. gy.-brn., gy., s. chky.&v. arg.,. cpct., foss.
	SLTST	34	gy., loc. sdy., v. calc./lmy., carb., anhy.
	SH	20	blk., gy., plty., anhy.
20	SLTST	70	a.a.
	SH	20	a.a.
	LS	10	a.a.
30	SLTST	60	a.a.
	SH	40	a.a.
40	SLTST	70	dk. gy.-brn., gy., blk. v. shly., calc./lmy., pyr., carb.
	SH	30	dk. gy.-blk., plty. mica, brn., calc., anhy., carb.
50	SLTST	55	a.a.
	SH	45	a.a.

DRILL CUTTING (Cont.)

12750 - 60	SH	70	blk., gy., plty./fis., v. lmy. stks.
	SLTST	20	a.a.
	LS	5	dk. gy.-brn., v. slty.
	SS	5	wh., f. g./m. gy., subang.
70	SH	70	a.a.
	SLTST	20	a.a.
	LS	5	a.a.
	SS	5	a.a.
80	SLTST	55	a.a.
	SH	40	a.a.
	SS	5	a.a.
90	SH	75	blk., blky., fis., plty., calc., s. doltc.
	SLTST	20	a.a.
	SS	5	a.a.
90 - 12800	SH	85	
	SLTST	10	
	SS	5	
12800 - 10	SLTST	55	gy., dk. gy., v. calc., lmy., mica.
	SH	40	blk., plty., fis., v. calc.
	SS	5	wh., org., f./m. g., calc.
20	SLTST	70	a.a.
	SH	20	a.a.
	SS	10	gy., v. f. g., calc.
30	SLTST	60	a.a.
	SH	20	a.a.
	SS	20	a.a.
40	SH	50	a.a.
	SLTST	25	a.a.
	SS	25	a.a.
50	SS	60	lt. gy.-gn., wh., f. g., subang./subrnd., calc., m. kao., carb., glau.
	SH	30	a.a.
	SLTST	10	a.a.
60	SS	70	lt. gy.-gn., wh., f./m. g., subang./subrnd., calc., glau.
	SH	20	a.a.
	SLTST	10	a.a.
70	SS	60	a.a. carb.
	SH	35	a.a.
	SLTST	5	a.a.
80	SS	40	a.a.
	SH	30	a.a.
	ANHY	20	wh. gy., clr., amor., xln., suc. sltst.
		10	a.a.
90	SH	55	blk., plty., s. blky., dotc., anhy., cl. calc.
	ANHY	30	gy., clr., m. xln., suc., gran., arg., carb.
	SS	15	a.a.
90 - 12900	SH	65	a.a.
	ANHY	20	gy., gran./suc.
	DOL	15	gy., f. xln./gran.; (mixed trip samp.)

DRILL CUTTING (Cont.)

12900 - 10		DOL	80	gy., lt.gy., tan., f. gran.,/suc., microxln.,anhy.
		SH	20	blk. plty., anhy., doltc.
		ANHY	Tr.	
	20	DOL	90	
		SH	10	
		ANHY	Tr.	
	30	DOL	60	wkst., gran., s. suc., gy., v. arg., anhy.
		ANHY	25	gy., lt. gy., wh., amor., gran., f. sln., calc.& doltc.
		SH	15	blk., blky./plty., calc., anhy., w. stks. dk. gy. -brn. ls., carb.
	40	SH	70	a.a.
		DOL	15	a.a. s. dk. gy.
		LS	10	mdst., dk.gy.-brn., blk., v. arg.
		ANHY	5	a.a.
	50	SH	40	blk., gy., v. calc. & doltc., v. anhy., fis.
		LS	30	a.a. doltc.
		DOL	30	wkst., gran., v. calc., shly., anhy.
	60	DOL	60	a.a.
		SH	30	a.a.
		LS	10	a.a., tr. coal
	70	DOL	60	mdst./pkst., gran. dk. gy./blk., v. calc., v. sh. y., carb.
		LS	25	mdst., dk. gy.-brn./blk., doltc., shly.
		SH	15	blk., fis., plty., calc./doltc., v. carb., s. coal.
	80	DOL	50	a.a.
		SH	40	a.a.
		LS	10	a.a.
	90	DOL	45	a.a.
		LS	30	a.a.
		SH	20	a.a., crin.
		ANHY	5	lt. gy., suc., amor.
90 - 13000		DOL	45	a.a.
		LS	30	a.a.
		SH	20	a.a.
		ANHY	5	a.a.
13000 - 10		SH	60	blk., dk. gy., blky., v. calc., doltc., v. fis., crin., spng. spic., anhy.
		LS	30	mdst., dk. gy.-brn., v. arg., cpct.
		DOL	10	wkst./pkst., gy., calc.
		ANHY	Tr.	gy.-tan., amor.
	20	DOL	70	wkst., f. xln./suc., dk. gy.-brn., v. arg.,calc.
		SH	20	a.a.
		LS	10	a.a.
	30	DOL	60	a.a.
		SH	30	a.a.
		LS	10	a.a.

DRILL CUTTING (Cont.)

13030 - 40	DOL	65	a.a.
	SH	15	a.a.
	SS	15	vh., brn., gy., f./s. m. g., subrnd., calc.
	LS	5	a.a., tr. anhy.
50	SH	45	a.a.
	LS	25	a.a.
	SS	20	a.a.
	DOL	10	a.a.
60	SH	80	blk., dk. gy., plty./fis., sooty, doltc., v. dol. nod., foss.,sft.
	SS	15	lt. gy., vh., gy.-brn., f. g.,subang., doltc. a.a.
	DOL	5	a.a.
70	SH	85	blk., dk. gy., fis., lumpy., sooty, m. sft./sft. doltc., calc. in frac.
	LS	10	mdst., dk. gy.-brn., doltc., v. shly.
	DOL	5	gran., dk. gy./gy., lmy., arg.
80	SH	85	blk., fis., plty., doltc.
	SS	10	lt. gy., gy., s. lt. gy.-gn., f. g., subang., calc./doltc.
	DOL	5	lt. gy., v. f. xln., slty.
90	SH	100	blk., sooty., lumpy., v. sft., tr. anhy., calc.
90 - 13100	SH	80	blk., sft., sooty., lumpy., calc., s. fis., plty., doltc.
	ANHY	10	lt. gy., vh., tan, amor., f. xln./suc., salt casts
	SS	5	lt. gy., f. g., subang., sl. carb.
	DOL&LS	5	dk. gy.-brn., brn., mdst.

DRILLING MEDIUM SALT BRINE MUD

13100 - 10	SH	70	blk.,dk.gy., plty., blky., fis., doltc., anhy., v. calc. vains., sa casts, pyr.
	ANHY	15	gy., vh., xln., suc./gran., amor., s. v. stks. blk. sh
	DOL	10	gy., mdst., slty., calc., anhy.
	LS	TR	brn., arg.
	SS	5	vh., lt. gy.-grn., f./s. m. g.
20	DOL	70	gy., gy.-brn., suc./gran., calc./lmy., slty., f. vug. por (10%), spt. fnt. oilstn., p. inter-gran. por.
	SH	25	blk., dk. gy., plty., blky., lumpy., doltc., calc., anhy. inclu., pyr., calc veins
	ANHY	5	lt. gy., vh., amor., xln., suc., loc. stks. sh.
30	DOL	80	a.a.
	SH	20	a.a.

DRILL CUTTINGS (Cont.)

13130 - 40	DOL	55	gy., dk. gy.-brn., suc., anhy., tr. wh. cht.
	SH	35	blk., dk. gy., v. inclu. anhy., calc. & doltc.
	ANHY	5	wh., gy., suc., amor., stks. sh.
	SA	5	wh./clr., rnd./xln.
50	SA	60	clr., s. wh., s. lt. brn., s. anhy.
	SH	30	blk., blky., lumpy., doltc.
	DOL	5	a.a.
	ANHY	5	a.a.
60	SA	100	a.a.
13160 - 70	SA	60	a.a.
	SH	25	blk., blky., doltc.
	DOL	15	gy., tan., gran., v. slty.

Initial depth @ Core #1-13,170.1 to 13,229.8'(59.7')
corrected to 13,177.7' on 2nd strap, (1st strap
in error-not used).
Core depth used - 13,177.7' to 13,238.2'
Cut 60.5'; Recovered 60.5' (12.3' DOL & 48.2'SA).
3rd strap core depth - 13,172' to 13,230'(58')

CORE NO.1 13177.7 - 13238.2 (See core desc.)

Drill Cuttings Descriptions

13230 - 40	SA	95	clr., wh., lt. brn., m./c. xln., occ. sl. carb., anhy.
	DOL	5	lt./dk. gy., slty.
50	SA	90	a.a.
	DOL	5	a.a. v. carb.
	SH	5	blk., doltc., v. carb.
60	SA	95	clr., wh., lt. gy., carb., anhy.
	SH	5	a.a.
70	SA	100	a.a.
80	SA	100	a.a. tr. blk., v. carb. sh.
90	SA	100	clr., wh., m./c. xln., sl. anhy.
90 - 13300	SA	100	a.a.
13300 - 10	SA	100	clr., wh., m. g.
20	SA	100	a.a., sl. carb., tr. blk. sh.
30	SA	100	a.a.
40	SA	100	clr., wh., anhy., sl. crb., tr. blk. sh., tr. dk. gy. dol.
50	SA	100	a.a.
60	SA	95	a.a.
	DOL	5	dol., gy., slty., carb.
70	SA	85	a.a.
	DOL	15	dk. gy., slty., v. carb., v. arg.
80	SA	60	a.a.
	DOL	30	dk. gy., gy.-brn., slty., carb.
	SH	10	blk., carb., doltc.

DRILL CUTTINGS (Cont.)

13380 - 90	SA	50	a.a.
	SH	35	blk., sl. doltc., sooty., sft., v. carb., lumpy., s. plty.
	DOL	15	a.a.
90 - 13400	SH	60	a.a.
	SA	30	a.a.
	DOL	10	a.a.
13400 - 10	SH	85	blk., lumpy., s. plty./fis., doltc., slty., v. carb., sooty, v. sft., pyr.
	DOL	15	mdst., gy.-brn., tan, v. slty., loc. lmy., sft. (Cont. hi.% sa. in samp. Not drld.-not logged.)
20	SH	85	a.a.
	DOL	15	a.a.
30	SH	85	a.a.
	DOL	15	a.a.
40	SH	75	blk., lump., s. plty./fis. doltc., slty., v. carb., sooty, v. sft., pyr.
	ANHY	15	vh. amor.
	SS	5	lt. gy., v. f. g., calc./doltc.
	DOL	5	a.a.
50	SH	75	a.a.
	ANHY	15	a.a.
	SS	5	a.a.
	DOL	5	a.a.
60	SH	65	a.a. (Oily gas bubbles in samp.)
	ANHY	20	vh., amor., fibor.
	DOL	10	gy.-brn., v. slty.
	SS	5	brn., v. f. g., oil stn., v. p. por.
70	Sh	60	a.a., becm. v. slty., v. carb. (Oily gas bubbles in samp.)
	DOL	15	gy., v. slty., v. arg.
	ANHY	15	a.a.
	SS	10	a.a., tr. sltst.
80	SLTST	55	gy., sdy., v. carb., calc. & doltc.
	SS	25	gy., gy.-brn., v. f. g., slty.
	SH	20	a.a., tr. anhy.
90	SLTST	100	a.a.
90 - 13500	SLTST	60	a.a.
	SH	40	a.a.
13500 - 10	SLTST	55	lt. gy./gy., loc. sdy., lmy./doltc.
	SH	40	blk., blky., plty. v. calc., s. doltc.
	LS	5	lt. gy., chky., v. arg.
20	SLTST	75	a.a.
	SS	20	gy., gy.-brn., v. slty., calc./doltc.
	LS	5	a.a.
30	SLTST	75	a.a., v. s. yel.-tan, carb., pyr.
	ANHY	25	vh., mot. gy., amor.

DRILL CUTTINGS (Cont.)

13530 - 40	SA	70	clr., vh. mot., anhy.
	SH	20	blk., blky., lump, plty., calc., doltc., v. carb.
	SLTST	10	a.a.
50	SA	90	a.a.
	SH	10	a.a.
	SLTST	Tr.	a.a.
60	SA	95	
	SH	5	a.a.
70	SA	95	a.a.
	SH		a.a.
13570 - 80	SA	95	a.a.
	SH	5	a.a.

CORE NO. 2 13580 - 13640

13640 - 50	SH	75	blk., lumpy., plty., calc., doltc., sooty., sft., carb.
	ANHY	25	wh., gy., amor., s. fib., v. blk. sh. veins., carb.
	SS	TR	qtz. gs., m.
60	SH	70	a.a.
	ANHY	30	wh., gy., amor., s. fib., suc/f. xln., v. blk. sh. veins.
70	SH	65	a.a.
	ANHY	35	a.a.
80	SH	75	blk., dk. gy., plty., v. calc., doltc., slty., v. carb.
	SLTST	20	dk. gy., carb., calc.
	ANHY	5	a.a.
90	SH	65	blk., dk. gy., plty., doltc., anhy., pyr.
	DOL	30	mdst., dk. gy., dk. gy.-brn., v. arg.
	ANHY	5	a.a.
90 - 13700	LS	50	mdst., s. wkst., lt. gy., dk. gy., gy.-brn., chky., f. grn., anhy.
	ANHY	35	wh., clr., mot. dk. gy., shly., lmy.
	SH	10	a.a.
	DOL	5	gy.
13702 3 Hr.	SH	85	blk., plty., calc.
Circ.	ANHY	10	wh. amor.
	LS	5	a.a.

DRILL CUTTINGS (Cont.)

CORE NO. 3 13702 - 13749.8

13750 - 60	LS	55	mdst., dk. gy.-brn., brnish.-blk.,gy., s. chky., v.arg./shly., carb.
	SH	45	blk., plty., v. calc., sl. doltc., s. calc. lined frac.
	ANHY	Tr	wh.
70	SH	85	blk., plty./blky., lumpy, calc., v. carb., anhy.
	LS	15	a.a.
80	SH	70	blk., dk.-gy., plty, fis., blky., v. calc./lmy., calc. filled frac., anhy.
	LS	15	a.a., anhy.
	ANHY	10	wh., s. tan., m. xln., suc., gran.
	COAL	5	v. shly.
90	LS	55	mdst., gy., gy.-brn., dk. gy.-brn., cpct., chky., s. doltc., frac.-calc. arg.
	SH	40	blk., blky., plty., v. calc., anhy., pyr.
	ANHY	5	wh., lt. gy., f. xln., s. suc.
90 - 13800	LS	60	mdst., dk. gy.-brn.,gy.-brn., lt. gy.-tan., dns., suc., chky.
	SH	35	a.a.
	COAL	5	vit.
13800 - 10	LS	90	mdst., s. wkst., lt. gy., lt. gy.-tan., gy.-brn., chky., micrxln., pyr., sl. arg.
	SH	10	blk., plty., v. carb., calc., anhy., pyr.
20	LS	85	a.a.
	SH	15	a.a., anhy.
30	LS	90	mdst./wkst., gy.-brn., dk. gy.-brn., lt. gy., dns., chky., earthy
	SH	10	blk., blky.
40	LS	90	a.a.
	SH	10	a.a.
13848 Circ.	SH	60	blk., calc./mon calc., blky., v. carb.
	LS	30	a.a.
	COAL	10	

CORE NO. 4 13848 - 13885.3 (See core desc.)

Drill Cuttings Descriptions

13885 - 90			No sample
90 - 13900	LS	75	mdst., s. wkst., brn., lt. gy., gy.-brn., dns., s. chky., doltc., arg.
	DOL	15	mdst., brn., dk. gy.-brn., dns.
	SH	10	dk. gy., blk., calc., blky., tr. cht., lt. tan.
13900 - 10	LS	80	mdst., s. wkst., dk. gy.-brn., lt. gy.-crm., dns., s. chky., foss., doltc.
	DOL	10	dk. gy.-brn., dns., lmy.
	SH	10	dk. gy., s. lt. gy., calc., tr. cht., lt. brn.

DRILL CUTTINGS (Cont.)

13910 - 20	LS	85	mdst., s. wkst., brn., gy.-brn., lt. gy., crm., dns./chky., tr. suc., sl. doltc.
	SH	15	dk. gy., blk., calc., tr. lt. brn. cht.
30	LS	80	mdst., lt. gy., gy., dns./chky., arg./shly.
	SH	20	gy., mot., blk., blky., s. plty., v. s. dk. gy., doltc. nod. .5 mm., calc., s. non-calc., doltc.
40	LS	90	mdst., s. wkst., lt. gy., gy., crm., brn., cms./chky., arg.
	SH	10	blk., gy., tr. lt. tan cht.
50	LS	75	mdst., gy., lt. gy., dk. gy.-brn., dns./chky., s. doltc.
	SH	25	gy., lt. gy., s. blk., non-calc., blk.-calc.
60	SH	55	lt. gy., lt. gy.-gn., gy., mot., s. blk., plty., lumpy, sl. waxy, v. calc., sl. doltc., s. non-calc.
(5 Ft. Samp.)	LS	35	mdst., v. wkst., lt. gy., brn., doltc., shly., anhy.
	DOL	10	mdst., lt. gy.-brn., calc., arg.
13960 - 65	SH	70	a.a.
	LS	30	a.a., anhy.
70	SH	85	lt. gy., lt. gy.-bn., gy., s. lt. gy.-orsh., tr. rd., calc., non-calc.
	LS	15	a.a., tr. lt. gy. cht.
75	SH	80	lt. gy.-gn., gy., lt. gy.-orsh., pale purp., brn., rd., non-calc., s. calc.
	SLTST	10	rd-or., sl. sdy.
	LS	10	a.a., tr. or., rd., R.Q.G's.
80	SLTST	75	rd.-brn., rd., s. rd.-orn. sdy., non-calc.
	SH	25	lt. gy., lt. gy.-gn., orn.-rd., s. sdy., non-calc.
85	LS	50	mdst., lt. gy., brn., buff., s. chips v. ang. c. ht., tr. rd. sltst. in ls.
	SLTST	25	rd., orsh.-rd., sl. sdy., non-calc., R.Q.G's.
	CHT	20	lt. gy., lt. tan., wh., s. incased in ls.
	SH	5	lt. gy.-gn., lumpy, sl. waxy.
90	SH	60	lav., gy., s. orn., brn., rd., blky./plty., non-calc., s. sl. calc.
	LS	20	a.a.
	SLTST	10	a.a.
	CHT	10	a.a., tr. R.Q.G's.
13990 - 95	SH	70	lav., purp., rd., or.-rd., mar., lt. gy.-grn., orn.-brn., brn., gy., s. varic., most non-calc., s. sub-waxy., loc., sdy/gran.
	SLTST	15	rd., rd.-brn.
	LS	10	a.a., tr. cht.
95 - 14000	SH	75	a.a.
	SLTST	20	a.a.
	LS	5	a.a.

DRILL CUTTINGS (Cont.)

14000 - 05	SH	80	a.a.
	SLTST	15	a.a.
	LS	5	a.a.

CORE NO. 5 14005 - 14014.5 (See core desc.)

Drill Cuttings Descriptions

14005 - 10	SLTST	55	rd., mar., sl. sdy., non-calc.
	SH	30	gy.-gn. purp., lav., non-calc.
	LS	15	mdst., lt. gy., blk.-brn., tr. blk. shly., ss. & vh., R.F.Q.G's.

CORE NO. 6 14014.5 - 14057.2 (See core desc.)

Drill Cuttings Descriptions

(10 Ft. Sample)

14014.5-20	SLTST	45	mar., sl. sdy., non-calc.
	SH/CLYST	35	lav., lt. gy-gn., mot.
	LS	20	mdst., lt. gy., crm., gy.-brn. tan Tr. cht., brn., lt. gy., sl. calc.
30	SLTST	50	a.a.
	LS	25	mdst., lt. gy., crm.
	SH/CLYST	25	a.a.
40	LS	40	mdst., lt. gy., s. gy., tan. mot., v. pk. yelish, micrxln. Tr. lt. gy./blk. mot. cht.
	SLTST	35	mar., rd., sl. sdy.
	SH/CLYST	25	lt. gy., rd., mar., purp., mot., non-calc.
45	LS	45	mdst., pk., lt. gy., mot. gy., crpxln., s. micrxln.
	SLTST	35	a.a.
	SH/CLYST	20	a.a.
45 - 14050	LS	50	mdst., s. wkst., crpxln., microxln., s. chky., lt. tan., lt., gy., gy. ool., foss.
	SH/CLYST	30	a.a.
	SLTST	20	a.a.

RAN INTERMEDIATE LOGS & CASING @ 14057.2 Ft.

DRILLING & CORING MEDIUM CLEAR TREATED WATER

CORE NO. 7 14071.0 - 14092.0 (See core desc.)

CORE NO. 8 14092.0 - 14113.5 (See core desc.)

CORE NO. 9 14113.5 - 14124.0 (See core desc.)

DRILL CUTTINGS (Cont.)

CORE NO. 10 14124.0 - 14140.7 (See core desc.)

CORE NO. 11 14140.7 - 14170.8 (See core desc.)

CORE NO. 12 14170.8 - 14173.8 (See core desc.)

CORE NO. 13 14173.8 - 14188.0 (See core desc.)

CORE NO. 14 14188.0 - 14202.7 (See core desc.)

CORE NO. 15 14202.7 - 14223.3 (See core desc.)

CORE NO. 16 14223.3 - 14233.4 (See core desc.)

CORE NO. 17 14233.4 - 14243.0 (See core desc.)

CORE NO. 18 14243.0 - 14244.0 (See core desc.)

