NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR N0. 221

Summary of the Magnolia Petroleum Company - North Dakota State "A" #1
Kidder County, North Dakota
Well No. 24 Stratigraphic Test

by Dan E. Hansen
November, 1959

The Magnolia Petroleum Company - North Dakota State "A" No. 1 is located in the SE of the NE of Sec. 36, T. 141N., R. 73W., Kidder County. The elevation 1968 feet D.F.

The Magnolia Petroleum Company - North Dakota State "A" No. 1 was spudded October 21, 1950; drilled to a total depth of 5609 1/2 feet, ending in granite; found dry and plugged December 24, 1950. 13 3/8" casing was cemented at 74 feet with 60 sacks cement and 9 5/8" casing cemented at 1329 feet with 250 sacks.

Logs: Electrical.

Cores:

1	35- 45	10	2456-2461
2	60- 65	11	2461-2465
3	100- 105	12	2886-2891
4	150- 155	13	2891-2894
5	200- 205	14	3375-3396
6	270- 275	15	3924-3949
7	330- 335	16	3967-3994
3	692- 693½	17	4003-4015
9	1360-1364	18	4738-4746

Tests:

DST 1, 3357'-3396'; tool open 45 minutes. Recovered 350 feet thin salty mud. BHFP 0#; BHSIP 1050#; mud weight 1900#.

Plugging Record: Cement plugs were set at the following depths:

5268-5300	12 sacks cement
4518-4550	12 sacks cement
3938-3970	12 sacks cement
3298-3330	12 sacks cement
2600-2650	20 sacks cement
1330-1362	12 sacks in bottom of 9 5/8" casing.

Cellar filled with 20 sacks cement. 9 5/8" casing sealed with welded steel cap and 2" pipe above it set in cement projects 8' above cap.

Formation tops were picked from samples and electric logs; corrected to electric logs. Not all formation tops are called in the following list. Colors are from the rock color chart distributed by the Geological Society of America.

FORMATION TOPS

Cretaceous System	
Fox Hills formation	
Pierre formation	427 (?)
Niobrara formation	1456
Greenhorn formation	1924
Mowry shale	2272
Fall River sandstone	2502
Jurassic System	
Piper lime	2934
Mississippian System	
Madison undifferentiated	3070
Bakken formation	3933
Devonian System	
Devonian undifferentiated	3998
Silurian System	
Interlake formation (?)	4337
Ordovician System	
Stony Mountain	
Gunton formation	4410
Stoughton formation	4488
Red River formation	4532
Winnipeg formation	
upper siltstone	5173
middle shale	5233
lower sandstone	5362
Cambrian-Ordovician Systems	
Deadwood formation	5420
Precambrian	5600

0-30 Shale, very light olive gray to yellowish gray, silty and very fine-grained, calcareous sandstone. Samples also contain traces of medium-grained, quartzose, glauconitic (?) sandstone.

30-35 Shale, medium gray, massive, silty, and silty sandstone, very fine-grained, glauconitic (?).

Core Chip Description

Core #1 (recovered 10 feet)

35-45 Shale, medium light gray, massive, slightly silty, brown iron stained.

Description of Samples

45-50 Shale, medium gray, massive, silty. Traces of coarse-grained clear and white, subrounded loose quartz grains.

50-60 Shale, medium gray, as pebbles. Granules of igneous rock fragments - for the most part feldspar and quartz - with loose grains of rounded, fine to coarse grained quartz, and traces of granules of pale brown dolomite.

Core Chip Description

Core #2 (recovered 1 foot)

60-65 Sandstone and siltstone, yellowish gray, argillaceous, iron staining.

Description of Samples
65-80 Samples, as above, with much brownish and yellowish gray clay and silt.
80-100 Shale, light gray, massive, silty, with some brown iron staining.

Core Chip Description
Core #3 (recovered 5 feet)
100-105 Siltstone, light gray, argillaceous.
Description of Samples
105-140 Shale, medium gray, massive, silty, and medium gray, soft, silty, fine-grained sandstone.
140-150 Shale, medium light gray, massive, very silty.

Core Chip Description
Core #4 (recovered 5 feet)
150-155 Shale, medium light gray, massive, slightly silty.
Description of Samples
155-200 Shale, as above.