Drill Cuttings Description

(5 Ft. Sample)

14244 -	50	DOL	60	wh., lt.gy., brn., suc./gran.
		LS	30	tan, lt. brn., doltc., v. f. xln.
		CLYST	10	wh., crm., noncalc.
	55	DOL	75	lt.gy., wh., s. brn., v. f. xln. cpct./suc., (3% - 4% por.).
		LS	20	tan, v. f. xln., pct., Tight
		CLYST	5	wh., crm., noncalc., Poor Por.
	60	DOL	80	lt.gy., gy., gy.-brn., wh., v. f. xln./suc. (2% - 3% por.).
		LS	15	tan, lt.brn., v. f. xln., cpct, Tight Poor Por.
		CLYST	5	a.a.
	65	DOL	95	a.a. (3% - 4% por.)
		LS	5	a.a.
		CHT	TR	brn., wh., Poor Por.
	70	DOL	85	lt.gy., gy.-brn., v. v. f. xln./suc. (2% - 3% por.)
		LS	10	tan, lt.brn., v. f. xln., cpct. Tight
		CH	5	a.a.
	75	DOL	80	wh., lt.gy., brn., gran., suc., s. v. f. xln., pp. vugs. (4% por.)
		LS	15	lt.brn., v. f. xln., Tight
		CHT	5	lt.brn., wh.
	80	DOL	70	lt.gy., m. gy., wh., brn., v. f. xln./gran., (3% por.) Poor Por.
		LS	20	lt.brn., wh., chky., v. f. xln., Tight
		CHT	10	lt.gy., wh., gy.-brn.
	85	DOL	60	gy.-brn., wh., f. xln./gran., pp. vug., (4% por.) Poor Por.
		LS	35	tan, brn., wh., v. f. xln., cpct., chky.
		CHT	5	brn., wh.

DRILL CUTTINGS (Cont.)

14280 - 90	DOL	65	lt.gy., wh., v. f. xln., s. suc., (2% por.) Tight
	LS	35	brn., tan., wh., chky., v. f. xln., Tight
	CHT	TR	brn., lt.gy.
95	DOL	45	lt.gy., wh., v. f. xln., s. gran., (2% por.) Tight
	LS	55	wh., s. lt.brn., chky.
	CHT	TR	brn., lt.gy.
95 - 14300	LS	70	wh., s. lt.brn., chky., s. v. f. xln., Tight
	DOL	30	lt.gy., v. f. xln., s. sl. gran., Tight
	CHT	TR	lt.gy., brn.

CORE NO. 19 14300.1 - 14330.7

CORE NO. 20 14330.7 - 14333.1

Drill Cuttings Descriptions

14333 - 38	DOL	85	lt.gy., buff., lt.gy.-brn., brn., v. f./f. xln./ lit., cpct., ti. TR bl.-gy. sh.
	LS	15	lt.brn., s. pt., v. f. xln., cpct.

CORE NO. 21 14338 - 14398

Drill Cuttings Descriptions

(10 Ft. Sample)

14338 - 50	LS	80	lt.gy.-brn., buff., lit./s. v. f. xln., cpct., ti.
	DOL	20	m. gy.-brn., v. f. xln., cpct., ti.
60	LS	85	lt.gy.-brn., brn., buff., lit./v. f. xln., cpct., ti.
	DOL	15	m. gy.-brn., v. f. xln./s. suc., cpct., ti.
70	LS	80	lt.gy.-tan, gy.-brn., buff, lit./v. f. xln., cpct., ti.
	DOL	20	m. gy.-brn., v. f. xln./s. suc., cpct., ti.
80	LS	75	a.a.
	DOL	25	a.a.
90	LS	75	lt.gy.-tan, gy.-brn., buff, lit./v. f. xln., cpct., ti.
	DOL	25	lt.gy./m. gy.-brn, v. f. xln., cpct., ti
90 - 14398	LS	80	lt.gy.-tan, gy.-brn., brn., lit./v. f. xln., cpct., ti.
	DOL	20	lt.gy./m. gy.-brn., v. f. xln./s. suc., tr. p.p. vug. por., (2% por.), v. Poor Por.

DEPTH CORRECTION 14398 - 14403

14403 - 10	LS	60	tan, buff, wh., lit., chky., cpct., ti, indst., foss.
	DOL	40	brn., v. f. xln., cpct., pyr., wh., suc., intrxln. por. (6% - 5% samp.)
	SH	TR	blish.-gn., lt.gy.-gn., vxy.

DRILL CUTTINGS (Cont.)

14410 -	20	DOL	75	brn., brn.-gy., gy.-gn., f. xln., s. lit, suc. (2%por.), pyr.
		LS	25	tan, buff, lit./v. f. xln., indst. foss.
		SH	TR	gn., gy.-gn., tr. anhy., tr. cht. wh., tan.
	30	DOL	85	brn., brn.-gn, gn.-gy., f. xln., s. lit., cpct., suc. (3% por.), pyr., tr. fr. qtz. gs.
		LS	15	tan, wh., dk.brn.
		SH	TR	lt.gy., wxy., pyr.
	40	DOL	85	a.a. arg.
		LS	15	tan., wh., v. f. xln./gran.
	50	DOL	55	brn., lt.gy., lt.gn.-gy., v. f. xln., lit., pyr., arg., cpct.
		LS	45	tan, wh., lit., s. wh., gran., (3% por.)
		SH	TR	lt.gy., pale bl.-gn., gn.-gy., wxy., pyr.
	60	LS	60	wh., buff, lt.tan, suc./chky., lit., (4% por. - 30% samp.), w. s. rd. rdd. ss.
		DOL	40	lt.gy., pale gn., v. f. xln., pyr.
		SH	TR	a.a.
	70	DOL	80	lt.gn.-gy., tan., v. f. xln., lit., suc., pyr.
		LS	20	buff., brn., wh., v. f. xln., s. suc., doltc.
		SH	TR	a.a.
	80	DOL	85	lt.gn., s. buff, f. xln., suc., s. lit., fltg. qtz. gs., pyr. (5% por.)
		LS	15	buff., f. xln., s. doltc. (3% por.)
		SH	TR	a.a.
	90	DOL	90	lt.gn., lt.gy., s. buff., f. xln., suc., s. lit., fltg. qtz. gs. pyr. (5% por.)
		LS	10	buff, brn., f. xln., s. doltc. (3% por.)
		SH	TR	a.a.
90 -	14500	DOL	100	lt.gy., wh., lt.gy.-gy., brn., tan, suc., v. f. xln., lit., pyr., sl. sdy. (5% por.)
		SH	TR	lt.gn., lt.bl.-gn., pyr., wxy.
14500 -	10	DOL	100	lt.gy., lt.gn.-gy., buff., wh., f. xln., suc., s. lit., pyr. loc., cpct.
	20	DOL	80	a.a.
		LS	20	brn., gy.-brn., lit., cpct.
	30	DOL	75	lt.gn.-gy., blish.-gn., buff., wh., f. xln., suc., s. lit.
		LS	15	tan, brn., cpct.
		SH	10	gn.-gy., wxy.
	40	DOL	80	lt.gn., gn.-gy., buff., wh., sl. sdy., v. f. xln., s. suc., lit.
		SH	20	gn., bl.-gn., wxy., sl. sdy., fltg. rdd. qtz. gs., pyr.
	50	DOL	90	a.a.
		SH	10	a.a., glau.
	60	DOL	100	gy., lt.gy., lt.gy.-gy., brn./tan s. p., v. f. xln., cpct., mica.

DRILL CUTTINGS (Cont.)

14560 - 70	DOL	90	gn.-gy., vh., buff. v. tr. rd. qtz. gs., mica.
	SH	10	gn., s. gn.-gy., vxy., incr. sdy.
	SS	TR	v. s. clr., f. g. ss., sil.
80	DOL	85	gn.-gy., gy., brn., tan. buff, v. f. xln., s. suc., s. lit., cpct. v. abd. fltg., f./m., R.F.Q.G's. mica.
	SH	10	lt.gn., vxy.
	SS	5	clr., vh., f./m. g. rdd., fros., fltg.
90	DOL	85	lt.gy., tan, gn.-gy., s. brn., f. xln., cpct., pyr., arg.
	SS	10	clr., vh., m. g., s. f. g., rdd., frosted, v. dol. mot.
	SH	5	lt.gn.-gy., vxy.
90 - 14600	DOL	90	lt.gy., lt.gn., tan, dk. brn., f. xln., s. suc., s. lit. mica., fltg. R.F.Q.G's., s. rsms. cpct.
	SS	10	vh., clr., f./m.ged.
	SH	TR	blish-gn., pyr., R.F.Q.G's.
14600 - 10	DOL	90	brn., gy., tan, v. f./f. xln., lit., cpct., loc. rdd. sd. gs., tr. pyr.
	SS	10	lt.gy., s. sh., v. f. g., s. f. g., sub. any., v. dol. mot.
20	DOL	90	tan., gy., s. brn., lit./f. xln., cpct., loc. rdd. sd. gs., (tr. brn., slty. dol.)
	SS	10	lt.gy., vh., clr., v. f. g., s. m. g., subang./ subrdd., dol. mot.
30	DOL	90	a.a.
	SS	10	a.a.
40	DOL	85	a.a.
	SS	15	a.a. v. rd., org., v. f. g., subang., sl. dol., loc. slty. v. incr. in lge. pyr./se.
50	SS	50	rd., org., pk., clr., blk. v. f. g., ang./subang., sl. calc., loc. v. slty, s. & p. v. ss. a.a., tr. blk. carb. mat.
	DOL	40	a.a.
	SLTST	10	rd., loc. v. sdy.
60	SS	75	vh., rd.-brn., mot. & s. & p., v. f./m. g., sub rdd./subang., doltc. & sil. mot.
	SLTST	10	rd.-brn., rd., mar., blk., sdy.
	SH	10	gn.-gy., vxy.
	DOL	5	tan., gy., lit.
70	SS	75	vh., lt.gy., s. rd.-brn., lt.org., s. & p., v. f. g., s. m. g., sil. infill, sl. doltc.
	SH	10	lt.gn., lt.gn.-gy., vxy.
	DOL	5	lt.gy., v. f. xln.
	SLTST	10	rd.-brn., slty.
80	SS	90	a.a.
	SH	10	a.a. decr. in rd.-brn. ss. & sltst.
90	SS	100	vh., lt.gy., clr., f./v. f. g., subrdd./s. subang., sil. infill, sl. doltc., ti. tr. lt.bl.-gn. sh.
90 - 14700	SS	100	a.a.

DRILL CUTTINGS (Cont.)

14700 - 10	SS	100	wh., clr., tr. rd. gs., f./m. g., subrdd./subang., sil. mat., sl. doltc., few. fltg. R. F. Q. Gs., ti.
20	SS	100	sh., clr., v. f./f. g., s. m. g., subrdd./subang., sil. mat., sl. doltc., ti.
30	SS	90	wh., clr., rd., lt.gy., v. f./f. g. subrdd./subang., s. sil., s. slty. & calc., ti.
	SH	10	gy., s. dk. gy., v. f. mica., v. sl. doltc., plty.
40	SH	50	blk., plty., s. blky., sl. slty., non-calc., v. carb., v. pyrtc., sl. mica.
	SS	40	gy., wh., s. & p., v. f./f. g., loc. shly., ti., sl. sdy.
	DOL	10	dk.gy., lt.gy./blk., s. & p., v. f./f. xln., suc., v. carb., arg.
50	SS	65	wh., clr., f. g./m. g., (McCracken), dk.gy., v. f./f. g., shly., doltc.
	DOL	25	dk.gy., lt.gy.-wh./blk., s. & p., v. f./f. xln., suc., v. carb., dissem. pyr. sl. sdy.
	SH	10	dk.gy./blk., plty., carb., TR tan. lit., dol.
60	DOL	55	dk.gy., lt.gy./blk., s. & p. v. f./f. xln., suc., v. carb. dissem. pyr. sdy.
	SS	45	a. (McCracken ss.) a.
	TR	DOL	tan, brn., lit.
	TR	SH	blk.
70	DOL	85	dk.gy., lt.gy./blk., s. & p., v. f./f. xln., suc., v. carb., dissem. pyr. loc. gds./doltc. ss.
	SS	15	a.a.
	TR	DOL	lt.brn.
80	DOL	85	gy., blk./lt.gy., s. & p., v. f. xln., s. suc., v. carb.
	SS	10	a.a.
	LS	5	brn., tan, lit.
90	DOL	75	dk.gy., lt.gy., v. f./f. xln., v. carb, arg. loc. gds. to doltc. ss.
	SS	15	a.a.
	DOL	5	lt.gy.-tan, lit.,
	SH	5	dk.gy., wxy.
90 - 14800	DOL	70	lt.gy./dk.gy., v. f./ f. sln., suc. v. carb., loc. gds. to doltc. ss., arg., pyr.
	SS	10	wh., clr., f./s. m. g., subang./subrdd., sil./ doltc., ti.
	DOL	10	tan, lt.gy.-tan, lit., lmy.
	SH	5	blk., blky./plty.
	LS	5	tan, lt.gy., lt.brn., wh., lit., chky.

(5 Ft. Sample)

14800 - 05	DOL	75	dk.gy./lt.gy., v. f. xln., s. f. xln., v. carb. & arg., pyr., loc. sl. lmy.
	DOL	15	lt.gy./lt.gy.-brn., v. f. xln./lit.
	LS	5	tan, lt.gy., lit.
	SS	5	wh., clr., f./s. m. g., subang./subrdd., doltc. & sil. infill, ti.

DRILL CUTTINGS (Cont.)

14800 - 10	DOL	70	dk.gy./lt.gy., gy.-brn., v. f. xln., carb. & arg., pyr., loc. sl. lmy. ti.
	DOL	15	lt.gy./lt.gy.-brn., v. f. xln./lit.
	SS	10	wh. clr., lt.gy., f./s. m. g., subang./subrdd., doltic. & sil. infill.
	LS	5	tan. lt.gy., lit.
15	DOL	65	gy., dk.gy., lt.gy. gy.-brn., v. f./f. xln., carb. & arg., pyr., loc. lmy., loc. sl. sdy.
	DOL	15	lt.gy., lt.gy.-brn., brn., v. f. xln./lit.
	LS	10	tan, lt.gy., lit.
	SS	10	a.a.
	SH	TR	lt.gy.-gn., wxy., blk., mica.
20	DOL	65	a.a.
	LS	15	a.a.
	SS	5	a.a.
	SH	TR	lt.gy.-gn., wxy., s. blk., mica.
14825.9 3 HR.+ Circ.			2 hr. & 2.5 hr. circ. samp. (sweep samp.) showed incr. in ls.,lt.gy.-brn./gy.-brn., gy., f. xln./m. xln., arg., loc. doltc. & ds. dol., foss., brac., coral, crin., loc. pyr.
(10 Ft. Sample)			
14825.9-30	SS	45	lt.gy., v. f. g., subang./ang., lmy. (w. ss. from McCracken)
	STSTN	30	gy./dk.gy., v. carb., doltc.
	LS	15	tan, lt.gy., brn., lit.
	DOL	10	lt.gy., s. pk., dk.gy., v. f. xln. s. carb.
40	DOL	30	gy.-brn. lt.gy. mot., f./m. xln., carb., arg., sdy. loc., v. pyr.
	LS	25	gy.-brn., mot., tan, sdy., loc. carb.
	SS	15	a.a.
	STSTN	10	dk.gy.-brn., doltc.
	SH	20	blk. lumpy.
50	SS	10	lt.gy., v. f. g., subang./subrdd., lmy./calc., ti., v. glau.
	DOL	30	lt.gy., brn., s. mot., f./s. m. xln., s. sdy. & carb., pyr.
	SH	35	dk.gy.
	SLTST	20	dk.gy.-brn., sdy. carb.
	LS	5	a.a.
60	DOL	60	gy., gy.-brn., mot., lt.gy., f./m. g., sdy., mica.
	SS	20	a.a. loc. mica.
	SH	20	gy., plty., mica., sl. doltc.
	LS	5	lt.gy.-brn., carb. mot., f. g. sdy.
70	LS	60	buff., brn., gy., gy.-brn., suc./lit., slty./sdy., sl.sdy. doltc., foss. carb. crin.
	SH	20	gy., blk., sl. mica.
	DOL	20	gy.-brn., lt.gy.
80	LS	65	lt.gy., buff. brn., gy.-brn., dk.gy.-brn. f. gran., f./m/ xln., s. lit., glau., sl. carb., loc. sdy., s. arg., foss.
	SH	25	gy.blk., plty., f. mica., carb., blky.
	STSTN	10	dk.gy., mica.

DRILL CUTTINGS (Cont.)

14880 - 90	SH	55	dk.gy., blk., gy., plty./blky., f. mica.
	LS	45	gy.-brn., lt.gy., buff., f./m. xln., gran., s. lit., arg.
90 - 14900	LS	65	dk.gy.-brn., brn., s. buff, v. f./f. xln., s. f. gran., arg., s. carb., s. sl. sdy.
	SH	35	dk.gy.-blk., gy., plty./blky., f. mica.
	SS	TR	clr., f./s. m. g., ang./rdd., sil./lse.
14900 - 10	LS	80	brn., gy.-brn., buff, gy., v. f. xln., f. gran., s. lit., arg. loc., scat. carb., sl. sdy., pyr.
	DOL	TR	gy., slty.
	SH	20	dk.gy., gy., blk., f. mica. Tr. clr., m. g./v. fg. ss.
20	DOL	50	lt.gy., gy., f. gran./f. xln., arg.
	LS	35	gy.-brn., buff, gy., f. xln./s. m. xln., s. chky., s. lit.
	SH	15	gy., dk. gy., plty., s. lumpy., f. mica.
30	LS	80	brn., gy.-brn., lt.gy./buff, f./m. xln., arg., foss. hash.
	DOL	10	a.a.
	SH	10	gy., dk.gy., mica.
40	LS	90	gy.-brn., buff, mot., m. xln., suc., s. lit., foss., arg., s. carb.
	SH	10	dk.gy., gy., blk., plty./blky., f. mica., s. carb.
50	LS	95	gy.-brn., buff, mot., m. xln./suc., foss., arg., s. carb.
	SH	5	dk.gy., plty., f. mica.
60	LS	95	lt.gy., gy., lt.gy.-brn. buff., mot., f./m. xln., s. suc./gran., foss. hash., crin., spring spic., ool., pisol., arg. loc.
	SH	5	a.a.
70	LS	95	buff, gy.-brn., mot., chky./f. xln., s. lit., arg.
	SH	5	blk., gy., plty., f. mica.
80	LS	90	brn., gy.-brn., buff, mot. v. f. xln., chky., s. f. sln., v. ool.
	SH	10	blk., gy., blky., f. mica.
90	LS	80	dk.brn., m. gy.-brn., s. buff, v. f. xln./lit., s. chky., v. arg., tr. pyr.
	SH	20	blk. dk.gy., blky., f. mica.
90 - 15000	LS	75	dk.brn., m. gy., buff., s. mot., v. f./f. xln., suc., s. arg., foss.
	SH	25	blk., dk.gy., blky., f. mica.
15000 - 10	LS	70	gy.-brn., gy., buff., dl.brn., mot. v. f. xln./f. sln., cky., s. v. arg., s. carb.
	SH	30	dk.gy., blk., gy., plty./fis., s. blky., sl. mica., sl. doltc.
20	LS	65	dk.gy.-brn., gy., buff. mot., v. f. xln./s. f. xln.,
	SH	35	dk.gy., blk., s. gy., plty./fis., sl. mica., sl. doltc.

DRILL CUTTINGS (Cont.)

15020 - 30	LS	50	gy., buff, brn., v. f./s. m. xln., suc./cky., pyr., sl. arg.
	DOL	40	dk.brn., v. f. xln., v. slty., gds./doltc. sltst.
	SH	10	dk.gy./blk.
40	LS	70	gy., buff., mot., s. brn., suc./chky., v. f. xln., v. ool., sl. arg. (3/4% por.)
	SH	20	blk., carb., dk.gy.
	DOL	10	a.a.
50	LS	90	gy., gy.-brn., dk.gy., buff. mot., suc., v. ool., arg. (3/4% por.)
	SH	10	blk., dk.gy.
60	LS	90	gy., gy.-brn., buff, mot., cus., v. ool., v. arg., (3/4% por.)
	SH	10	blk., dk.gy., pyr., f. mica.
70	LS	85	lt.brn./dk.gy.-brn., suc., s. ool., s. v. arg./carb., (3/4% por.)
	SH	15	blk., dk.gy.-brn., s. v. calc., v. carb.
80	LS	80	lt.brn./dk.gy.-brn., suc./v f. xln., arg. (3% por.)
	SLTST	10	dk.gy.-brn., v. calc.
	SH	10	blk., blky., calc., carb.
90	LS	90	a.a. becms. more arg.
	SLTST	5	a.a.
	SH	5	a.a.
90 - 15100	LS	75	m. brn./dk.gy.-brn., chky./suc., v. f. xln., v. arg., s. carb.
	SH	15	blk., blky./plty.
	SLTST	10	dk.gy.-brn., calc., carb.
15100 - 10	LS	55	m. brn., dk. gy.-brn., suc. & chky., s. v. f. xln., arg.
	SH	35	blk., carb., sl. mica.
	SLTST	10	blk.,carb., mica.
20	LS	70	m. brn., dk.gy.-brn., gy., s. v. arg. & shly.
	SH	30	blk., dk.gy., plty., s. gds./v. shly. ls.
30	LS	60	a.a.
	SH	40	a.a., foss.
40	LS	55	m. brn., dk.gy.-brn.., gy., buff, suc., f. gran., foss., s. v. arg. becr. sl.
	SH	30	blk., dk.gy., plty./blky., v. f. mica.
	SLTST	15	dk.gy.-brn., v. calc., gds. to slty ls.
50	SH	50	blk., dk.gy., v. f. mica., plty./lumpy.
	LS	40	a.a.
	SLTST	10	a.a.
60	SH	65	dk.gy., blk., blky./plty., v. f. mica, carb.
	LS	25	m. brn., dk.gy.-brn., gy., buff, suc., arg.
	SLTST	10	dk.gy.-brn., carb.
70	SH	70	dk.gy., s. blk., blky./plty., v. f. mica., s. carb.
	LS	20	a.a.
	SS	TR	lt.gy., wh., subang./ang., sil. void filler s. doltc., v. occ. c. R.F.Q.G's.
	SLTST	10	dk.gy.-brn., sl. sdy., sl. doltc.

DRILL CUTTINGS (Cont.)

15170 - 80	SH	55	dk.gy., blk., blky./plty., f. mica.
	SLTST	20	dk.gy., sdy., doltc.
	SS	15	gy., f. g., subang./ang., doltc., dirty.
	SS	TR	wh., clr., f./v. g. subang./ang., few. c. R.F. Q.G's., sil. void filler, s. doltc.
	LS	10	a.a.
90	SLTST	40	a.a., loc. carb.
	SH	30	a.a.
	SS	20	a.a. w. tr. wh., clr. ss., w. R.F.Q.G's.
	LS	5	a.a.
90 - 15200	DOL	40	brn., f. xln., arg. sdy., w. R.Q.G's., -gds./doltc. ss.
	LS	30	m. brn., buff, gy., mot., suc., s. arg.
	SH	20	dk.gy., plty., blky., f. mica.
	SS	10	gy., wh., clr., f./m. g. w. R.Q.G's., s. sil., s. v. doltc., gds. to sdy. dol.
15200 - 10	SLTST	55	gy., gy.-brn., sdy., doltc.
	SS	30	gy., wh., rd. gs., v. f./ s. m. g., doltc., slty., ang./subang., sil.
	SH	10	dk.gy., s. gy.-gn., wxy, pyr.
	LS	5	brn., gy., buff. v. f. xln., arg., s. suc.
20	SLTST	55	gy., gy.-brn., sdy., doltc.
	SS	35	gy., wh., s. rd. gs., v. f./s. m. g., doltc., slty., s. sil.
	SH	10	gy., dk.gy. blky./plty., f. mica., tr. ls.
30	SS	65	gy., lt.gy., wh., clr., rd. & blk. gs., s & p., v. f./s. c. gs., subang., s. R.F.Q.G's., loc. slty. & carb., doltc., s. sil. ti.
	SLTST	35	gy., doltc., sdy.
40	SS	70	a.a.
	SLTST	25	a.a.
	SH	5	gy., plty., wxy.
50	SLTST	65	gy., doltc., sdy.
	SS	30	gy., lt. gy., wh., v. f./f. g., subang., doltc.
	SH	5	dk.gy., blk., carb., s. mica.
60	SLTST	55	dk.gy., gy., doltc., sdy.
	SS	40	gy., lt.gy., wh., clr., v. f./m. g., s. doltc., s. sil., subang./ang.
	SH	5	a.a.
70	SH	45	gy., gy.-gn., plty., s. wxy., tr. gy.-gn.
	SLTST	40	a.a.
	SS	15	a.a.
80	SH	40	gy.-gn., gy., f. mica.
	SLTST	35	gy., doltc., sdy.
	SS	25	gy., wh., clr., s. rd. & blk., rdd. c. gs., s. doltc., s. sil. cmt.
90	SLTST	40	gy. doltc., sdy.
	SH	35	gy., lt.gy.-gn., wxy., sl. mica.
	SS	25	lt.gy., wh., s. clr., v. f./m. g., w. s. c. gs. subang./ang. incr. in c., rdd., rd., blk.

DRILL CUTTINGS (Cont.)

90 - 15300	SS	90	lt.gy., wh., rd., rose f./c. g., s. v. c. cong., v. rd., blk., .ang. & rdd. gs. orthoclase, hornblend, pyr., biot., sil. & doltc. cemt., ti.
	SH	10	gn., gy., wxy., sl. mica., sl. sdy.
15300 - 10	SS	100	clr., rd., gy., f./c. g., ang., sil., qtztc., v. c. rdd., clr., rd. gs.
20	SS	100	rd., clr., gy., m./c. g., subang., sil., qtztc., v. brnish.-blk. (carb.) mat. between gs., v. sl. doltc. cemt., v. num. rd., blk. rdd., gs.
	SH	TR	gy.-gn., gy., sub. wxy.
30	SS	90	rdish. (rose) clr., gy., m./c. g., subang./subrdd., sil., secondary qtz. infill, qtztc., tr. doltc. cemnt., brnish-blk. mat. (carb.) between gs., num. rdd. gn.-talc, blk. gs.
	SH	10	rdish.-brn., gy.-gn., gy., s. v. mica. (maybe cng. impart.)
40	SS	90	clr., rdish. (rose), gy., m./c. g., subang., v. sil., sec. qtz. infill & overgrowth, qtztc., blk. mat. between gs., abd. gn., dk. rdd. gs. (talc), pyr.
	SH	10	rdish.-brn., gn.-gy., plty., s. v. mica., (cvg. impart).
50	SS	85	rdish. (rose) clr., gy., m./c. g., subang., v. sil., qtz., abd. gn., dk.gy.-blk., s. org., rdd., rect. gs., abd. blkish-brn. mat. (carb.?) between gs., pyr.
	SH	15	gn., rdish.-brn., plty./fis., mineralized stks. in rdish-brn. sh., s. v. mica., (most cvg. size)
60	SS	80	clr., rdish., gy., m./c. g., subang., tr. rdd. c. gs., qtztc., abd. gn., dk.gy.-blk., rd., s. rdd., s. ang. gs., abd. blkish.-brn. mat. between gs., v. v. sl. doltc. cmt. between gs., pyr., feldspar xls., tr. hornblend.
	SH	20	gn., rdish.-brn., gy.-gn., plty./fis., mineral stks., (2 chips v. v. f. g., s. & p. sd. stk.), stks. v. mica., loc v. sdy., (abd. geopressure related cvgs.)
70	SS	70	clr., rose. lt.gy., m./c. g., ang./subang., tr. c. R.F.Q.G's., sil.
	SH	30	brnish.-rd., gn., blky./fis., sl. mica.
80	SS	80	clr., wh., s. rd., m./c. g., subang./rdd., num. R.F.Q.G's., sl. sil., abd. lse. gs., s. kao. cmt., fair por.
	SH	20	gn., brnish.-rd., blky./fis., sl. mica.
90	SS	90	rdish.-brn., clr., c./s. m/ g., subrdd./subang., abd. R.F.Q.G's., dbd. rd.-brn. sh. void filler., p. por.
	SH	10	a.a.

DRILL CUTTINGS (Cont.)

90 - 15400	SS	90	wh., clr., rdish.-brn., f./m. g., ang./subang., s. R.F.Q.G's., s. sil., s. v. rd.-brn. clg. cmt.
	SH	10	a.a.
15400 - 10	SS	80	clr., rd., wh., m./c. g., subang., v. ang./s. rdd., s. frost., sil. shards., s. rd. cly. filler v. s. rd., pt. gy. R.F.Q.G's.
	SH	20	rd., gn., lt.gn., purp., blky., plty., sl. mica./v. mica., loc. slty. & sdy.
20	SS	85	clr., rd., rd.-brn., wh., subang., ang., s. rdd., abd., rd. gs. v. rd.-brn. mica. coating, num. sil. shards., v. R.F.Q.G's., tr. talc, dk.gn.
	SH	15	rd.-brn., org.-brn., org.-brn., gn., blky., s. plty., sl. mica./v. mica.
30	SS	85	a.a., v. incr. in lge. rdd., frost. gs. & sil. shards.
	SH	15	a.a.
40	GRT.W.	50	clr., ang. xls./shards., m./c. xln., inclu. hornb., talc., mag., flds.
	SS	40	a.a., becm. f. g., slty.
	SH	10	a.a.
50	SS	60	clr., rd., wh., pk., f./c. g., subang./ang., s. sil., s. kao. cmt., s. gn. talc. void filler, abd. C.R.F.Q.G's., s. rd. cly. cmt.
	GRT.W.	30	clr., ang. xls./shards., m./c. xln., inclu. hornb., fld.
	SH	10	gn., rd.-brn., mar., lumpy., blky., s. plty., loc. v. mica.
60	GRT.W.	55	a.a.
	SS	40	a.a.
	SH	5	a.a.
70	SS	45	wh., clr., rd., pk., m./c. g., subang., s. rdd., sil./kao. & rd. cly. cmt.
	GRT.W.	20	a.a.
	SH	35	rd., mar., dk.gy., s. gn., lump., noncalc., sl./v. mica., loc. v. sdy., loc. slty. abd. dk. min. (hornblend, biotite, etc.), s. sl. shistose like.
15470 - 74	SS	45	rd., rose., wh., clr., f./c. g., ang./rdd., rd. cly. cemt., sil. infill (qtztc.) ti., (rd. ss.= 60% sd. samp.)
	SLTST	35	rd.-brn., brn., dk.gy., v. rdd. fltg. qtz. gs.
	SH	20	gn., gn.-gy., rd.-brn. blk.gy.-brn., micro mica./wxy., blky./plty.
74 - 80	SS	60	rd., rose, wh., clr., f./c. g., ang./rd., rd. cly. cmt., sil. void filler (qtztc.) ti. (rd. ss, 55% sd. samp.)
	SLTST	30	rd.-brn., brn., dk.gy., v. rdd. fltg. qtz. gs. in rd. cly. & sltst.
	SH	10	gn. gn.-gy., rd.-brn., micro mica., wxy., blky., plty. (probably lov grade metamorphic sh., eroded & redeposited.)

DRILL CUTTINGS (Cont.)

15480 - 85	SLTST	45	dk.gy.-brn., rd.-brn., micro mica., loc. shistose like.
	SS	30	rd., rd.-brn., wh., clr., f./c. g., ang./rdd., rd. gs. rd. cast cly.
	SH	25	gn., rd.-brn., wxy., w. sil. veins.
90	SLTST	50	dk.gy.-brn., rd.-brn., micro mica., (loc. shistose like.) fltg. c. rdd. qtz. gs.
	SS	35	wh., clr., pk., lt.rd., f./c. g., ang./subrdd., s. rdd., s. frost. lge. plag. xls.
	SH	15	gn., rd., dk.gy.
95	SLTST	70	a.a.
	SS	20	lt.rd., clr., wh. (ang./s. rdd. m./c.g.)
	SH	10	a.a., tr. ls.
95 - 15500	SLTST	75	a.a., w.qtz. & feldspar clr., pk., m. xln.,m./c.g., tr.plagioclase feld.
	SH	5	a.a.
	SS	10	wh., clr., pk., gy., f./c. g., ang./rdd., cly. cmt.
15500 - 05	SLTST	70	dk.gy.-brn., micromica., shistose like. foliation appears low grade metamorphism.
	QTZ	10	clr., m. xln., ang., w. assoc. rd. hem./line.
	FELD	20	clr., lt.gy.-gn., inclu., suc./amor., xln., (soda-lime & potassium) w. limonite pseudomorphs after pyrite, appears weathered.
10	FELD	35	wh., lt.gy., brn. clr. suc., amor., m./c. xln., w. limonite pseumor.-pyr. & horn., (primarily potash feld.)
	QTZ	25	wh., clr., loc. inclu. limon. pseumor., cherry rd. hem.
	SLTST	40	a.a.
15	FELD	65	wh., buff., brn., s. gy., suc., m./c. xln., crp-xln., limon. pseumor., (soda-lime feld. predominate)
	QTZ	35	clr., wh., brn., m./c. xln. (Decr. in sltst. & sh.)
20	FELD	60	wh., buff., brn., s. gy., suc./crpxln., m./c. xln., horn., limon. pseumor. of horn. (soda-lime feld.)
	QTZ	40	clr., brn., smky. m./c. xln. (decr. in sltst. & sh.)
30	FELD	70	wh., buff, brn., lt.gy., suc./crpxln., m./c. xln., horn., limon. pseumor., (predominately soda-lime) s. feld. spars foliated.
	QTZ	30	clr., brn., smky., m./c. xln., up to 2 mm. hem. inclu.
40	FELD	70	wh., buff., lt.gn., grn.,/crpxln., inclu. hem., (plagioclase).
	PYROX	20	gnish.-blk., columnar, inclu. hem.
	QTZ	10	clr., m./c., ang., inclu. hem.
50	FELD	80	wh., buff, gn., lt.gn., inclu. rd. & specula hem.
	PYROX	15	gnish.-blk., inclu. rd. hem.
	QTZ	5	a.a.

DRILL CUTTINGS (Cont.)

15550 - 60	FELD	85	lt.gn., gn. buff, clr. pk.org. albite, orthoclase, labradorite, (weak foliation).
	PYROX	10	a.a.
	QTZ	5	a.a.
70	FELD	75	a.a., v. abd. rd. & specular hem. incul., incr. shistose appearance.
	PYROX	25	a.a. (Other mnrls.-olivine, rd. coating, rdd.,qtz.)
80	FELD	75	a.a.
	PYROX	25	a.a. (Other mnrls.-olivine, qtz.)
90	FELD	80	gn., lt.gn., crm., gran., ortho., albite. labra., shistose.
	PYROX	20	a.a.
90 - 15600	FELD	90	a.a.
	PYROX	10	a.a.

CORE No. 23 15600 FT. - 15630.2 FT. (See core desc.)

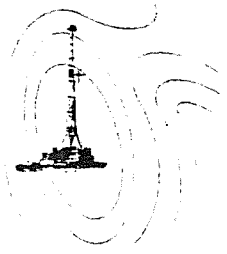
Drill Cuttings Description

15630.2	DIOR-GAB SCH	predominate dk.bn. mnrls. pyroxene group, lt. mnrls., plagioclase feldspars, inclu. hem. & s. olivine (V. poor trip samp.)
40	DIOR-GAB SCH	dk.gn. mnrls. pyroxene group, lt.gn. mnrls. plagio. feld., albite & labradorite, inclu. rd. hem., num. rdd. glassy gs. olivine, poss. tr. qtz., tr. ortho.
50	DIOR-GAB SCH	lt.gn. plagio. feld., dk.gn. pyrox., horn., olivine, mnrls. foliated
60	DIOR-GAB SCH	a.a.
70	DIOR-GAB SCH	lt.gn. plagio. mnrls. predominate w. s. dk. gn. pyrox. mnrls.
80	DIOR-GAB SCH	lt.gn., plagio. mnrls. predom., sec. dk. gn. pyrox., s. gn. talc, rd. earthy hem. inclu., tr. qtz., glassy olivine, mnrls. foli.-low grade metamorphism.
90	DIOR-GAB SCH	a.a.
90 - 15700	DIOR-GAB SCH	lt.gn., wh. plagio. mnrls., wh., buff. suc. labra., albite, inclu. rd. earthy & blk. specular hem., minor dk.gn. pyrox., s. qtz. w. attached wh. dol. vein., s. mnrls. show weak/fair foliation.
15700 - 10	DIOR-GAB SCH	predominate mnrls. plag. felds, clr. albite, lt.gn., crm., suc., columnar labraborite, occ. potach feld. ortho., sec. dk. gn. proxenes
20	DIOR-GAB SCH	a.a., has inclu. rd. earthy & blk. specularite hem., clr., rdd., glassy olivine, incr. pyrox. mnrls.
30	DIOR-GAB SCH	a.a., weak/fair foliation-low grade metamorphism.

DRILL CUTTINGS (Cont.)

15730 - 40	DIOR-GAB SCH	lt.gn., vh. plagio. felds. predominate, minor dk.gn., pyrox. mnrls.
50	DIOR-GAB SCH	lt.gn., vh. plagio. felds.-clr. albite, crm., lt.gn. suc., columnar labradorite, pyrox. mnrls., augite, s. rdd. glassy olivine, tr. qtz., talc, hem.
60	DIOR-GAB SCH	a.a.
70	DIOR-GAB SCH	a.a., incr. pyrox. mnrls.
80	DIOR-GAB SCH	lt.gn. plagio. predominate, v. rd. & blk. specularite hem. inclu., incr. dk. gn. pyrox. v. inclu. horn.
90	DIOR-GAB SCH	a.a., low grade metamorphic foliation
90 - 15800	DIOR-GAB SCH	a.a.
15800 - 10	DIOR-GAB SCH	lt.gn., wh., crm. plagio. felds. sominate, dk.gn. pyrox. sec., v. actinolite spear inclu in epidote
20	DIOR-GAB SCH	(v. poor trip samp.)
30	DIOR-GAB SCH	lt.gn. plagio. felds. dominate, dk.gn. pyrox. sec., low grade metamorphic foliation
40	DIOR-GAB SCH	a.a.
50	DIOR-GAB SCH	a.a.
60	DIOR-GAB SCH	lt.gn. plagio felds. dominate, dk.gn. pyrox. sec., abd. qtz. & c. xln. wh. dol.
70	DIOR-GAB SCH	lt.gn. plagio. felds. lominate but incr. in dk. gn.
80	DIOR-GAB SCH	plagio. felds., num. ortho., pyroxene mnrls., inclu. horn., rd. & specularite hem., rdd. glassy olivine.
90	DIOR-GAB SCH	a.a.
90 - 15900	DIOR-GAB SCH	a.a.
15900 - 10	DIOR-GAB SCH	lt.gn., wh. plagio. felds., dk. gn. pyroxenes, yel.-gn. epidote v. horn. inc., v. pyr., specularite, v. talc, tr. glassy gn. olivine.
20	DIOR-GAB SCH	a.a., talc. v. inclu. actinolite.
30	DIOR-GAB SCH	primary mnrls. a.a. v. incr. rd. & specular hem. inclu., tr. qtz.
40	DIOR-GAB SCH	lt.gn., wh., plagio. felds. dominate, dk.gy.-gn. pyroxenes sec., v. talc, epidote olivine
50	DOIR-GAB SCH	a.a.
60	DIOR-GAB SCH	decr. in plagio. felds., incr. pyroxenes
70	DIOR-GAB SCH	a.a., v. num. dk. gy., grnish.-blk. mnrls. (horn.), becm. more micaceous (medium grade metamorphism).
80	GAB SCH	dk.gy.-gn. pyroxene group mnrls. & hornblend dominate, minor plagioclase mnrls, abd. mica - biotite, olivine incr. shistoscity.
90	GAB SCH	a.a.
90 - 16000	GAB SCH	a.a. TOTAL DEPTH 16,000 FEET

Clarence L. Harr
November, 1988



Clarence L. Harr
Consulting Petroleum Geologist

FINAL GEOLOGICAL WELL REPORT

Report Section III

BUREAU OF RECLAMATION
INJECTION TEST WELL NO. 1
PARADOX VALLEY
30 - 47N - 18W
MONTROSE COUNTY, COLORADO

Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

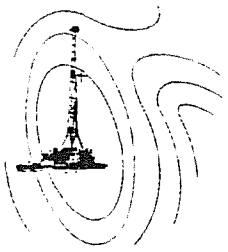
BUREAU OF RECLAMATION

Contract 4-CA-40-01660

Project 10-760

CLARENCE L. HARR

Consulting Petroleum Geologist



Clarence L. Harr
Consulting Petroleum Geologist

FINAL GEOLOGICAL WELL REPORT

BUREAU OF RECLAMATION
INJECTION TEST WELL NO. 1
PARADOX VALLEY
30 - 47N - 18W
MONTROSE COUNTY, COLORADO

Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

Report Section III

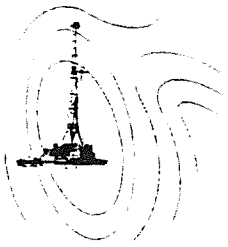
FRACTURE LOG

Detailed Schematic of Core Fractures
and Solution Features

AUGUST, 1988

CLARENCE L. HARR

Consulting Petroleum Geologist



Clarence L. Harr
Consulting Petroleum Geologist

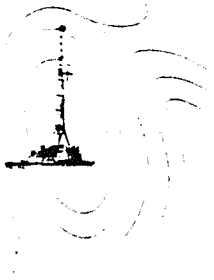
FRACTURE LOG

BOR Injection Test Well No. 1
Paradox Valley Unit, Salt Brine Injection Project
Bedrock, Colorado

The subject section of the Final Geological Well Report is a detailed schematic log of all fractures and major solution features recognized during examination of the core recovery from Injection Test Well No. 1. The fracture log shows only that part of the core segment which contains fractures or significant solution structure. Fracture inclination and approximate length of the fracture is schematically illustrated. The vertical scale is 2.06 inches equals 1 foot.

Due to the numerous core breaks and subsequent core rotation the fracture traces as shown are not oriented one to another, even within the same core segment. Fractures marked with a heavy line are open natural fractures and in most cases are interpreted to be tectonic in origin. Solution channels or cavities illustrated by solid black patterns are closed due to mineral or clay void filler. Similar solution features that are "open-drawn" are open and permeable.

It is the intent of this log to show open fracture and solution structure depth and fracture dip angle for use in modeling the fracture field. Other important core characteristics are presented on the "5 inch-equal-100 feet" core log and the detailed lithologic core descriptions.



Clarence L. Harr
Consulting Petroleum Geologist

FRACTURE LOG

BOR INJECTION TEST WELL No. 1

The fracture log shows only that part of the core segment which contains fractures. Fracture inclination and approximate length of the fracture is schematically illustrated. Due to the numerous core breaks and subsequent core rotation the fracture traces as shown are not oriented one to another, even within the same core segment. Fractures marked with a heavy line are open natural fractures and in most cases are interpreted to be tectonic in origin.

It is the intent of this log to show open fracture depth and dip angle for use in modeling the fracture field. Other important core characteristics are presented on the "5 inch-equal-100 ft." (5"=100') core log.