Core Chip Description
Core #5 (recovered 5 feet)
200-205 Siltstone, medium light gray, very argillaceous.
Description of Samples
205-260 Shale, medium gray, massive, soft, silty and medium gray sandstone, fine grained, silty, glauconitic. Small amounts of brownish gray shale and one fossil, pelecypod.
260-270 Shale, medium light gray, soft, silty.

Core Chip Description
Core #6 (recovered h foot)
270-275 Shale, medium light gray, massive, silty.
Description of Samples
275-300 Shale, medium gray, soft, massive. Much loose, very fine grained quartz grains.
300-320 Shale, medium light gray, silty, soft, massive.
320-330 Shale, medium gray, silty, soft, massive. Small amounts of loose, quartz, very fine grained sand.

Core Chip Description
Core #7 (recovered 5 feet)
330-335 Shale, medium gray, silty, soft. Small amounts of soft, silty sand.
Description of Samples
335-440 Shale, medium gray, soft, silty, massive and very small amounts of loose, very fine grained quartz grains, traces of glauconite.
440-600 Shale, medium gray, massive, slightly silty.
600-692 Shale, medium gray to medium dark gray. Traces of light gray bentonite from 600-660.

Core Chip Description
Core #8 (recovery 1 1/2 feet)
692-693½ Shale, medium gray, massive.
Description of Samples
693½-700 Shale, as above.

700-740 Shale, medium gray, massive, traces of rounded, medium grained, quartz grains.
740-1000 Shale, medium gray, massive.
1000-1050 Shale, as above. With very small amounts of rounded, frosted, fine to coarse grained quartz grains and calcite prisms. Inclusions of irregular light brownish gray carbonate, at times in a spherical form.
1050-1080 Shale, medium gray, massive.
1080-1090 Shale, as above. Small amounts of very light brownish gray fullers earth and brownish gray shale.
1090-1100 Shale, medium gray, massive.
1100-1120 Shale, medium gray, massive. With small amounts of light gray bentonite.
1120-1170 Shale, medium gray, massive.
1170-1190 Shale, as above. With small amounts of light gray bentonite. Traces of brown calcite prisms.
1190-1200 Shale, medium gray, massive.
1200-1220 Shale, as above. With light gray bentonite in small amounts.
1220-1240 Shale, medium gray, lumpy. Many Foraminifera at 1220-1230.
1240-1250 Shale, as above. With small amounts of brownish gray shale.
1250-1270 Shale, medium gray, lumpy and flaky.
1270-1280 Samples missing.
1280-1300 Shale, as above.
1300-1340 Shale, medium dark gray, lumpy.
1340-1347 Shale, medium dark gray, lumpy. With very light bluish gray bentonite.
1347-1360 Shale, medium dark gray, massive. Much casing cement.

Core Chip Description
Core #9 (recovered 4 feet)
1360-1364 Shale, medium dark gray, massive.
Description of Samples
1360-1440 Shale, medium dark gray, lumpy. Small amounts of light bluish gray bentonite.
1440-1450 Shale, as above. With calcareous, medium gray shale, “white specks”.
1450-1500 Shale, medium gray, very calcareous, “white specks”.
1500-1590 Shale, medium gray to medium dark gray, calcareous, lumpy. With traces of light bluish gray bentonite. Traces of pyrite.
1590-1600 No sample.
1600-1650 Shale, medium dark gray, lumpy, very slightly calcareous.
1650-1700 Shale, medium dark gray, lumpy.
1700-1720 Shale, medium dark gray, lumpy. With traces of pyrite and light bluish gray bentonite.
1720-1730 Shale, as above. With many fragments of light brownish gray, dense, very fine grained, crystalline limestone.
1730-1750 Shale, as above. With traces of pyrite and light bluish gray bentonite.
1750-1930 Shale, as above. With traces of very light gray bentonite.
1930-1950 Shale, medium dark gray, calcareous, massive. Very small amounts of calcite prisms.
1950-1990 Shale, medium dark gray, very calcareous, massive, “white specks”. With many fragments of calcite prisms.
1990-2000 Samples missing.