Clarence L. Harr

August 25, 1988

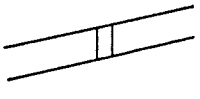
2024 Broadview Ct. Grand Junction, Colo. 81503 303-241-5974

Clarence L. Harr
Consulting Petroleum Geologist

FRACTURE LOG

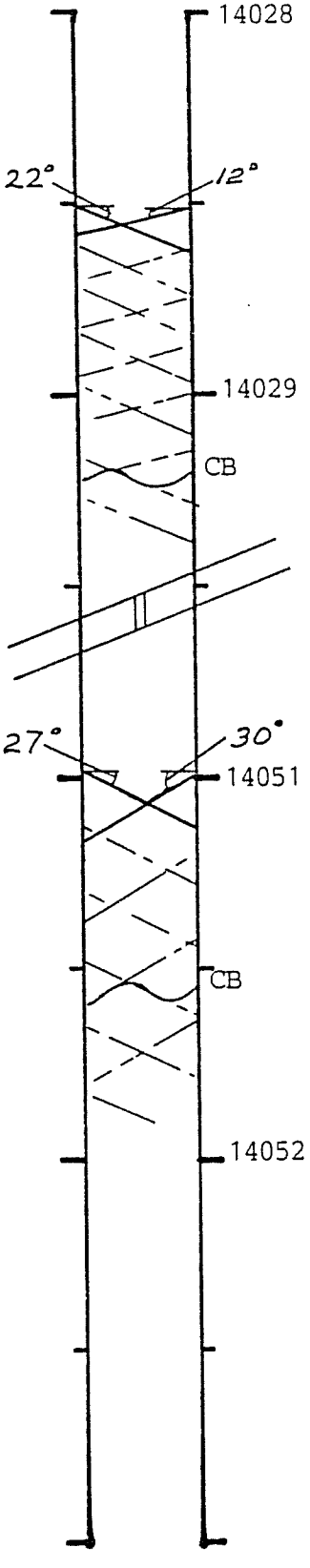
BOR INJECTION TEST WELL No. 1

LOG LEGEND

———	Open Fracture
—— - - —— -	Hairline Fracture
CB	Core Break
SS	Styolite Seam
BC	Solution Breccia Cavity
SCA	Solution Cavity
SCH	Solution Channel
	Footage Interval Separation

2024 Broadview Ct. Grand Junction, Colo. 81503 303-241-5974

CORE No. 6 14014.5 -14057.2 ft. : Cut 42.7 ft.-Rec. 41.6 ft.
Molas-Leadville: Ls., gy.-brn., tan, crpxln., microxln., brac., sol. cav. & chan. filled w. rd. cly., sltst.



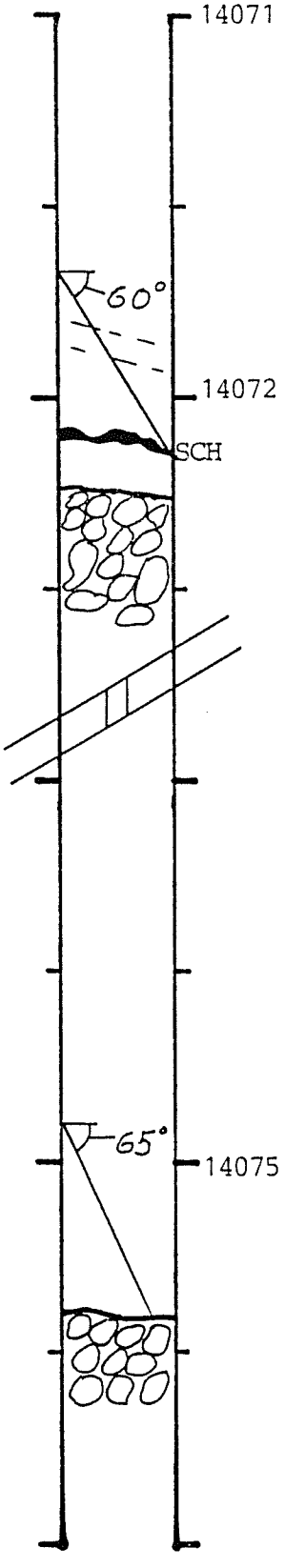
Open fractures.

Numerous open hairline fracs. @ 12° & 22°.
(Maybe associated to karsting.)

Open fractures.

Numerous open hairline fracs. @ 30° & 27°.
(Maybe associated to karsting.)

CORE No. 7 14071.0-14092.0 ft.: Cut 21 ft.-Rec. 5 ft.
Leadville: Dol. & Ls., gy.-brn., tan, microxln., s. brec., calc. & pyr. filled vugs.



Open fracture.

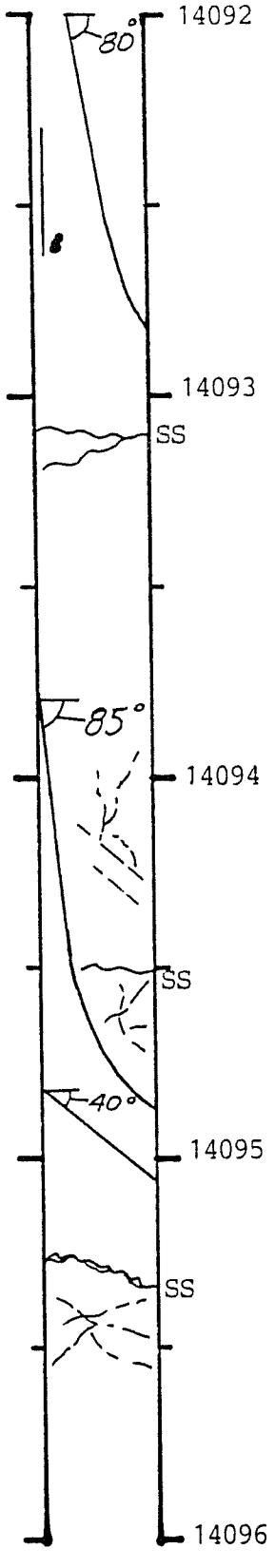
Few hairline fractures.

Core rubble.

Open fracture.

Core rubble.

CORE No. 8 14092-14113.5 ft.: Cut 21.3 ft.-Rec. 14 ft.
Leadville: Dol. w. some Ls. lt.gy.-tan., f./c. xln., g. vug. por.



Open fracture with some calcite lining.
Near vertical open fracture w. anhy. filled vug.

Some styolite seams open.

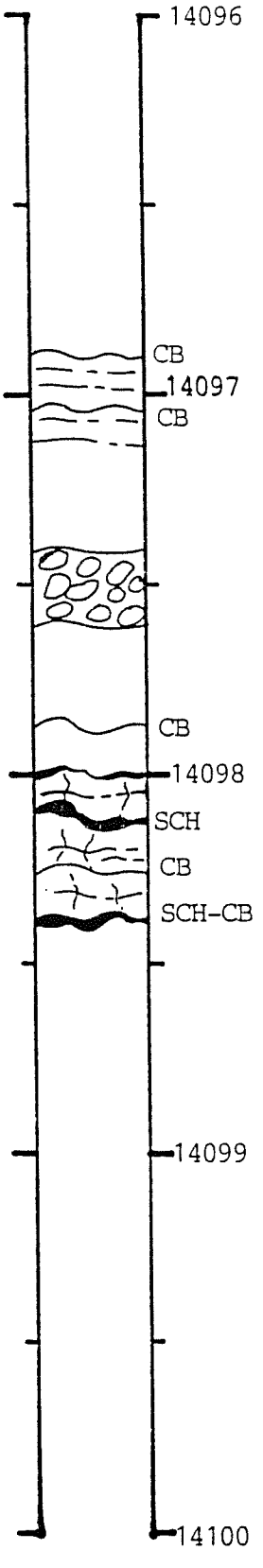
Open fracture.

With some hairline and dendritic fracs.

Styolite seam partly open.

Few hairline dendritic fractures.

CORE No. 8 14092-14113.5 ft. (cont.)

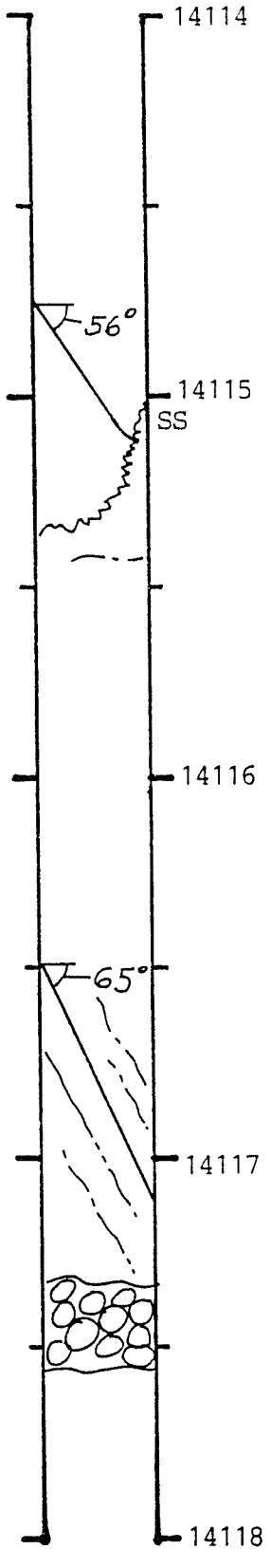


Hairline fractures bleeding salt water.

Core rubble.

Numerous vertical and horizontal hairline fractures bleeding salt water. Solution channels developed along bedding plane fractures.

CORE No. 9 14113.5-14124 ft.: Cut 10.5 ft.-Rec. 9.1 ft.
Leadville: Dol., lt.gy., m.gy.-brn., f.xln./cpct., scat. p.p. to .2/.5 mm. vugs.



Open fracture, calcite sealed in part, cut off by styolite seam.

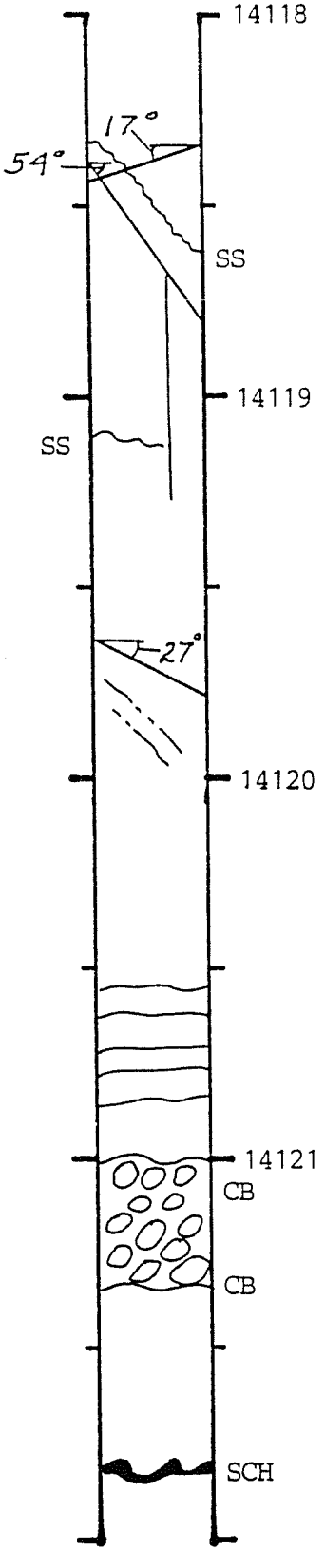
Hairline fracture partly healed.

Open fracture.

Numerous hairline fractures bleeding salt water.

Core rubble.

CORE No. 9 14113.5-14124 ft. (cont.)



Styolite seam, open in part.

Open fractures @ 54° & 17°.

Near vertical open fracture.

Open fracture.

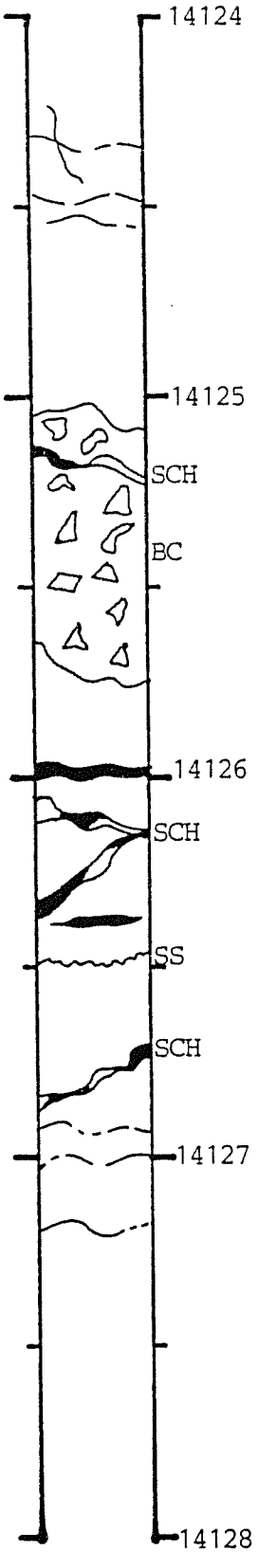
Hairline fracture bleeding salt water.

Numerous bedding plane fractures bleeding salt water.

Core rubble.

Solution channel partly open, some sealed with dead oil & trace anhydrite.

CORE No. 10 14124-14140.7 ft.: Cut 16.7 ft.-Rec 16.7 ft.
Leadville: Dol., gy.-brn., lt.gy.-tan, v.f. to f.xln., scat. p.p. por. to tight.



Numerous fractures in-filled with calcite and anhydrite.

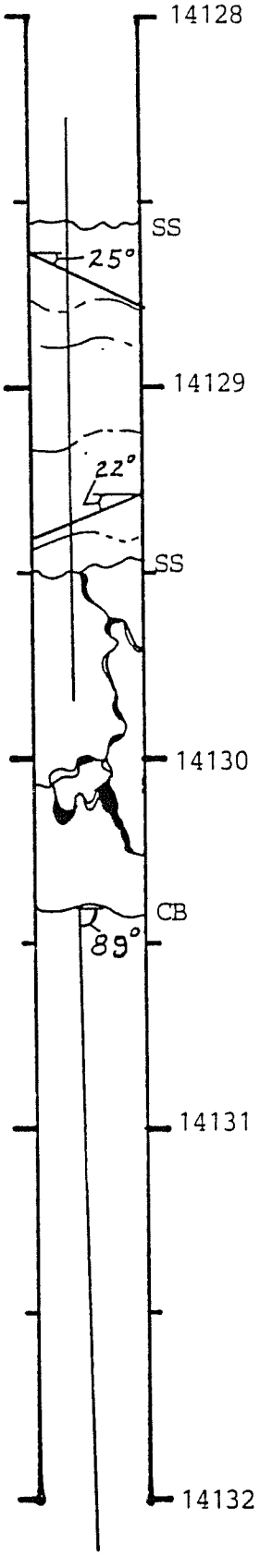
Breccia cavity 200mm. x 100mm.

Numerous solution channels up to 6mm.

Solution channel along old fracture (open 3mm. to hairline, some calcite filled).

Horizontal wavy hairline fractures bleeding salt water, partly calcite filled.

CORE No. 10 14124-14140.7 ft. (cont.)



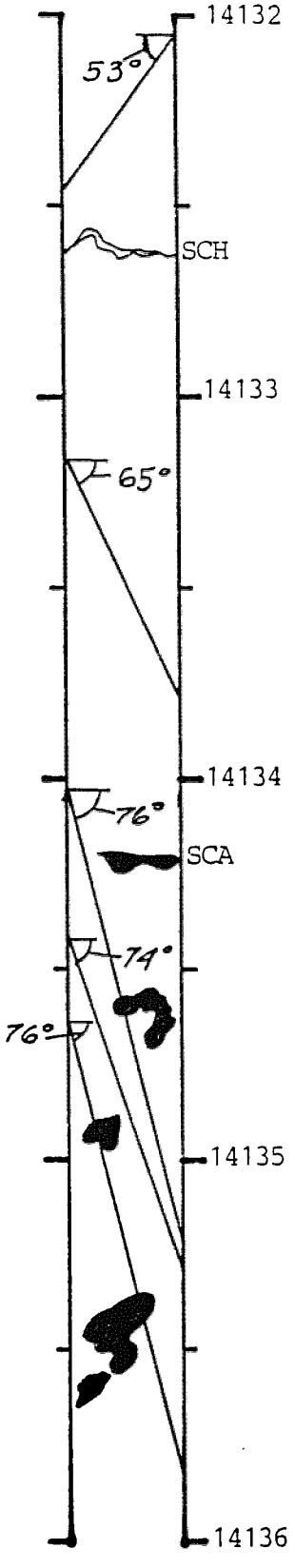
Near vertical open fracture and open fracture at 25°.
Hairline fractures bleeding salt water.

Open fracture calcite lined.

Solution channels along styolite seams, partly open.

Near vertical open fracture.

CORE No. 10 14124-14140.7 ft. (cont.)



Open fracture.

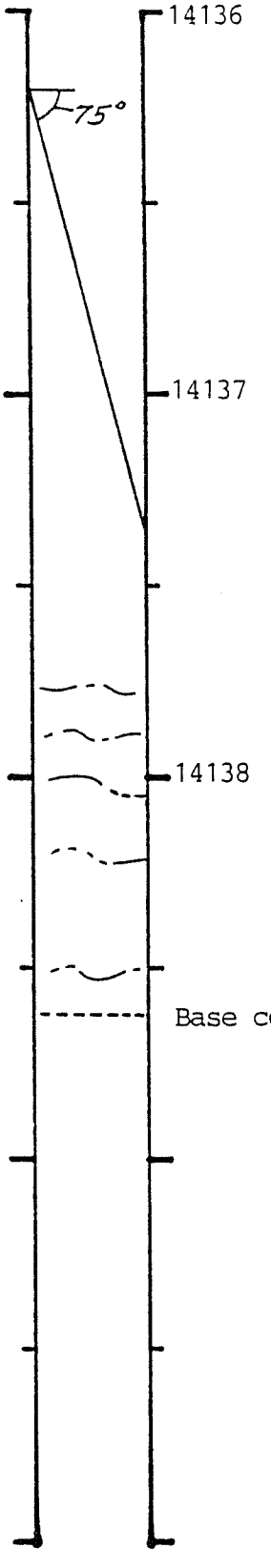
Open solution channel along styolite.

Open fracture.

Set of 3 near parallel open fractures.

Numerous solution cavities calcite filled, size @ 120mm. x 38mm.

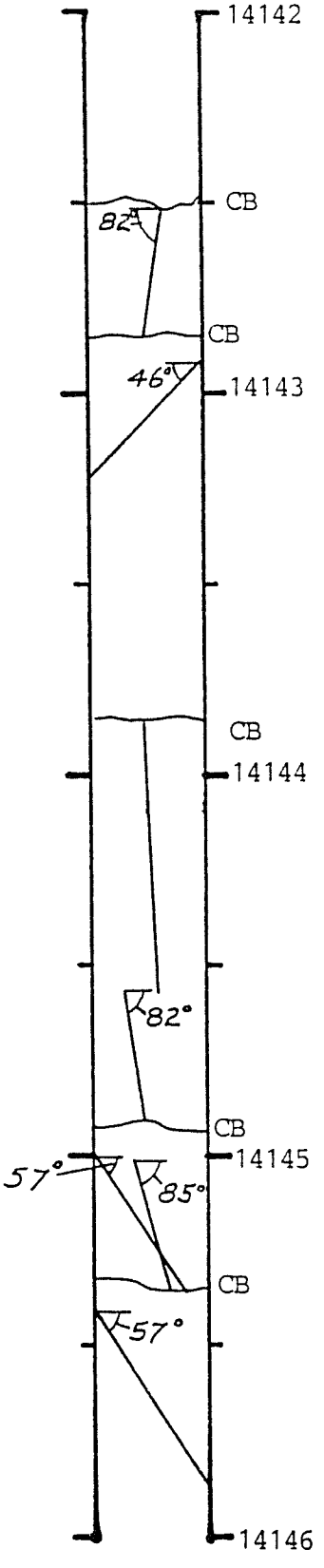
CORE No. 10 14124-14140.7 ft. (cont.)



Open fracture.

Numerous hairline fractures bleeding salt water.

CORE No. 11 14140.7-14170.8 ft.: Cut 30.1 ft.-Rec. 11.7 ft.
Leadville: Dol., gy./lt.gy., v.f. xln./cpct., scat. p.p. vugs.; Fractures vary from 20° to near vertical.



Open fracture.

Open fracture.

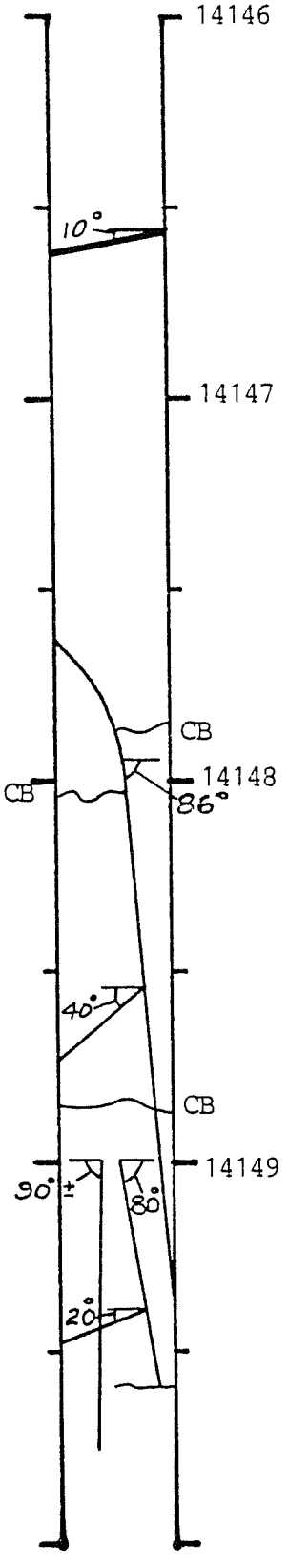
Near vertical open fracture.

Open fracture.

Two open fractures.

Open fracture.

CORE No. 11 14140.7-14170.8 ft. (cont.)



Bedding plane fracture.

Open 86° fracture. (Not coring induced.)

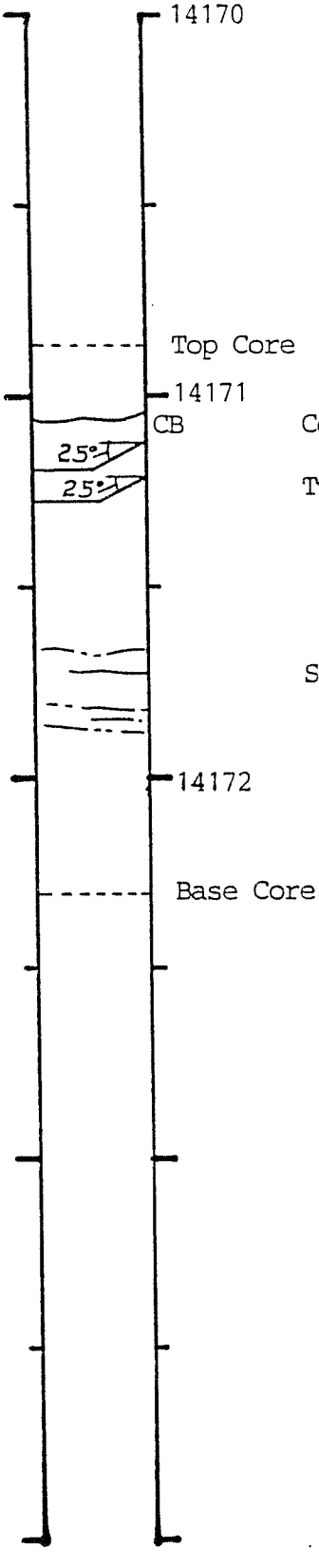
Open fracture.

Two open fractures.

Open fracture.

Horizontal fracture.

CORE No. 12 14170.8-14173.8 ft.: Cut 3 ft.-Rec. 1.5 ft.
Leadville: Ls., lt.gy.-brn., mot., v.f./c. xln., crin. abd., num. horz. fracs. (prob. bedding plane)

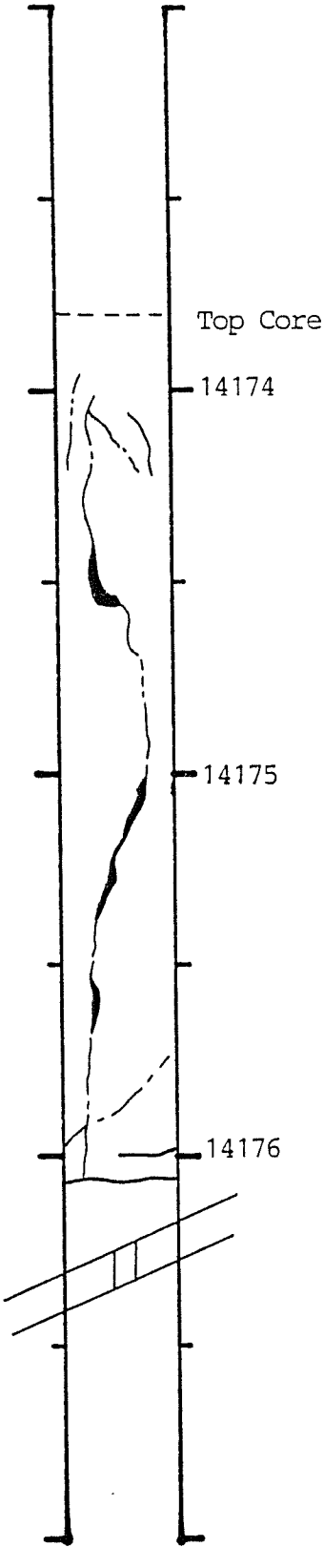


Core break along open fracture.

Two open fractures.

Several other horizontal fractures healed.

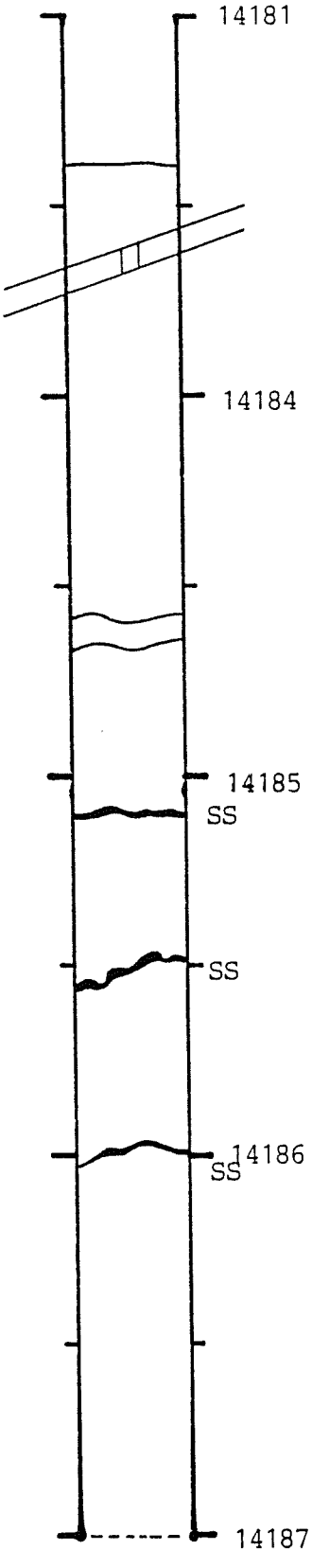
CORE No. 13 14173.8-14188 ft.: Cut 14.2 ft.-Rec. 13.2 ft.
Leadville: Ls., lt.gy.-brn., v.f./c. xln., abd. crin.



Secondary fine solution channel developed along old fractures; filled with claystone (?).

Horizontal open fractures.

CORE No. 13 14173.8-14188 ft. (cont.)



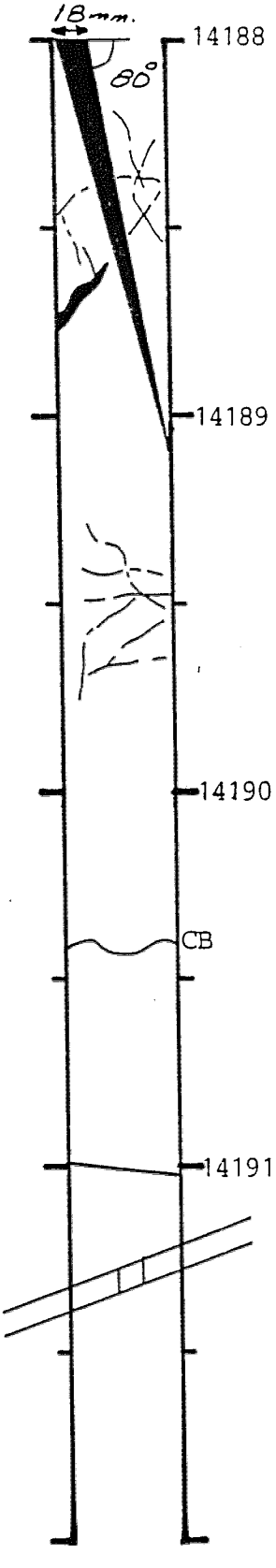
Open horizontal fracture.

Open wavy fractures.

Styolite seams or wavy fractures filled with laminated light gray-green claystone.

Base Core

CORE No. 14 14188-14202.7 ft.: Cut 14.7 ft.-Rec. 14.9 ft.
Leadville: Ls., lt.gy.-brn., lt. gy., f./m. xln., few styolite seams, solution channels and solution cavities.



Fracture filled with gray claystone, incased in green claystone.

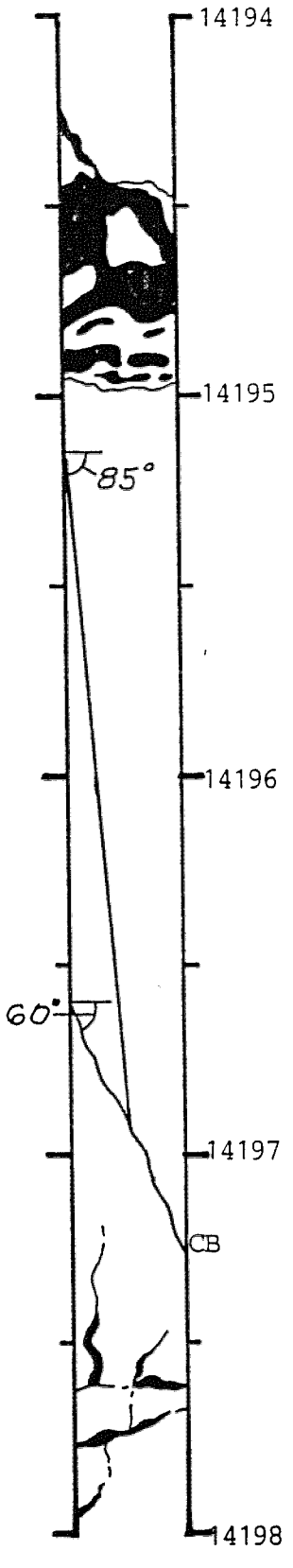
Numerous dendritic hairline fractures. Solution channel up to 5mm., sealed with green claystone.

Dendritic hairline fractures sealed with green claystone.

Core break along horizontal fracture with calcite lining.

Horizontal open fracture.

CORE No. 14 14188-14202.7 ft. (cont.)



Solution cavity 100mm. thick with dolomite breccia encased in light gray claystone. Solution channel at top developed along a fracture.

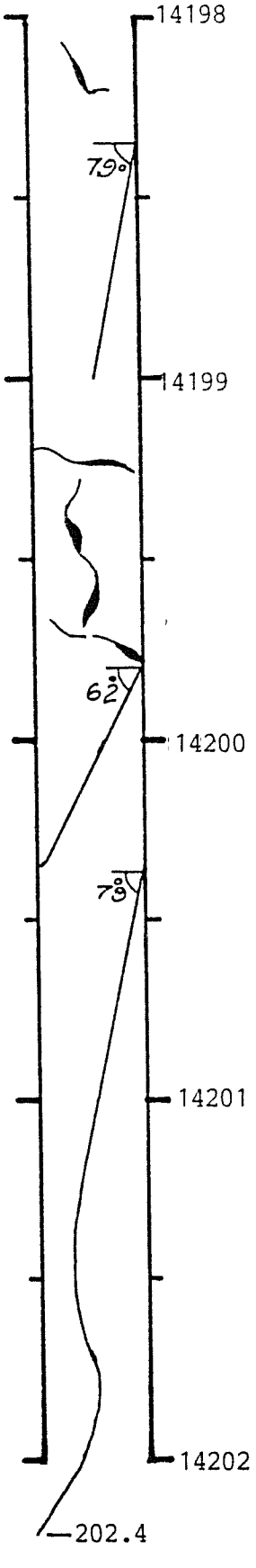
Sealed fractures.

Long 85° fracture calcite filled.

Core break along 60° fracture.

Numerous diagonal and vertical thin solution channels which developed along fractures, sealed with claystone.

CORE No. 14 14188-14202.7 ft. (cont.)



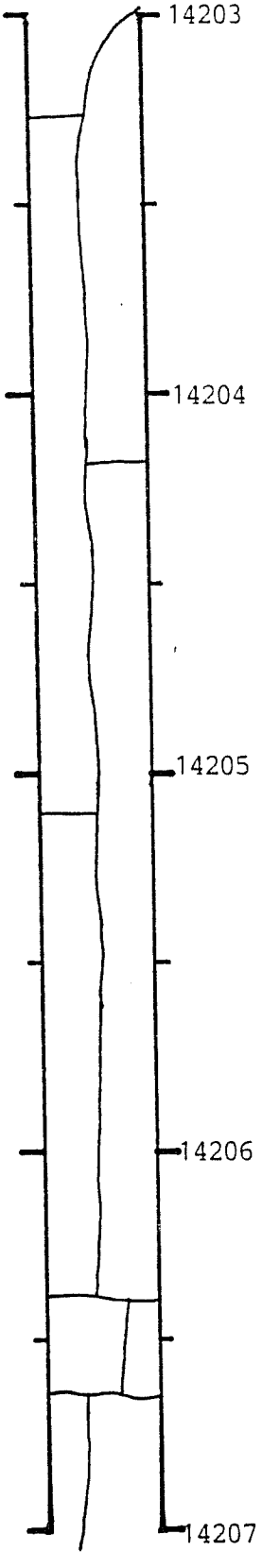
79° fracture sealed with green claystone.

Solution channels developed along fractures, sealed.

Open 62° fracture.

Open 79° fracture.

CORE No. 15 14202.7-14223.3 ft.: Cut 20.6 ft.-Rec. 20.3 ft.
Leadville: Ls., lt.gy.-tan, lt.gy., f./c. xln., crin.



Vertical open fracture.

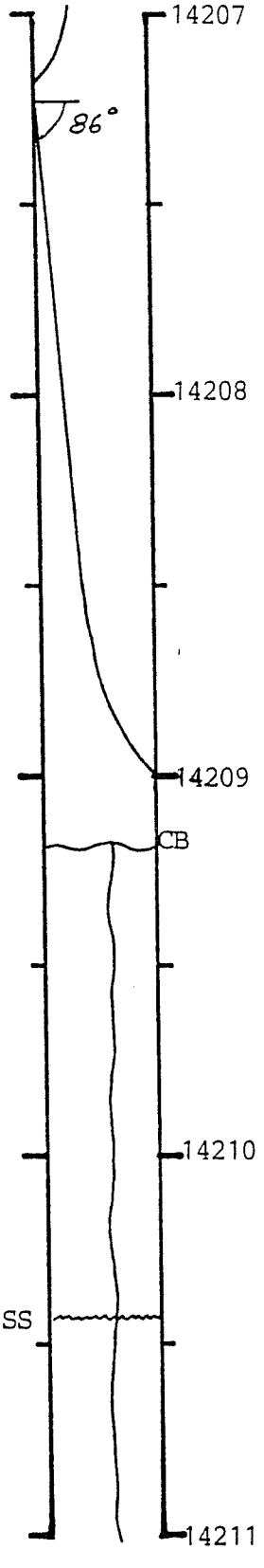
Three open horizontal fractures, which extend only $\frac{1}{2}$ way through core and end at vertical fracture, exhibit calcite lining.

Open vertical fracture.

Open horizontal fracture.

Horizontal fracture (?) rounded by core action.

CORE No. 15 14202.7-14223.3 ft. (cont.)



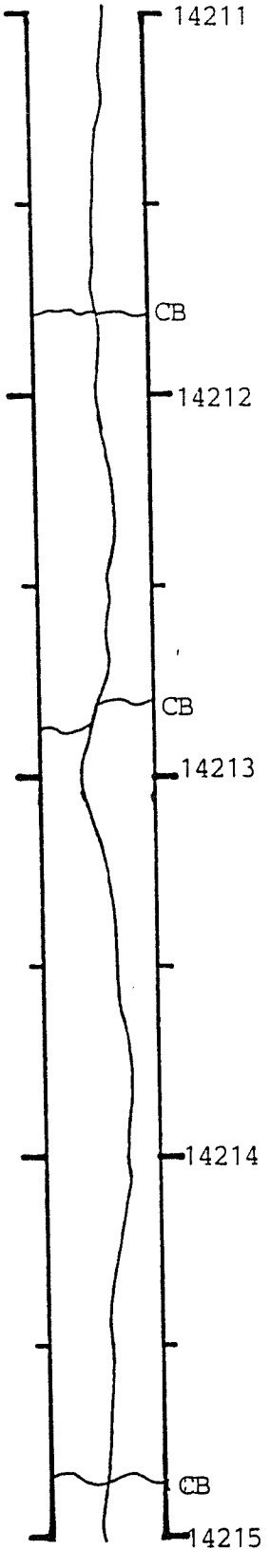
86° open fracture.

Core break rounded from core action.

Open vertical fracture.

Styolite seam not broken.

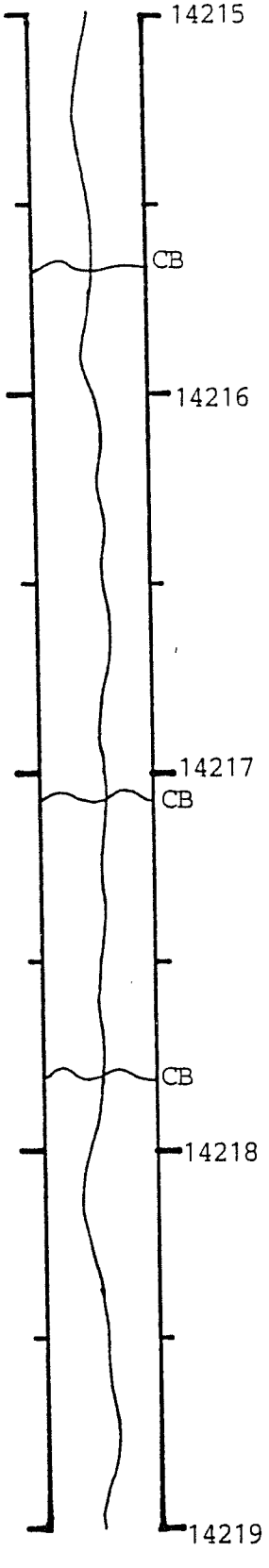
CORE No. 15 14202.7-14223.3 ft. (cont.)



Open vertical fracture.

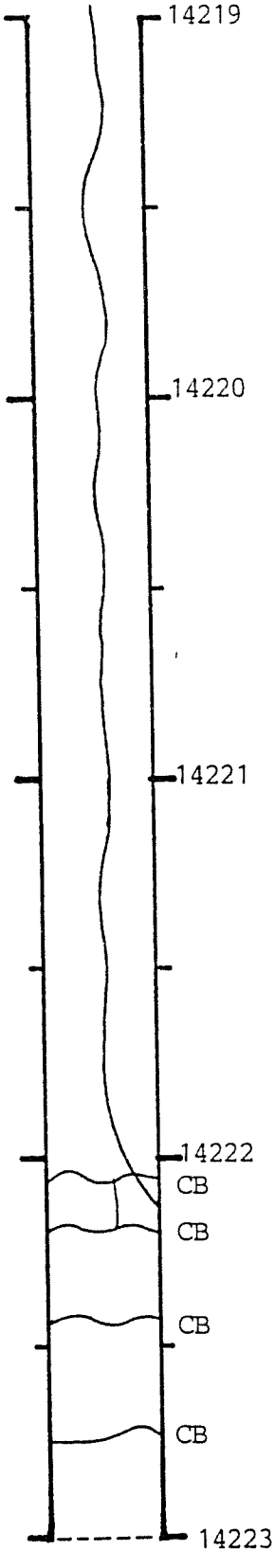
Broken along styolite.

CORE No. 15 14202.7-14223.3 ft. (cont.)



Open vertical fracture.

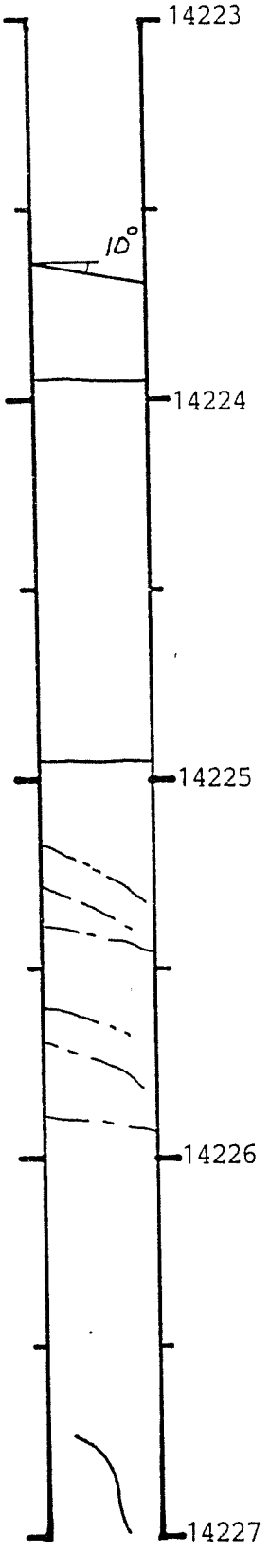
CORE No. 15 14202.7-14223.3 ft. (cont.)



Open vertical fracture.

Base core.

CORE No. 16 14223.3-14233.4 ft.: Cut 10.1 ft.-Rec. 7.4 ft.
Leadville: Ls., lt.gy.-brn., m. xln., s. sil./cht., w. wh. anhy. and blk. tar resid. in sol. chan.



Core highly broken with core chunks rounded by coring action. (Core breaks not shown.)

Horizontal fracture (?).

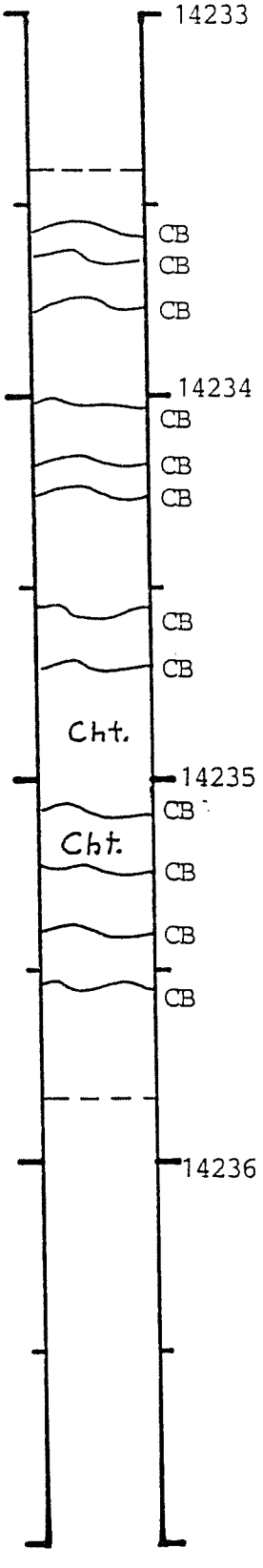
Horizontal fracture (?).

Numerous hairline fractures.

Open fracture in broken segment of core.

(Remainder of core highly broken.)

CORE No. 17 14233.4-14243 ft.: Cut 9.6 ft.-Rec. 2.4 ft.
Leadville: Dol., gy.-brn., v.f. xln., sil./chty., w. intbd. Ls. and cht.



Top core.

Core highly broken and rounded due to coring action. Core breaks may be along horizontal fractures (?).