2000-2030 Shale, as above. Calcite prisms, as above. Traces of light gray bentonite.
2030-2050 Shale, medium dark gray, calcareous. Traces of Globigerina. Small amounts of light gray bentonite. Moderate amounts of calcite prisms.
2050-2090 Shale, medium dark gray, lumpy, slightly calcareous.
2090-2200 Shale, medium dark gray, lumpy. Traces of light bluish gray, bentonite.
2200-2210 Samples missing.
2208 Circulation, 45 minutes. Shale, as above.
2211 Circulation, 60 minutes. Shale, as above.
2211-2280 Shale, as above. Traces of light gray bentonite and bentonitic silt.
2280-2284 Samples missing.
2284 Circulation, 30 minutes. Shale, as above.
2284-2350 Shale, medium dark gray, lumpy, traces of light bluish gray bentonite. Traces of calcite prisms and calcareous shale from above.
2350-2380 Shale, as above. With admixture of medium gray shale (Pierre).
2380 Circulation, 30 minutes. Shale, as above.
2380-2390 Shale, as above.
2390-2450 Shale, medium dark gray, lumpy.
2456 Circulation, 45 minutes. Shale, as above.

Description of Core Chips
Core #10 (recovered 2 1/2 feet)
2456-2461 Siltstone, light olive gray. With a small amount of medium gray shale.

Core #11 (recovered 3 feet)
2461-2465 Shale, medium dark gray, massive.
Description of Samples
2465-2470 Shale, medium dark gray, massive. Much cave of calcite prisms and pyrite.
2470-2500 Shale, medium dark gray, massive.
2500-2510 Shale, medium dark gray, lumpy.
2505 Circulation, 30 minutes. Shale, as above, with many fragments of pyrite.
2510-2520 Shale, medium dark gray, lumpy.
2515 Circulation, 45 minutes. Shale, as above, with pyrite and calcite prisms.
2520-2530 Shale, as above.
2530-2534 No samples.
2534 Circulation, 30 minutes. Shale, as above, with many iron carbonate “pellets”, brownish gray.
2534-2540 Shale and “pellets” as above.
2540-2550 Shale and “pellets”, as above. With many fragments of white to very light gray, very fine grained, calcareous sandstone.
2550-2554 Samples missing.
2554 Circulation, 40 minutes. Samples as above.
2554-2570 Sandstone, fine to very coarse grained, angular to rounded, clear to frosted loose quartz grains. With dense, very fine grained, calcareous sandstone and brownish gray iron carbonate “pellets”. Small amount of pyrite.

2570-2600 Shale, medium dark gray and “pellets” as above.
2600-2630 Sandstone, quartzose, fine to very coarse grained, angular to rounded, frosted, clear and pink, loose quartz grains and fragments of limonite and iron carbonate cemented fine grained quartzose sandstone. Small amounts of “pellets” as above.
2630-2660 Sandstone, quartzose, fine to very coarse grained, angular to rounded, frosted, clear and pink, loose quartz grains. Small amount of gray shale and some of the quartz grains are cemented by white clay.
2660-2680 Shale, medium gray, lumpy and very light gray clay. Many loose, coarse, rounded and frosted or clear quartz grains. Small amounts of fragments consisting of microscopic crystals of pyrite. Cementing very fine grained quartz grains.
2680-2710 Siltstone and sandstone, very fine grained, white, calcareous with inclusions of coarse grained quartz grains. Many loose grains of fine to very coarse grained, angular to rounded, clear or frosted quartz grains.
2710-2730 Siltstone, pale red and sandstone, very fine grained to coarse, generally loose grains of quartz, angular to rounded, clear to frosted. Traces of pyrite and white siltstone.
2730-2760 Clay, silty, pale red, slightly calcareous. Loose grains of fine to coarse grained, angular to rounded quartz.
2760-2770 Clay, yellowish brown gray, silty. Clay, as above and loose quartz grains.
2770-2800 Shale and siltstone light gray to light greenish gray, slightly calcareous. Traces of white to light gray, dense, fragmental, fossiliferous limestone. Traces of pyrite.
2800-2850 Shale, medium light gray to light greenish gray, massive to splintery, slightly calcareous.
2850-2886 Shale, as above, with many fragments of limestone, dense, sub-lithographic to very fine grained crystalline and fragmental, fossiliferous, many shell fragments.