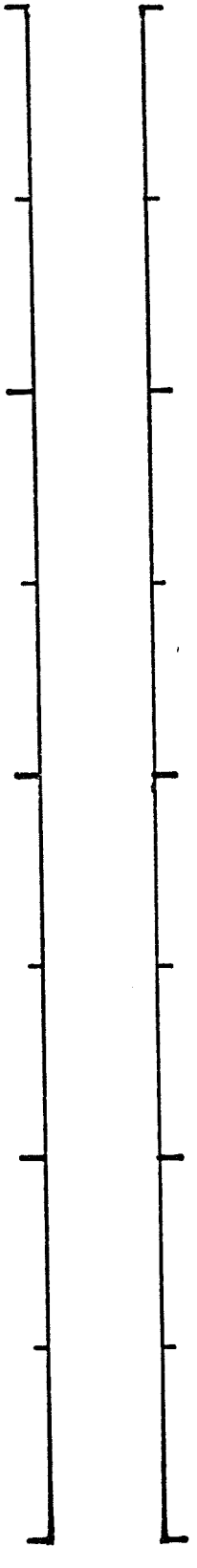
(Some fractures in dolomite filled with calcite. Fractures in chert filled with dolomite.)

Chert zone.

Chert zone.

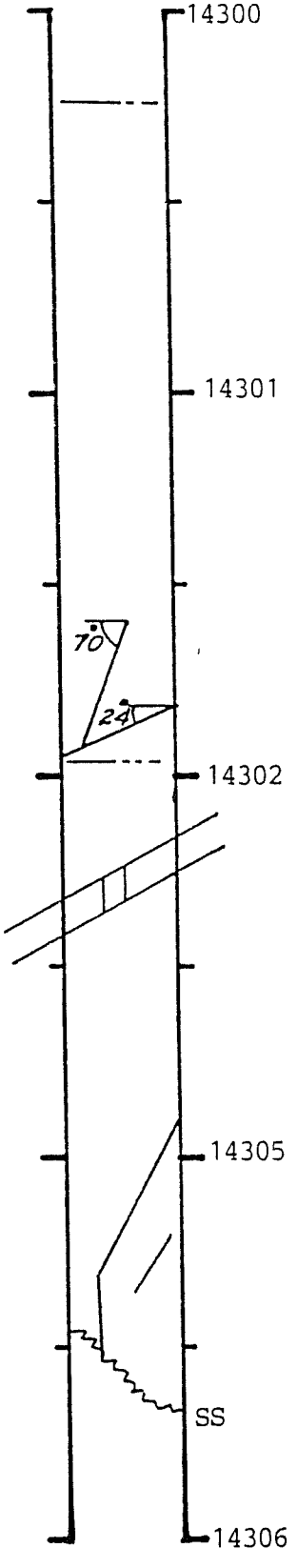
Base core.

CORE No. 18 14243-14244 ft.: Cut 1 ft.-Rec. .25 ft.
Leadville: Dol., brn., buff., v.f. xln., suc., with dk.gy.-blk. sh. in 10mm. thick styolite seam.



Recovered only .25 ft. - no fracture data.

CORE No. 19 14300.1-14330.7 ft: Cut 30.6 ft.-Rec. 29.5 ft.
Leadville: Dol. lt.gy.-tan, lt.gy.-brn., v.f. xln., w. s. intbd. Ls., gy.-brn., buff, loc. sil., chty.



Open hairline fracture.

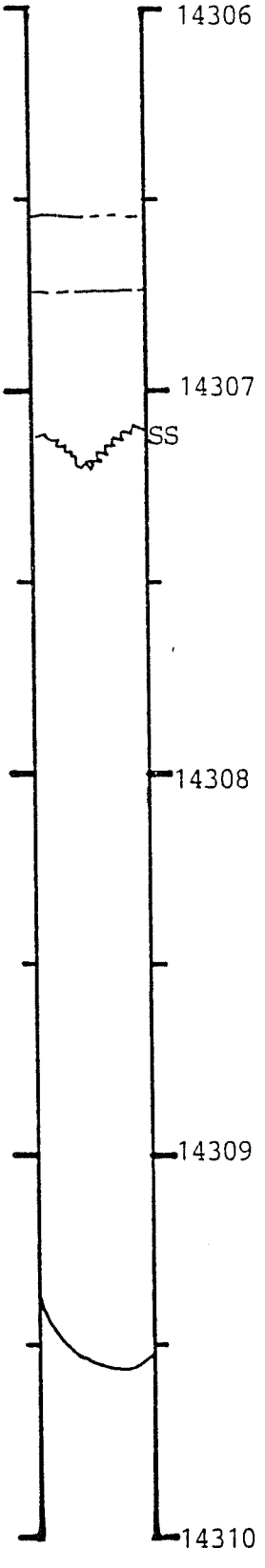
Open fractures @ 70° and 24°.

Open horizontal hairline fracture.

Two open diagonal fractures.

Open vertical fracture.

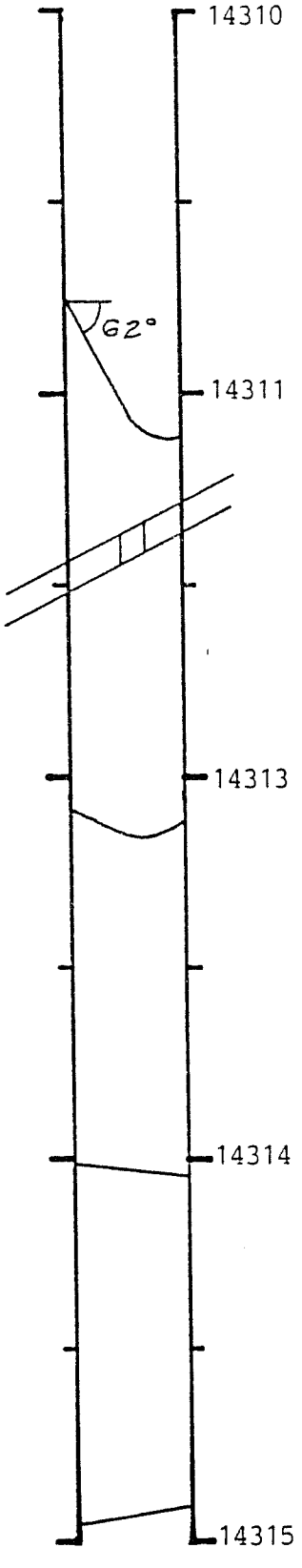
CORE No. 19 14300.1-14330.7 ft. (cont.)



Open hairline fractures bleeding salt water.

Fracture.

CORE No. 19 14300.1-14330.7 ft. (cont.)



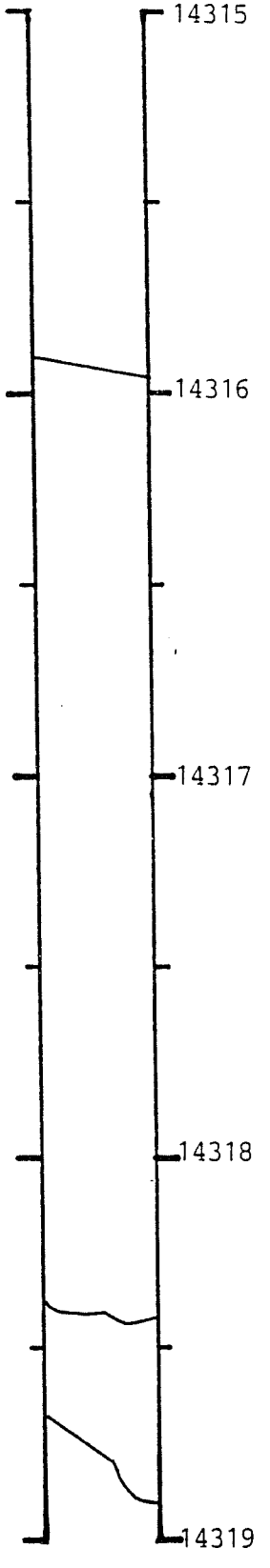
62° fracture bleeding salt water.

Fracture bleeding salt water.

Open fracture.

Open fracture.

CORE No. 19 14300.1-14330.7 ft. (cont.)

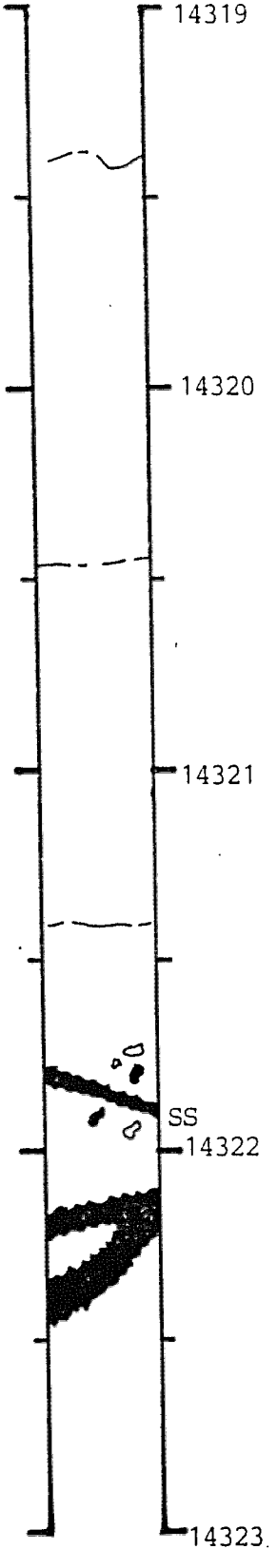


Near horizontal fracture.

Fracture.

Open fracture, 1mm. wide.

CORE No. 19 14300.1-14330.7 (cont.)



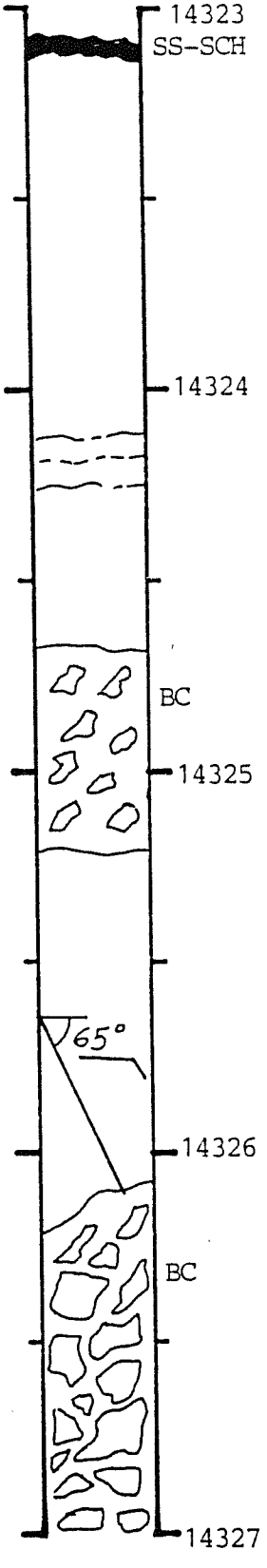
Hairline fracture, sealed.

Open hairline fracture.

Styolite seam, shale and calcite filled.

Styolite seam (probably altered by solution) filled with medium gray shale.

CORE No. 19 14300.1-14330.7 ft. (cont.)



Shale filled styolite seam (altered by solution).

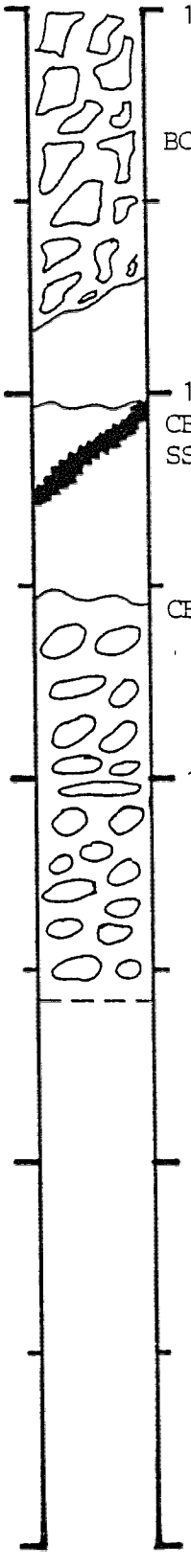
Solution breccia cavity.

65° open fracture.

Nearly horizontal open fracture.

Solution breccia cavity.

CORE No. 19 14300.1-14330.7 ft. (cont.)



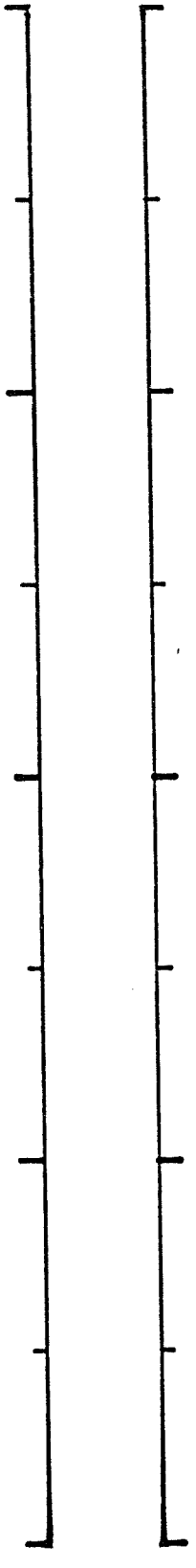
Breccia cavity.

Styolite seam filled with shale.

Core rubble.

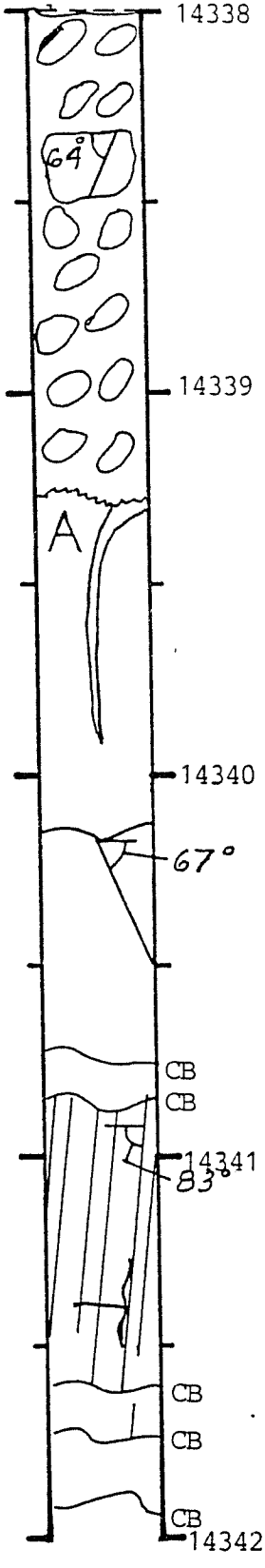
Base core. 14329.6 ft.

CORE No. 20 14330.7-14333.1 ft.: Cut 2.4 ft.-Rec. 0.5 ft.
Leadville: Dol., gy.-brn., brn., v.f./f. xln., sl. sil., cpct.



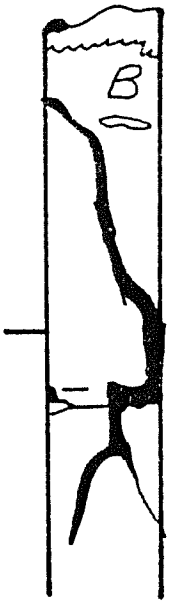
Not sufficient core for fracture analysis. The .5 ft. core did exhibit vertical and dendritic fracture patterns. Hairline fractures partly calcite sealed, some open.

CORE No. 21 14338-14398 ft.: Cut 60 ft.-Rec. 5.6 ft.
Leadville: Ls., lt.gy.-brn., buff, sl. lit., s. chky., v. f. gran., v. f. xln., sil., loc. chty.



Core rubble.

Open 64° fracture.



Side A: Open curving to vertical fracture exhibiting solution action.

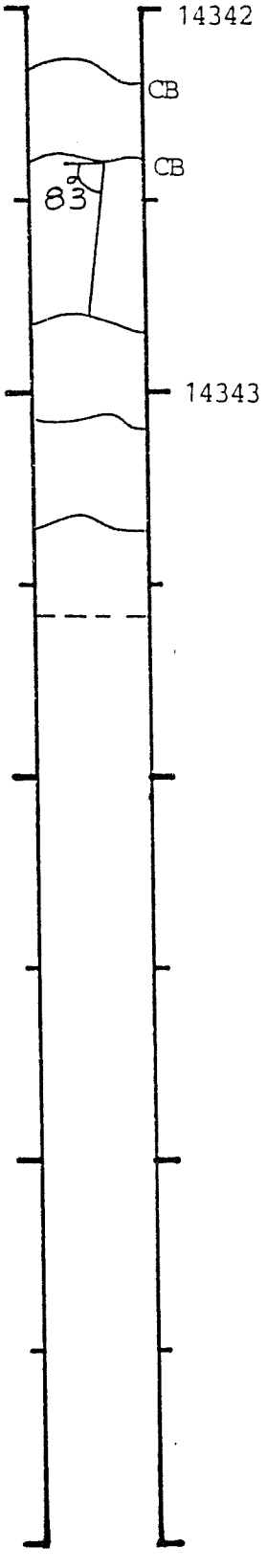
Side B: Vertical meandering solution channel, open to sealed, controlled by preexisting fractures.

Open

Numerous 83°± fine fractures, open to calcite sealed.

Open solution channel along fractures.

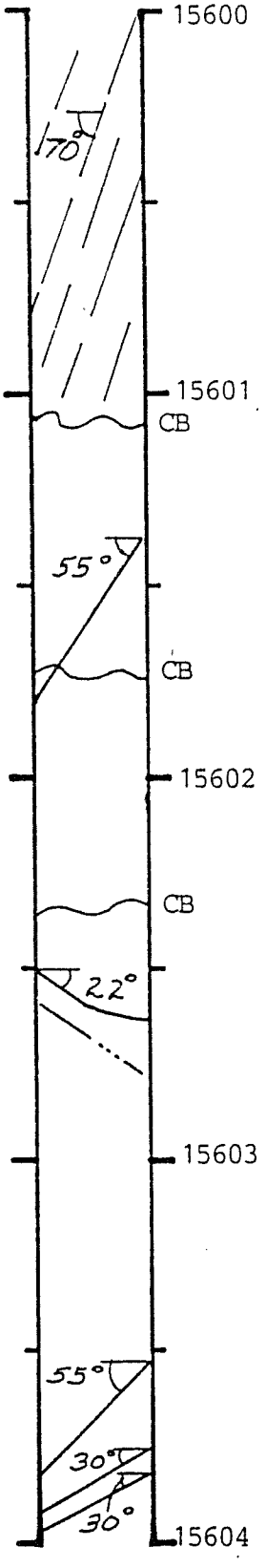
CORE No. 21 14338-14398 ft. (cont.)



Base Core @ 14343.6

CORE No. 23 15600-15630.2 ft.: Cut 30.2 ft.-Rec. 30.4 ft.

Precambrian: Diorite-Gabbro Schist, lt./m. gn., grn. feldspars predominate, s. dk. gn. mnrls. of pyroxene group, potash & plagioclase feldspars, w. limonite, hornblend, hemitite, low grade foliation at 70°.



Foliation @ 70° ± for most of 30 ft. core.

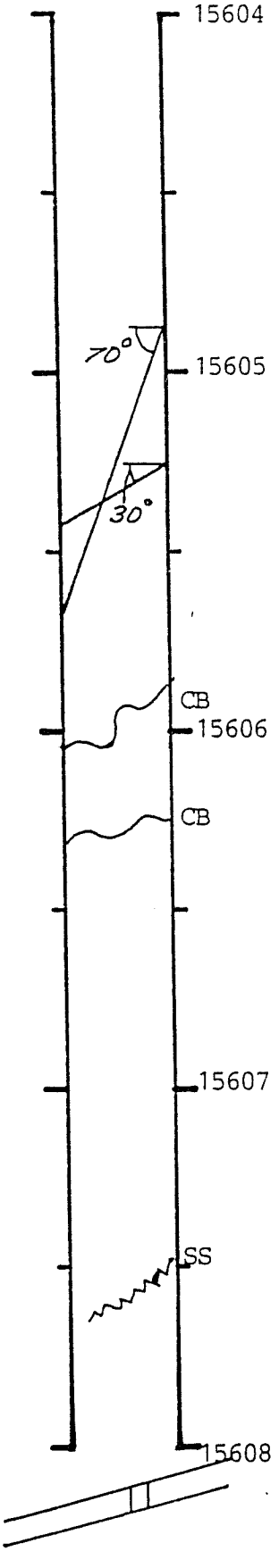
Open fracture with slickensides, indicates movement.

Open fracture, dip azimuth @ 335°.

Open fracture, dip azimuth @ 100°.

Open fracture, partly calcite lined, dip azimuth @ 320°.
Sealed fracture, replacement of matrix rock, dip azimuth @ 320°.

CORE No. 23 15600-15630 ft.: (cont.)

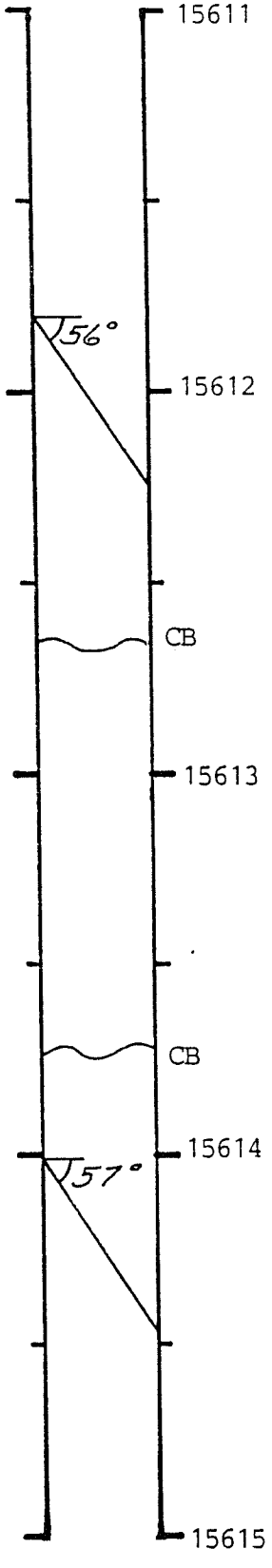


Open fracture, dip azimuth @ 275°.

Open fracture.

Styolite seam, alteration of matrix minerals by weathering (?).

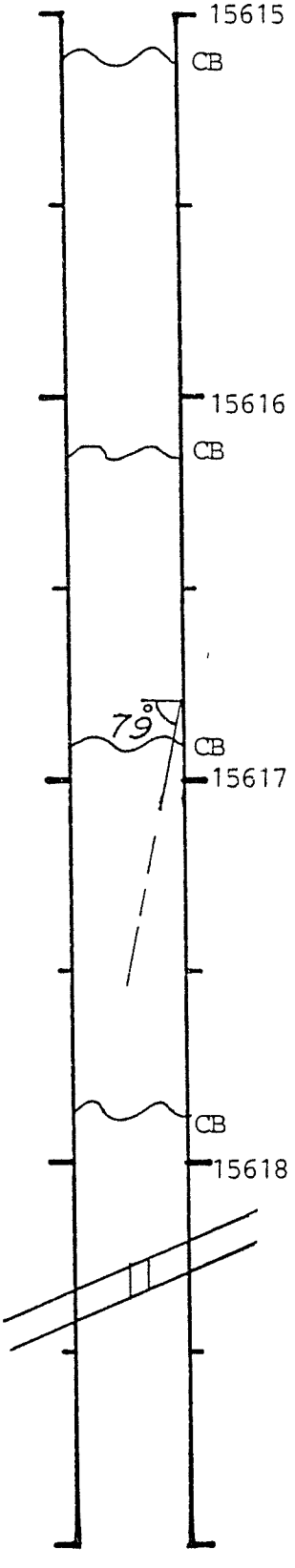
CORE No. 23 15600-15630.2 ft. (cont.)



Open fracture, dip azimuth @ 224°.

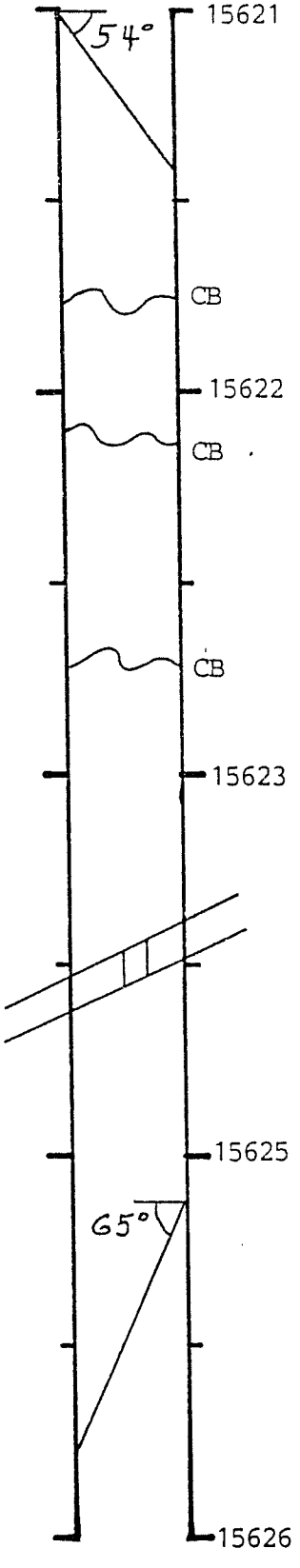
Open fracture, dip azimuth @ 220°.

CORE No. 23 15600-15630.2 ft. (cont.)



Hairline fracture, dip azimuth @ 25°.

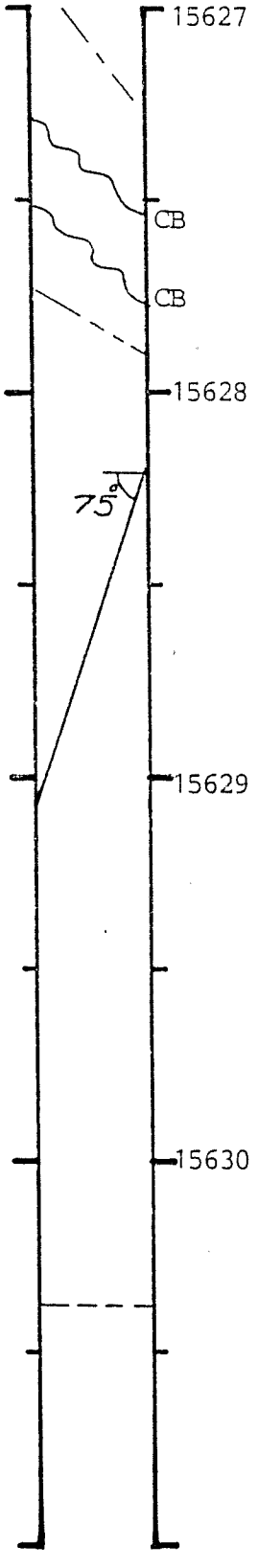
CORE No. 23 15600-15630.2 ft. (cont.)



Open fracture with slickensides.

Open fracture, dip azimuth @ 255°.

CORE No. 23 15600-15630.2 ft. (cont.)



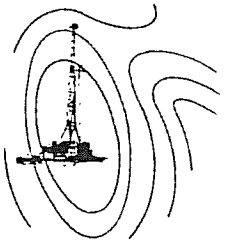
Hairline fracture.

Hairline fracture.

Fracture healed with red hemitite.

Core broken from 15627.4 to base.

Base core 15630.4 ft.



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FINAL GEOLOGICAL WELL REPORT

BUREAU OF RECLAMATION
INJECTION TEST WELL NO. 1
PARADOX VALLEY
30 - 47N - 18W
MONTROSE COUNTY, COLORADO

Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

Report Section IV

ANNOTATED WELL LOGS

TRUE VERTICAL DEPTH LOG
Surface to Total Depth Formation Tops

SONIC DOLOMITE POROSITY LOG
Porosity, Fractures, Core Depths Injection Zones

SAMPLE LOG (2 IN. = 100 FT.)

TABULATED FORMATION TOPS, THICKNESS, DATUM

AUGUST, 1989

CLARENCE L. HARR

Consulting Petroleum Geologist

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Consulting Petroleum Geologist

BUREAU OF RECLAMATION

INJECTION TEST WELL NO. 1

SW SE Sec. 30, T. 47 N., R. 18 W.

Paradox Valley

Montrose County, Colorado

ELEVATION: K.B. 5028 Ft. G.L. 4996 Ft.

TOTAL DEPTH: 16,000 Ft. PRECAMBRIAN

LOG TOPS

	DRILLED			TRUE		
FORMATION	DEPTH	THICKNESS	DATUM	DEPTH	THICKNESS	DATUM
TRIASSIC						
Chinle	Surf.	391	+4996	Surf.	390	+4996
Moenkopi	391	749	+4637	390	750	+4638
PERMIAN						
Cutler	1140	7190	+3888	1140	7173	+3888
PENNSYLVANIAN						
U. Honaker Trail	8330	3710	-3302	8313	3693	-3285
LaSal	12040	76	-7012	12006	76	-6978
L. Honaker Trail	12116	268	-7088	12082	268	-7054
Paradox	12384	261	-7356	12350	260	-7322
Hatch	12645	230	-7627	12610	229	-7582
Ismay	12875	265	-7847	12839	265	-7811
1st Main Salt	13140	219	-8112	13104	218	-8076
2nd Main Salt	13535	69	-8507	13497	69	-8469
Base Salt	13604		-8576	13566		-8538
Lower Paradox	13604	127	-8576	13566	127	-8538

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	DRILLED			TRUE		
FORMATION	DEPTH	THICKNESS	DATUM	DEPTH	THICKNESS	DATUM
Pinkerton Trail	13731	253	-8703	13693	251	-8665
Molas	13984	40	-8956	13944	40	-8916
MISSISSIPPIAN						
Leadville	14024	416	-8996	13984	416	-8956
DEVONIAN						
Ouray	14440	40	-9412	14400	40	-9372
Elbert	14480	168	-9452	14440	167	-9412
McCracken	14648	74	-9620	14607	74	-9579
Aneth	14722	82	-9694	14681	82	-9653
CAMBRIAN						
U. Lynch Shale	14804	73	-9776	14763	72	-9735
Lynch Limestone	14877	93	-9849	14835	93	-9807
L. Lynch Shale	14970	60	-9942	14928	60	-9900
Muav	15030	115	-10002	14988	115	-9960
Bright Angle	15145	143	-10117	15103	143	-10075
Ignacio	15288	201	-10260	15246	201	-10218
PRECAMBRIAN	15489	511	-10461	15446		-10418
TOTAL DEPTH	16000		-10972			

CASING: 20 in. @ 243 ft.; 13 3/8 in. @ 2020 ft.; 9 5/8 in. @ 14050 ft.; 5 1/2 in. @ 12880-15930 ft.

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PRIME INJECTION ZONES

FORMATION	DRILLED DEPTH	TRUE DEPTH
Leadville	14066-14352 ft. (286 ft.)	14026-14312 ft. (286ft.)
Leadville-Ouray	14352-14504 ft. (152 ft.)	14312-14464 ft. (152ft.)
Precambrian	15498-15650 ft. (152 ft.)	15455-15607 ft.

PERFORATED INTERVALS

FORMATION	DRILLED DEPTH	TRUE DEPTH
U. Leadville	14080-14185 ft. (105 ft.)	14040-14145 ft. (105ft.)
M. Leadville	14215-14350 ft. (135 ft.)	14175-14310 ft. (135ft.)
L. Leadville-Ouray	14380-14504 ft. (124 ft.)	14340-14464 ft. (124ft.)
McCracken	14651-14709 ft. (58 ft.)	14610-14668 ft. (58ft.)
Ignacio	15376-15386 ft. (10 ft.)	15334-13344 ft. (10ft.)
Precambrian	15489-15827 ft. (338 ft.)	15446-15781 ft. (335ft.)

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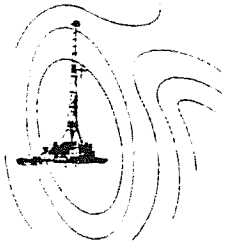

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FINAL GEOLOGICAL WELL REPORT

Report Section _V_

BUREAU OF RECLAMATION
INJECTION TEST WELL NO. 1
PARADOX VALLEY
30 - 47N - 18W
MONTROSE COUNTY, COLORADO

Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

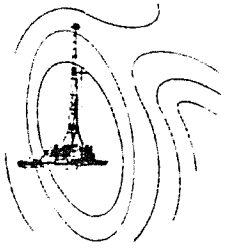
BUREAU OF RECLAMATION

Contract 4-CA-40-01660

Project 10-760

CLARENCE L. HARR

Consulting Petroleum Geologist



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FINAL GEOLOGICAL WELL REPORT

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PARADOX VALLEY
30 - 47N - 18W
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Paradox Valley Unit
Salt Brine Injection Project
Bedrock, Colorado

Report Section _V_

GEOLOGIC CRITERIA USED IN SELECTION OF INJECTION ZONES

With

Comments Regarding Analysis
Of November - December, 1988 Zone Tests

JULY, 1989

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2024 Broadview Ct. Grand Junction, Colo. 81503 303-241-5974

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GEOLOGIC CRITERIA USED IN SELECTION OF INJECTION ZONES

Paradox Valley Unit Salt Brine Injection Project
Bedrock, Colorado

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- Lithology
- Sonic Porosity
- Core/Sample Porosity
- Fractures
- Petrophysical Character of Reservoir
- Test Objective
- Planned Test Procedure

Interval 15,489-15,680 (191 ft.) Upper Precambrian Zone . 4

Interval 15,376-15,406 (30 ft.) Ignacio Zone 5

Interval 14,655-14,715 (60 ft.) McCracken 6

Interval 14,380-14,504 (124 ft.) Lower Leadville & Ouray. 7

Interval 14,215-14,350 (135 ft.) Middle Leadville 8

Interval 14,080-14,185 (105 ft.) Upper Leadville 9

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Test No. 2 - Precambrian, Ignacio and McCracken Zones . . 11

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Lower Precambrian Zone 12

Upper Precambrian Zone 13

CONTENTS

APPRAISAL OF ZONE INJECTIVITY (Cont.)

Ignacio Zone 13

McCracken Zone 14

Combined Lower Leadville/Ouray Zone, Middle Leadville Zone and Upper Leadville Zone 14

GEOLOGIC CRITERIA USED IN SELECTION OF INJECTION ZONES With Comments Regarding Analysis Of November - December, 1988 Zone Tests

INTRODUCTION

During geological and engineering discussions which occurred in April, 1988 at the Bureau of Reclamation (BOR), Paradox Field Office, seven zones in four separate reservoirs were selected for initial testing of their injectivity potential. Based on regional reservoir characteristics and supported by petrophysical data acquired during drilling operations the Mississippian Leadville carbonate was considered as the prime formation for disposal of the Paradox Valley salt brine. Three separate Leadville zones were defined for individual testing. Two separate zones of the Precambrian were selected. The Upper Precambrian interval is considered as a valid secondary disposal zone. Testing of the Lower Precambrian zone, the Cambrian Ignacio sandstone and the Devonian McCracken sandstone were chosen for testing primarily to determine if they had potential, or to eliminate them from any future question as possible disposal zones. Their petrophysical characteristics in the general area of the Paradox Valley Unit are not indicative of economically viable injection reservoirs. The seven test zones and their injectivity potential as defined by core, drill cutting samples and well logs are listed in summary as follows:

Reservoir Zone	Interval Depth	Geologically Defined Potential
Lower Precambrian	15,710-15,850 (140 Ft.)	Very Poor - Negative data only.
Upper Precambrian	15,489-15,680 (191 Ft.)	Fair - Good fracture evidence, secondary zone to Leadville.
Ignacio	15,376-15,406 (30 Ft.)	Very Poor - Probably fractured, but lateral extent of perforated sandstone is limited. Thin zone.
McCracken	14,655-14,715 (60 Ft.)	Poor - Probably fractured, but no matrix porosity. Relatively thin zone.
Lower Leadville & Ouray	14,380-14,504 (124 Ft.)	Good - Probably well fractured and in communication with Middle and Upper Leadville zones.

Reservoir Zone	Interval Depth	Geologically Defined Potential
Middle Leadville	14,215-14,350 (135 Ft.)	Very Good - Well fractured with some matrix porosity, communication with Lower and Upper Leadville zones.
Upper Leadville	14,080-14,185 (105 Ft.)	Excellent - Highly fractured with matrix porosity, communication with lower two zones.

Initial design of testing procedures included flow tests for water samples, 5000 psi maximum pressure step-rate and shut-in pressure fall-off tests and bottom hole pressure tests. The obtained data was to be used in determination of injection brine-reservoir compatibility, reservoir permeability, boundary effects, fracture gradient and original pressure; the data needed in predicting reservoir injectivity.

Mechanical failures during the injection zone tests conducted in November and December, 1988 negated full evaluation of all selected test zones for design of the two-year test program. However, the data obtained in conjunction with petrophysical data supports the early contention that the Mississippian Leadville and the upper zone of the Precambrian are viable injection zones, especially at fracture propagation pressure.

Following is a discussion of individual zone reservoir characteristics and a summary of geological and engineering opinion as to the test results. References used in preparation of this report are listed. Reference material included as part of the report is noted.

Sonic (Dolomite) Porosity Log, BOR Injection Test Well No. 1, Report Section IV. Fracture intervals, core and log porosities, core depths and test intervals annotated. (Enclosed)

Detailed Lithologic Description of Core Chips and Description of Drill Cutting Samples, BOR Injection Test Well No. 1, Report Section I. (Enclosed)

Detailed Core Log (5 in.=100 ft.), BOR Injection Test Well No. 1, Report Section II. (Enclosed)

Lithologic - Drill Time Log (2 in.=100 ft.), BOR Injection Test Well No. 1, Report Section IV. (Enclosed)

Fracture Log (2 in.=Approx. 1 ft.), BOR Injection Test Well No. 1, Report Section III. Includes only core segment containing fractures. (Enclosed)

Petrographic Examination of Core Drill Cutting Samples, BOR Petrographic Referral Code 88-60, November 7, 1988, D.R. Hurcomb.

Final Completion Report, KEDA Job No. 10-1189, February, 1989, Ken E. Davis Associates.

Area of Least Resistance to Fluid Movement and Pressure Rise, BOR Project 10-760, September, 1988, William Bremkamp and Clarence L. Harr.

Proposed Location For Injection Well No. 2, BOR Project 10-760, February, 1989, Clarence L. Harr.

DEFINITION OF TEST INTERVALS

Interval 15,710 - 15,850 (140 ft.) Lower Precambrian Zone
(Flow tested with Upper Precambrian Zone and step-rate tested with Upper Precambrian Zone and Ignacio Zone.)

Lithology: Aphanitic, fine grained, carbonate-quartz-chlorite schist (greenschist). Cuttings suggest rock is foliated and schistose as observed in Core No. 23. Mineralogy - Chlorite 35%, Quartz 20-25%, Feldspar 10%, Epidote 10%, Calcite 10%, Dolomite 5%, Other 5-10%. (Interpreted by binocular microscopic examination of drill cuttings as compared with petrographically examined sample from Core No. 23 at 15,627.6 to 15,630 feet and drill cuttings from 15,970 to 16,000 feet, BOR Petro. Memo. 88-60.)

Sonic Porosity: 4 feet of 2%, based on a matrix velocity of 50 microseconds per foot.

Sample Porosity: None visible by binocular microscopic examination of drill cuttings.

Fractures: Only fractures indicated were on the sonic wave form log which without supporting data are considered as unreliable. The microscanner image log was not run from 15,730 feet to T.D.

Petrophysical Character of Reservoir: Undefined to negative.

Test Objective: Determine validity of deeper Precambrian injectivity for depth determination of any subsequent disposal well.

Planned Test Procedure: 1) Flow test for water sample compatibility; 2) 1.5 hr. step-rate test to a maximum 5000 psi; 3) Record shut-in pressure fall-off; 4) Obtain original formation pressure; 5) Determine permeability, fracture gradient and injectivity.

(Injection zone and test results evaluation carried in the section, Appraisal of Zone Injectivity.)

Interval 15,489 - 15,680 (191 ft.) Upper Precambrian Zone
(Flow tested with Lower Precambrian Zone and step-rate tested with Lower Precambrian Zone and Ignacio Zone.)

Lithology: Aphanitic, chlorite-sericite-quartz schist (greenschist). The rock is foliated and schistose. Foliation is considered moderate and inclined to the drill hole at approximately 70 degrees. Mineralogy - quartz 40%, sericite 35%, chlorite 20%, other 5%. (Interpreted by binocular examination of drill cuttings and core chips as compared to petrographically examined samples from Core No. 23 at 15,627.6 to 15,630 feet, BOR Petro. Memo. 88-60.)

Sonic Porosity: 42 feet of 3% or greater, 30 feet of 5% of greater, 10 feet of 9% within interval 15,489-15,555 feet (66 feet). Based on a matrix velocity of 50 microseconds per foot.

Sample Porosity: Wet cuttings from 15,489 - 15,550 feet (60 feet) in both hand and binocular specimens under a heat lamp exhibited rapid evaporation of free water from within the matrix micropores.

Fractures: Core No. 23, 15,600 - 15,630.2 from 30 feet of recovery exhibited 13 open fractures and several hairline fractures. Fracture dip ranged from 22 degrees to 65 degrees. Fractures near the 55 degree inclination have a near common azimuth indicating tectonic origin. Positive indications of fracturing are visible in the microscanner image log, the fracture identification log and the sonic wave form log from the top of the Precambrian to 15,650 feet (161 feet). An open fracture at 15,601.4 feet exhibited slickensides produced by structural movement. Refer to fracture log (Section III), core log (Section II), and annotated sonic log (Section IV), enclosed.

Petrophysical Character of Reservoir: Based on 13 open fractures in the 30 feet of Precambrian core (1 fracture per 2.3 feet) it is plausible to assume 70 fractures within the 161 feet of fracture interval indicated by fracture log response in the top of the Precambrian. At fracture propagation pressure the Upper Precambrian Zone is considered a viable disposal zone second to the Mississippian Leadville. 180 feet (15,489-15,670 ft.) is considered as a fractured potential injection zone. Refer to annotated sonic log (Report Section IV), enclosed.

Test Objective: Determine validity of the Upper Precambrian interval as a Injection Test Well No. 1 disposal zone secondary to the Leadville and for depth determination of any subsequent disposal well.

Planned Test Procedure: Flow test for water sample compatibility; 1.5 hr. step-rate test to a maximum 5000 psi with fall-off pressures; original formation pressure; permeability; frac. gradient; injectivity.

(Injection zone and test results evaluation are carried in the section, Appraisal of Zone Injectivity.)

Interval 15,376 - 15,406 (30 ft.) Ignacio Zone
(Step-rate tested with Lower and Upper Precambrian.)

Lithology: Sandstone, clear, rose, white, gray, some reddish-brown, medium to course grained, subangular to subrounded (locally abundant rounded, frosted, quartz grains), silicious, some kaolinite cement, locally red-brown clay void filler. Mineralogy - quartz 85%, orthoclase 5%, carbonate 5%, other 5%. The sandstone adjacent to the perforation interval is 27 feet thick.

Sonic Porosity: 23 feet of 4% or greater intergranular porosity with 5 feet of 7% porosity as based on a matrix velocity of 51.3 microseconds per foot. 7% porosity in a sandstone is extremely low and should not be considered as effective unless tested.

Sample Porosity: No visible porosity under binocular microscope. The silicious and kaolinitic cement and clay void filler negated all possibility for effective intergranular porosity. Samples included a few cutting chips with possible fracture-plan faces.

Fractures: The caliper curve on the enclosed annotated sonic log is off scale, greater then 16 in., through 27 feet of the Ignacio sandstone test interval. The Ignacio is regionally a hard, tight sandstone. The enlarged rugos hole is most likely the result of fracturing and not because the sandstone is friable.