Core Chip Description

Core #12 (recovered 1 foot)
2886-2891 Shale, medium dark gray, massive, calcareous with streaks of fossiliferous shale.

Core #13 (recovered 3 feet)
2891-2894 Shale, very light pale reddish brown and pale red, very calcareous, massive and compact.

Description of Samples
2894-2930 Shale, pale red to pale reddish brown, calcareous, massive. Much gray shale and other cave from above.
2930-2940 Limestone, very light gray to white, chalky, dense. With a few pale red limestone fragments.
2940-2960 Limestone, pinkish gray to very light yellowish gray, dense, very fine grained crystalline to sublithographic. A few inclusions of fossil fragments.
2960-2970 Shale, very pale red, very calcareous.
2970-2980 Shale, pinkish gray and very light greenish gray, very calcareous, massive.
2980-2998 Samples missing.
2981 Circulation, 30 minutes. Limestone, pinkish gray to white, dense, sublithographic.

2991	Circulation, 45 minutes. Limestone, as above with some fragmental limestone. Small amounts of very light brownish gray and greenish gray, calcareous shale.
2998-3020	Shale, pale red, calcareous, massive.
3020-3040	Anhydrite, white, dense. Small amount of shale, as above.
3040-3070	Shale, pale reddish brown, calcareous, contains small amount of white anhydrite.
3070-3110	Dolomite, grayish pink, dense, very fine grained to fine grained, anhydritic. Traces of white anhydrite. Small amounts of pale red shale.
3110-3120	Limestone, very light gray, dense, fine grained, grainy to sub-lithographic.
3120-3170	Dolomite, grayish pink, dense, very fine grained with pale red and pale red brown shale. Much pale red brown shale from 3150-3170. Poor samples.
3170-3180	Limestone, very light gray to white, dense, very fine grained grainy to sublithographic and medium grained, fragmental, anhydritic (?). Small amounts of pale red, medium gray shales, white anhydrite and grayish pink dolomite.
3181	Circulation, 45 minutes. Limestone, as above. Dolomite and shale, as above.
3181-3190	Dolomite, grayish pink to very pale red, dense, very fine grained, grainy to sublithographic. With pale red dolomitic shale and very small amounts of white anhydrite.
3193	Circulation, 40 minutes. Samples, as above.
3193-3205	No samples.
3205	Circulation, 60 minutes. Dolomite, pale red with a few fragments grayish pink, fine grained, microsucrosic. With pale red and pale red-brown calcareous shale.
3205-3210	Dolomite, as above.
3210-3220	Limestone, grayish orange pink, dense, very fine grained, grainy with some pinpoint porosity and fragmental fine to medium grained.
3220-3220	Limestone, grayish pink, dolomitic, dense, very fine grained with some very pale red fragments. Small amounts of pale red calcareous shale.
3230-3240	Limestone, dolomitic, very pale purple, fragmental, medium grained to very fine grained, dense.
3240-3250	Limestone, grayish pink and very pale purple, dolomitic, medium grained, sucrosic and very fine grained, dense. Small amounts of pale red brown shale, calcareous.
3250-3260	Limestone, grayish pink and very pale purple, dolomitic, medium to coarse grained fragmental with dense, very fine grained crystalline matrix. Pale red brown calcareous shale. Small amounts of anhydrite, pink and white, dense.
3260-3270	Shale, pale red brown, calcareous, massive.
3270-3290	Shale, as above. With limestone, as above, and white, dense, anhydrite. Much gray shale.
3290-3300	Anhydrite, white, dense, trace of medium gray shale.
3300-3305	Samples missing.
3305	Circulation, 60 minutes. Anhydrite and gray shale as above.
3305-3310	Dolomite, very pale red to reddish purple gray, very fine grained, grainy, argillaceous and dolomitic, pale red shale. Anhydrite, white to pink.
3310-3314	Samples missing.

3314 Circulation, 60 minutes. Dolomite, shale, and anhydrite as above.

3314-3320 Anhydrite, white to pink, dense, and dolomite, pinkish gray, very argillaceous and dolomite, as above. Also pale red brown and medium gray shale.