Petrophysical Character of Reservoir: There was no visible evidence of effective porosity (porosity with sufficient permeability to permit fluid movement) in the Ignacio sandstone. Both the sonic log and drill cuttings indicated tight rock. There is the possibility of fracturing as mentioned, however the limited thickness and lateral extent of the sandstone lenses reduces storage volume. The petrophysical evidence for the Ignacio interval negates it as a valid disposal zone.

Test Objective: Check the possibility of the Ignacio sandstone being a tertiary disposal zone.

Planned Test Procedure: Short duration injection test for injection rate and pressure.

(Injection zone and test results evaluation are carried in the section, Appraisal of Zone Injectivity.)

Interval 14,655 - 14,715 (60 ft.) McCracken Zone
(Limited step-rate and pressure fall-off test combined with the Ignacio and Precambrian Zones.)

Lithology: Sandstone, white, light to dark gray, some red-brown, very fine to some course grained, subangular to subrounded, silicious and dolomitic cement void filler. Mineralogy - quartz 60%, dolomite 30%, calcite 5%, other 5%. The sandstone is 74 feet thick.

Sonic Porosity: 14 feet of 3% to 5% porosity as based on a matrix velocity of 51.3 microseconds per foot. Refer to annotated sonic log (Report Section IV), enclosed.

Sample Porosity: No visible porosity noted under binocular microscope. The silicious and dolomitic cement void filler negated all possibility for effective intergranular porosity.

Fractures: Right deviation of the caliper curve on the enclosed sonic log is off scale (hole size greater then 16 inch) through 74 feet of the McCracken interval. Quartz grains in the sandstone are well cemented suggesting that the hole rugosity and enlargement is due to fractures, not friable sand sluffing.

Petrophysical Character of Reservoir: Effective matrix porosity was not in evidence through the McCracken Zone by either samples or mechanical log. There is weak evidence of fracture development and the lateral bed limits are regional, however the 74 feet of thickness allows minimal capacity for brine storage. Based on available data the McCracken is considered as a poor low volume storage zone.

Test Objective: Check the possibility of the McCracken sandstone being a tertiary disposal zone.

Planned Test Procedure: Short duration injection test for injection rate and pressure.

Interval 14,380-14,504 (124 ft.) Lower Leadville/Ouray
(Flow tested with Middle and Upper Leadville Zones.)

Lithology: Dolomite and limestone interbedded; dolomite (dominate), brown, light gray, light gray-green, very fine to fine crystalline, sucrosic, floating quartz grains in lower portion, locally pyritic; limestone, buff, tan, white, very fine crystalline, lithographic, some sucrosic and chalky, dolomitic, locally fossiliferous.

Sonic Porosity: 2 feet of 11%, 22 feet of 5% to 8%, 14 feet of 3% to 4%, 34 feet of 2%. Refer to sonic log enclosed, porosity annotated.

Sample Porosity: Sample porosity determined from drill cuttings, no core recovery from this interval. Porosity zones shown on sonic log are diagenetic dolomite, very fine to fine crystalline and locally sucrosic. Porosity determined with the binocular microscope ranged from 2% to 6%.

Fractures: No core recovery from subject interval. The right deviation of the caliper curve on the sonic log exceeded 16 inches for hole diameter through 60 feet of Lower Leadville-Ouray section. The eroded and enlarged drill hole is attributed to intense fracturing. The enlargement and rugosity is an extreme anomaly to the general character of the Leadville and Ouray throughout the Paradox Basin. The microscanner image log was not run through the interval. The FIL fracture log did not record data due to the enlarged hole.

Petrophysical Character of Reservoir: Based on log and drill cutting sample data, the Lower Mississippian Leadville-Devonian Ouray Injection Zone is considered as secondary to the Middle and Upper Leadville Zones and equal to or slightly better then the Upper Precambrian Zone. The 38 feet of interbedded intercrystalline and vugular porosity greater then 3% present in the Lower Leadville is less then that contained in the upper two zones. Although I am confident the lower zone is fractured there is not available the core and fracture log evidence which is present in the upper two zones. The Lower Leadville-Ouray Injection Zone is considered as a valid disposal reservoir with fluid-pressure continuity by fractures to the prime reservoir of the upper two zones.

Test Objective: Determine the injectivity of the Lower Leadville-Ouray Zone, produce sufficient formation water for reuse during the injection test and for compatibility tests with the disposal brine.

Planned Test Procedure: Test as individual zone. Flow test for recovery of sufficient water for reinjection and use in compatibility tests; 1.5 hour step-rate test to a maximum 5000 psi with subsequent shut-in fall-off pressure evaluation; obtain original formation pressure; determine permeability and fracture gradient.

(Injection zone and test results evaluation are carried in the section, Appraisal of Zone Injectivity.)

Interval 14,215 - 14,350 (135 ft.) Middle Leadville Zone
(Flow tested with Lower and Upper Leadville Zones.)

Lithology: Dolomite and limestone interbedded; dolomite (dominate), light-gray brown, brown, very fine crystalline to sucrosic, locally cherty; limestone, light-gray to gray brown, buff, very fine crystalline to lithographic, locally silicious and cherty, locally chalky, fossiliferous.

Sonic Porosity: 36 feet of 5% to 8%, 20 feet of 3% to 4%, 16 feet of 2%. Refer to sonic log enclosed, porosity annotated.

Sample Porosity: Sample porosity determined by examination of core chips from 55.4 feet of recovered core and available core cuttings. Porosity zones shown on sonic log are diagenetic dolomite, very fine crystalline, some sucrosic. Binocular microscopic porosity determination ranged between 2% and 3% as recognized, but probably higher. Type of porosity is intercrystalline, pin-point vugular, solution channel and open fracture. Refer to Detailed Lithologic Description of Core Chips, Report Section I, enclosed.

Fractures: Fracture determination based on 55.4 feet of core recovery from 72.8 feet cut. There is 37 feet of Middle Leadville core which has one or more open fractures. Lower portion of middle zone has solution channels developed along preexisting fractures (refer to enclosed Fracture Log, Report Section III). Microscanner image log, FIL fracture log and the sonic wave form fracture log indicated good fracture response through 110 feet of the Middle Leadville Zone (refer to annotated Sonic Log, Report Section IV, enclosed).

Petrophysical Character of Reservoir: Based on core and mechanical log data the Middle Leadville Zone is considered as prime reservoir for brine disposal, second only to the Upper Leadville. Using both the core and mechanical logs, the entire 135 feet of the Middle Leadville is considered as containing fractures and is in fluid and pressure communication with the Upper and Lower Leadville Zones.

Test Objective: Determine the injectivity of the Middle Leadville Zone, produce sufficient formation water for reuse during injection test and for compatibility tests with the disposal brine.

Planned Test Procedure: Test as individual zone; flow test for recovery of sufficient water for reinjection and use in compatibility tests; 1.5 hour step-rate test to a maximum of 5000 psi with subsequent shut-in fall-off pressure evaluation; obtain original formation pressure; determine permeability and fracture gradient.

(Injection zone and test results evaluation are carried in the section, Appraisal of Zone Injectivity.)

Interval 14,080 - 14,185 (105 ft.) Upper Leadville Zone
(Flow tested with Middle and Lower Leadville/Ouray Zones.)

Lithology: Dolomite and limestone interbedded; dolomite (dominate), light-gray tan, light-gray, gray-brown, very fine to crystalline, grandular, sucrosic some medium crystalline, fossiliferous, contains solution channels and styolite seams; limestone, light-gray, brown, very fine to some medium crystalline, contain styolite seams, fossiliferous.

Sonic Porosity: 24 feet of 5% to 8%, 24 feet of 3% to 4%, 4 feet of 2%. Refer to annotated sonic log, Report Section IV, enclosed.

Sample Porosity: Sample porosity determined by examination of core chips from 63.7 feet of recovered core. Porosity zones shown on the sonic log are diagenetic dolomite, fine to medium crystalline, sucrosic to grandular. Binocular microscopic porosity determination ranged between 2% and 3% with traces up to 18%. Porosity type is intercrystalline, vugular (up to 1.5 mm. x 3 mm.), open solution channels and fractures. Refer to Detailed Lithologic Description of Core Chips, Report Section I, enclosed.

Fractures: Fracture determination based on 63.7 feet of core recovery from 104.6 feet cut. There are 48 open fractures in the 63.7 feet of core recovery from the Upper Leadville Zone. Numerous hairline fractures were bleeding salt water. Refer to Fracture Log, Report Section III, enclosed. Microscanner image log and FIL fracture log show 70 feet of fracture response. Refer to annotated sonic log, (Section IV). Based on both core and fracture log data it is contended that the entire 105 feet of Upper Leadville Zone is fractured.

Petrophysical Character of Reservoir: Geological and petrophysical data defines the Upper Leadville Zone as the most adequate and desirable brine disposal zone of all formations penetrated in the BOR Injection Test Well No. 1. It is highly fractured and contains the best intermatrix permeability of any other zone. The upper zone is in pressure-fluid communication with both the Middle and Lower Leadville/Ouray zones. At fracture propagation pressure the reservoir will give excellent response to brine injection if the brine fluid is chemically compatible to both the Leadville formation water and formation mineral composition.

Test Objective: Determine the injectivity of the Upper Leadville Zone; produce sufficient formation water for reuse during injection test and for compatibility tests with the disposal brine.

Planned Test Procedure: Test as individual zone; flow test for recovery of sufficient water for reinjection and use in compatibility tests; 1.5 hour step-rate test to a maximum of 5000 psi with subsequent shut-in fall-off pressure evaluation; obtain original formation pressure; determine permeability and fracture gradient.

(Injection zone and test result evaluation are carried in the section, Appraisal of Zone Injectivity.)

NOVEMBER - DECEMBER 1988 ZONE TESTING

The initial plan and subsequent design of the proposed test program conducted during completion procedures in November - December, 1988 was directed primarily toward obtaining reservoir data for use in designing the Two-Year Injection Test Program. Due to downhole problems and test equipment failure only a minimum of data was recovered.

The proposed test procedure was described for each individual injection zone in the preceding section of this report. The actual interval perforated and the actual testing

accomplished follows. An appraisal of the test results and zone injectivity is presented in the final section of this report.

Test No. 1 - Precambrian and Ignacio Zones (15,376-15,386 feet, 15,489-15,827 feet; 348 feet @ 6 SPF)

Log response of the Pulse Echo Tool indicated very weak to no cement bonding of the 5 1/2 inch liner - open hole annulus from 15,400 feet to total depth (base Ignacio and Precambrian). Cement bonding between 15,280 feet to 15,400 feet (total Ignacio) was logged as marginal. The certainty of pressure and fluid communication between the Lower Precambrian Zone, the Upper Precambrian Zone and the Ignacio Zone negated the preferred testing of the zones individually.

The two Precambrian Zones were perforated continuous from 15,489-15,827 feet with 6 SPF under a 4500 psi negative pressure differential. There was no fluid entry initially or during a nitrogen jet of the tubing string. The digital quartz pressure gauge was damaged during retrival and the bottom hole pressure was not recovered.

During the perforating of the Ignacio Zone the gun malfunctioned and exploded. Only the upper 10 feet section fired resulting in an Ignacio perforated interval from 15,376-15,386 feet. There was no recorded formation water recovery.

22,042 gallons of fresh water was injected into the three combined zones in a eight step, step-rate test, followed by a shut-in pressure fall-off test. The initial rate of 102 gal./min. at 3275 psi was increased to 485 gal./min. at 4665 psi. Mechanical problems during the test reduced the usable test data recovered. The fracture propagation pressure in the combined test interval, field calculated at .68 psi/foot.

Test No. 2 - Precambrian, Ignacio and McCracken Zones (14,651-14,709 feet, 15,376-15,386 feet, 15,489-15,827 feet; 406 feet @ 6 SPF)

There was no water recovered during perforation of the McCracken Zone at 14,651-14,709 (58 feet @ 6 SPF). The attempted step-rate test of the combined 3 zone interval was terminated after the second step because of a malfunctioning pump.

Test No. 3 - Upper, Middle and Lower Leadville Zones (14,080-14,185 feet, 14,215-14,350 feet, 14,380-14,504 feet; 364 feet @ 6 SPF)

The Mississippian Leadville carbonate was perforated in three different zones as planned. 30 feet blank intervals were left between perforated zones for packer/bridge plug space during

individual zone testing or injection. The three zones were perforated with an under-balanced pressure of 5000 psi and allowed to flow combined until hydrostatic/formation pressure equalized. The hole was nitrogen jetted for 10 hours and a formation fluid sample was recovered.

A bridge plug was set below the Lower Leadville zone at 14,564 feet. Pressure gauges were set at 14,503 feet and the hole was nitrogen jetted to a stabilized flow of 10 bbls. of formation fluid per hour. Additional fluid samples were recovered. After release of the nitrogen, bottom hole pressures were recorded through a 12 hour flow-back of Leadville formation brine. There was no usable data recovered from the combined Leadville zone test.

Test procedures were terminated, rig released and the well head installed. The two year injection test will be initiated after completion of the surface facilities and all test regulation requirements.

APPRAISAL OF ZONE INJECTIVITY

The following appraisal of the individual zones as to their ultimate potential as a brine disposal reservoir is weighted more by the petrophysical data, core and well log data, recovered during drilling operations then the injection zone tests conducted in November-December, 1988. Recovery of test data usable for design of the "Two-Year Injection Test" or for a tentative prediction of long term injection capability was minimal. It certainly was not sufficient for determination of the reservoir characteristics or injectivity of the zones selected for disposal.

Mr. Gene Collins, Research and Engineering Consultants, Inc., Englewood, Colorado, evaluated the data recovered from the subject tests. In all cases my appraisals reference Mr. Collins work. His calculations and opinions are contained in the Final Completion Report of the BOR Injection Test Well No. 1 by Mr. Jim Bundy, Ken E. Davis Associates, Houston, Texas.

Lower Precambrian Zone

The petrophysical data presently available suggests that the Lower Precambrian Zone is not a viable salt brine disposal zone. The Fracture Identification Log (FIL) which was run over both the Lower and Upper Precambrian Zones showed no evidence of fracturing through the lower zone. The FIL did indicate fracturing through 150 feet of the Upper Precambrian. The Sonic Wave Form Fracture Log did show some fracture response in the Lower Precambrian, but that data used alone is not reliable.

The injected volume of water at a rate of 485 gal./min. during Test No. 1 is considered as having entered the Upper Precambrian Zone, known to be fractured and possibly the Ignacio Zone, which probably is fractured. Unless additional information is obtained the Lower Precambrian should be eliminated as a potential injection zone.

Upper Precambrian Zone

Core No. 23 recovered from the Upper Precambrian Zone contained positive fractures. All three of the fracture logs run through the Upper Precambrian showed fracture response. There is sufficient petrophysical data that supports fracturing in at least 150 feet of the Upper Precambrian that it should be considered as a potential disposal zone and be tested individually for its' injectivity.

Collins calculated a fracture gradient of .63 psi/ft. from the step-rate and shut-in pressure fall-off test conducted December 1, 1988. Due to the low value he concluded the .63 psi/ft. is actually a fracture opening value and not a fracture initiation value. Petrophysical data by identification of existing natural fractures strongly supports the .63 psi/ft. as being the fracture opening value for the Upper Precambrian Zone and possibly the Ignacio Zone.

The average permeability (K) of the Test No. 1 interval which covered the combined 3 zones calculated out at 3.2 md. This was based on a permeability-thickness (Kh) of 1113.8 md./ft. and a total thickness (perforated interval) of 346 feet.

Petrophysical data implies a fractured Upper Precambrian thickness of 161 feet and a Ignacio sandstone fractured interval of 27 feet. Combined, this puts the contended total fractured reservoir thickness tested at 188 feet.

$$\frac{1113.8 \text{ md./ft. (Kh)}}{188 \text{ ft. (Thickness)}} = 5.9 \text{ md.}$$

The average permeability for the test interval is approximately 6 md.

Ignacio Zone

The Ignacio sandstone was tested as one of the combined zones in Test No. 1. As previously discussed under the Upper Precambrian Zone portion of this report, the Ignacio is probably fractured and most likely was a partial recipient of the injected water during the short test period. However, the evaluation of the long time injectibility of the Ignacio Zone lies not with the degree of fracturing, but with its' thickness and lateral extent.

The sandstone is the basal unit of the Cambrian and was deposited by the transgressing Cambrian seas. The sands therefore are lenticular, discontinuous and unpredictable. As individual sand bodies they are thin and in the eastern portion of the Paradox Basin are quartzitic and tight.

The extent of the fractured reservoir is with present data undefinable. It is my recommendation to exclude the Ignacio Zone from any further testing.

McCracken Zone

The short test time and low injection rate obtained in Test No. 1 negates the recovered data as viable for determining the injectivity of the McCracken Zone. As discussed under the petrophysical character of the McCracken reservoir, it is considered as a potentially poor, low volume storage zone. The McCracken Zone should be excluded from any further testing.

Combined Lower Leadville/Ouray Zone, Middle Leadville Zone and Upper Leadville Zone

Due to the test procedures used in Test No. 3 there was no usable data obtained for determination of zone injectivity. The reservoir character of each individual zone as determined petrophysically has been adequately defined previously in this report.

Leadville reservoir character based on fluid movement measurements was partially defined during drilling and completion operations. Prior to running the 5 1/2" 60N, injection liner, a DST was run on the hole from 14,050 to 16,000 feet, on August 20, 1987. The test included the Leadville formation, Devonian, Cambrian and 511 feet of the Precambrian. The DST data recovered is as follows:

DST No. 1 14,050 to 16,000 feet.
Open 5 min., shut in 1 hr.; open 2 hrs.; shut-in 6 hrs.
Recovered 9736 ft. wtr. - 2060 ft. wtr. cushion and 7676 ft. drl. fluid and fm. wtr.
IFP 2337-1426; FFP 1618-4464 psi.
ISIP 6139 psi.; FSIP 6112 psi.
BHT @ 217; Rec. 122 BW
Gradient of fluid recovered = .468 psi/ft. (Otis)

The Horner plot of the build up pressures did not indicate stratified layering, suggesting the total fluid recovery was from the fractured Leadville carbonate. This was confirmed by the "no-fluid recovery" on the recent flow test conducted over the combined McCracken, Ignacio and Precambrian Zones. Log and core data indicates most of the fluid was recovered from the Upper and

Middle Leadville Zones (14,080 feet to 14,350 feet, 270 feet) which contains the best matrix porosity and is the most highly fractured. The Lower Leadville from 14,350 feet to 14,504 feet (154 feet) has lower value matrix porosity, but is considered as highly fractured and probably gave up some of the recovered fluids.

Several interpretations of the DST data for evaluation of the injection reservoir were submitted to the BOR. The following test data and interpretations are from Otis Services test analysis report. The Otis analysis is the most detailed.

Initial reservoir pressure was calculated from the DST data to be 6146 psia at gauge depth of 14,043 feet. The pressure gradient is .438 psi/ft. Original Leadville reservoir pressure at the mid-point depth of 14,209 calculates to be 6219 psia, which is a normally pressured reservoir. The 2 hour flow rate was 1404 BWPD. Multiple analysis using analytic radial flow and dual porosity reservoir models indicates a dual porosity flow system. This supports the Leadville cores which exhibited an extensive fracture system with moderate to poorly developed intercrystalline and vugular porosity.

The calculated water permeability - thickness from the pressure data ranged from 375 to 440 md. ft. within a 400-500 ft. radius of the wellbore. The skin value of +4 to +5.3 suggests the formation did not clearup during its' short flow period.

In a letter to the BOR through KEDA, dated February 14, 1988, Gene Collins of Research and Engineering Consultants, Inc. explains the necessity for using a variable flow rate analysis rather then the conventional Horner plot for calculating the permeability - thickness. During the 2nd open period of 2 hrs. the formation flow decreased from 60 gpm to 25 gpm negating the use of the conventional analysis which requires constant flow. The variable rate determination for permeability - thickness is 2280 md. ft. Based on a 100 ft. thick reservoir the permeability would equal 22.80 md. As previously stated the prime Leadville reservoir is 286 feet thick (14,066-14,504 ft.). The permeability would then be 7.97 md. Collins does not consider his skin factor of +13.5 relavent to injectivity performance because injection will be at fracture propagation pressure.

The 164 feet of 3 percent or greater intercrystalline and vugular porosity in the BOR Injection Test Well No. 1 is scattered through 18 different zones in the 416 feet of Leadville carbonate. Without the natural fracturing that allows communication between the zones of matrix porosity the Leadville would have a minimal effective volumetric capacity and very low permeability for storage and transmission of injected brine. Combining the extensive fracture system indicated by both mechanical logs and cores with the injection of salt brine at fracture propagation pressure should produce an excellent positive reservoir response.

Core data indicates, strongly, that the fault block which contains the BOR Injection Test No. 1 was both structurally and topographically high during the Pennsylvanian Morrow and Atokan time of erosion and weathering. "Karsting" is evident through 315 feet of the Leadville and probably extends an additional 160 feet into the top of the relatively shaly Devonian Elbert. The effect of the "karsting" and partial infill did substantially reduce the chance for development of effective dolomite and vugular porosity. However, by movement of the brine fluid through the existing fracture system there is the probability of intersecting areas of extensive solution cavities and caverns, void of Molas infill, that would serve as prime brine reservoir.

Supporting evidence of the probability of existing solution caverns in the Leadville was encountered in the CNG 16,053 ft. Devonian McCracken well drilled in Sec. 35, T. 48 N., R. 20 W. Confirmed reports say that while drilling the Mississippian Leadville carbonate the bit and drill pipe had a 6 foot free drop, a typical reaction to a 6 foot solution cavern.

The CNG test is located 10 miles northwest from the BOR injection well. Due to the deep "karsting" of the Leadville in the general area of the Paradox Valley Unit there is the strong probability that additional cavernous porosity is present and would significantly improve the storage capacity of the Leadville reservoir.

Considering all known factors, the core data, the log data and the DST analysis, I feel the Leadville carbonate is a viable reservoir for the injection of salt brine. At fracture propagation pressure the formation should accept the programmed 650 gal. per minute rate. The validity of the data used and the longevity of the Paradox Valley injection project will be more accurately determined during the two year injectivity test.

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July 14, 1989