3320-3330 Limestone, yellowish gray, very fine grained, grainy to medium grained fragmental with inclusions of small brown anhydrite crystals.

3330-3333 Samples missing.

3333 Circulation, 60 minutes. Dolomite, limey and very argillaceous, pale red and limestone, dolomitic, fine grained, grainy, dense, grayish pink to grayish orange pink.

3333-3340 Anhydrite, white, dense, limestone and argillaceous dolomite, as above.

3340-3350 Limestone, grayish orange pink and very pale red, dense, very fine grained, chalky or grainy.

3350-3360 Limestone, very light brownish gray to yellowish gray, dense, very fine grained, chalky.

3360-3374½ Anhydrite, white, dense with limestone as above. From 3370-3374 the samples also contain gray shale.

3375 Circulation, 60 minutes. Anhydrite and limestone, as above.

Core Chip Description

Core #14 (recovered 21 feet)

3375-3383 Anhydrite, white to pink, dense.

3383-3392 Limestone, dolomitic and argillaceous, grayish pink, dense, sub-lithographic and interbedded with pink and white anhydrite.

3392-3396 Dolomite, very calcareous, fine grained, granular with much pinpoint porosity, grayish orange pink in color, very porous.

Description of Samples

3396-3400 Dolomite, as above.

3400-3480 Limestone, very light brownish gray, pelletoid, medium grained, with oolites and some angular fragments. Some vuggy porosity, but the porosity is generally filled with very fine grained limestone or anhydrite in a few instances. Small amounts of medium gray, calcareous shale.

3480-3490 Limestone, as above, with rock chips of fragmental, fine to medium grained, rounded limestone with a very fine grained matrix.

3490-3510 Limestone, pale pink to very pale red purple, fragmental, fine-coarse grained, much recrystallization.

3510-3530 Dolomite, calcareous, argillaceous, pale red purple, micro-granular.

3530-3540 Limestone, pale pink to very pale red purple, fragmental, fine-medium grained. Small amounts of pelletoid limestone.

3540-3555 Limestone, grayish pink, fragmental, pelletoid, fine-coarse grained, dense, much recrystallization.

3555-3570 Limestone, pinkish gray, fragmental, fine-coarse grained, re-crystallized, fossiliferous.

3570-3590 Limestone, pale red purple, fragmental, fine-medium grained, recrystallized. Fragments are generally of a rounded nature.

3590-3750 Limestone, medium gray to light gray, fragmental, fine-coarse grained, fossiliferous, argillaceous grading into and interbedded with medium gray shale.

3750-3760 Limestone, as above, with microgranular, brownish gray limestone. Trace of oolites.

3760-3790 Limestone, light gray to medium light gray, fragmental, fine-coarse grained, very fine-grained, dense and chalky, and pelletoidal in part.
3790-3800 Limestone, very light brownish gray, medium grained, pelletoidal, irregular shapes.
3800-3820 Limestone, very light brownish gray to very light gray, micro-granular, poor porosity, small amount of fragmental limestone.
3820-3830 Limestone, very light gray to yellowish gray, fragmental, fine to coarse grained, to very fine grained, chalky. With a small amount of pelletoidal (irregular shapes) limestone.
3830-3840 Limestone, very light gray to yellowish gray, fine grained, pelletoidal.
3840-3880 Limestone, very light brownish gray, pelletoidal, medium to coarse grained with lesser amounts of fragmental fine to coarse grained limestone. Traces of crinoid stem fragments. Limestones recrystallized.
3880-3890 Limestone, very light brownish gray, pelletoidal, irregular shapes, mostly recrystallized.
3891 Circulation, 60 minutes. Limestone, as above.
3891-3910 Limestone, as above.
3910-3920 Limestone, light brownish gray, fragmental and pelletoidal, fine-medium grained, recrystallized to sucrosic limestone in part.
3920-3924 Samples missing.
3924 Circulation, 60 minutes. Limestone, as above.

Core Chip Description
Core #15 (recovered 25 feet)
3924-3936 Limestone, very light brownish-yellow gray, fragmental, fine grained, granular and pelletoidal, coarse grained.
3936-3949 Shale, medium dark gray, massive, traces of pyritized fossil fragments, pyrite, and very slightly calcareous.
Description of Samples
3949-3960 Shale, as above, with medium gray, fragmental, fine-coarse grained limestone.
3960-3967 Limestone, medium gray, fragmental, fine to coarse grained, fossiliferous.

Core Chip Description
Core #16 (recovered 27 feet)
3967-3994 Shale, medium gray to dark gray, laminated, brittle to flaky. A few interlaminations of dark greenish gray shale from 3967-3985.
Description of Samples
3994-4000 Shale, as above.
4003 Circulation, 70 minutes. Dolomite, pale red, fine grained sucrosic and grayish red, very fine grained, subcrystalline.

4003-4015 Core #17 (recovered 12 feet). Core and chips missing. From the files and from the P.I. card the interval is described as a very porous dolomite with the top four feet iron-stained.
4015-4040 Dolomite, very pale orange to very pale yellowish brown, sucrosic and microsucrosic, vugular to dense, very fine grained, crystalline.
4040-4070 Dolomite, as above with a small amount of pale red sucrosic dolomite and pale red dolomitic shale.

4070-4100 Dolomite, light brownish gray, sucrosic, medium grained, and microsucrosic, both vugular and dense, very fine grained, sub-crystalline.

4100-4110 Shale, medium dark gray, massive, and brownish gray, argillaceous dolomite, very fine grained.

4103 Circulation, 60 minutes. Small amount of shale, as above with a medium light gray, dolomitic, argillaceous grainy limestone.

4110-4130 Dolomite, light brownish gray, microsucrosic, with some sucrosic chips, and very fine grained, dense, subcrystalline. Vugular porosity.

4130 Circulation, 45 minutes. Dolomite, as above.

4130-4150 Dolomite, as above.

4150-4170 Limestone, and shale, medium gray, fossiliferous, fragmental with many of the ostracodes in a light brownish gray limestone matrix.

4170-4190 Dolomite, light brownish gray, sucrosic. With small amounts of limestone, as above.

4190-4200 Dolomite, as above and dolomite, medium light gray, granular, limey and argillaceous, fine grained.

4200-4220 Dolomite, light gray to very light brownish gray, granular, very fine grained, argillaceous.

4220-4240 Dolomite, light brownish gray to medium gray, sucrosic, fine-medium grained.

4240-4250 Dolomite, as above, with medium dark gray, slightly calcareous shale and very small amount of fragmental limestone. Traces of well rounded, frosted, medium quartz grains.

4250 Circulation, 80 minutes. Dolomite, yellowish gray to very light brownish gray, microsucrosic.

4250-4267 Dolomite, light gray to yellowish gray, fine grained, sucrosic and dolomite, as above. Many loose, frosted medium quartz grains.

4267-4280 Dolomite, very light gray, very limey, dense, very fine grained to sublithographic. Traces of quartz grains.

4280-4290 Dolomite, very light brownish gray, very limey, dense, very fine grained, grainy to sublithographic.

4290-4299 Shale, medium gray, massive and limestone, medium light gray, argillaceous, grainy, very fine grained. Traces of pyrite.

4299 Circulation, 60 minutes. Shale, very light gray, very calcareous, serving as a binder for quartz grains fine-medium, rounded and frosted. Small amounts of pale red, dolomitic shale.

4299-4330 Shale or clay, as above. With a small amount of very pale red, arenaceous dolomite. Poor samples from 4310-4330 where there are large amounts of cavings in the sample.

4330-4340 Dolomite, limey, pale red, sucrosic to fine grained granular, arenaceous, with many rounded, frosted quartz grains.

4340-4350 Dolomite, moderate orange pink, very fine grained, subcrystalline to sublithographic.

4350-4360 Dolomite, grayish orange pink, dense, very fine grained, sub-crystalline to sublithographic. Dolomite, as above.

4360-4380 Dolomite, as above, with a very light gray and pinkish gray very argillaceous dolomite.

4380-4385 Samples missing.

4385 Circulation, 75 minutes. Dolomite, grayish pink, very fine grained to sublithographic with traces of medium grained, fragmental dolomite.

4385-4390 Dolomite, as above

4390-4400 Dolomite, pale red, very fine grained to sublithographic, with a few chips showing an original fragmental nature.
4400-4410 Dolomite, pale red, very fine grained, subcrystalline to micro-sucrosic, scattered vugular porosity.
4410-4420 Dolomite, pale red, very fine grained to sublithographic.
4420-4430 Dolomite, pale red, argillaceous, grainy and dolomite, very light gray, to white, argillaceous. Small amounts of white and pink clay.
4430-4440 Dolomite, as above and dolomite very light gray, contains inclusions of quartz grains, sucrosic. Few chips of white and pink clay containing quartz grains. A few loose, medium grained, well rounded, frosted quartz grains.
4440-4450 Dolomite, very pale red and very light gray, argillaceous and very arenaceous with fine to medium grained, frosted, rounded quartz grains. Small amounts of dolomite as above.
4450-4480 Dolomite, pinkish gray, to very pale red, microsucrosic.
4480-4484 Samples missing.
4484 Circulation, 80 minutes. Dolomite, limey, medium gray to light brownish gray, sucrosic, dead oil.
4484-4490 Dolomite, as above.
4490-4500 Dolomite, as above, with fragmental, argillaceous dolomite.
4500-4590 Limestone, medium light gray, argillaceous, very fossiliferous, fragmental fine to very coarse grained. Many bryozoan fragments. Pyrite and loose quartz grains at 4580-4590.
4590-4620 Limestone, dolomitic, very light brownish gray, very fine grained to fine grained, grainy and granular.
4620-4640 Limestone, dolomitic, very light brownish gray, very fine to medium grained, fragmental to sublithographic, dense.
4640-4647 Samples missing.
4647 Circulation, 85 minutes. Shale, light gray, dolomitic, dense.
4647-4660 Shale, as above. With limestone, dolomitic, light brownish gray, fine grained, grainy to very fine grained and sublithographic. Small amounts of medium to coarse grained fragmental limestone.
4660-4670 Limestone, dolomitic, as above.
4670-4680 Limestone, dolomitic, very light brownish gray, dense, grainy, very fine grained to sublithographic. Traces of vugular porosity.
4680-4690 Dolomite, limey, light brownish gray, microsucrosic to sucrosic.
4690-4710 Limestone, dolomitic, very light brownish gray, dense, grainy, very fine grained to sublithographic.
4710-4720 Dolomite, limey, light brownish gray, microsucrosic with traces of vugular porosity. Limestone, as above.
4720-4727 Samples missing.
4727 Circulation, 90 minutes. Dolomite and limestone, as above.
4727-4735 Dolomite, light brownish gray, limey, microsucrosic to sucrosic, with some fragments, medium grained, rhombic.
4735-4738 Samples missing.
4738 Circulation, 90 minutes. Dolomite, as above.

Core Chip Description

Core #18 (recovered 8 feet)

4738-4746 Dolomite, light brownish gray, microsucrosic to sucrosic and very light brownish gray, granular, fine grained to sucrosic.

Description of Samples

4746-4770 Dolomite, as above.

4770-4810	Dolomite, light to very light brownish gray, microsucrosic to sucrosic with a dense, fine grained, some fossil fragment inclusions, grainy limestone.
4810-4840	Dolomite, light brownish gray to brownish gray, microsucrosic to sucrosic.
4840-4880	Dolomite, brownish gray, microsucrosic and very fine grained, grainy, limey, and dolomitic limestone, dense, sublithographic.
4880-4910	Dolomite, limey, brownish gray, microsucrosic.
4910-4930	Dolomite, very limey, brownish gray, very fine grained grainy and microsucrosic to sublithographic.
4930-4960	Limestone, dolomitic, medium light gray to very light gray, very fine grained, grainy to sublithographic. Traces of medium gray shale. Traces of very light gray chert.
4960-5000	Limestone, light gray, dolomitic, very fine to fine grained, granular to dense, sublithographic. Traces of very light gray chert.
5000-5060	Limestone, light gray, dolomitic, very fine to fine grained, granular and grainy. Traces of very light gray chert.
5060-5110	Limestone, very light brownish gray, dense, fine grained, grainy to medium grained fragmental to sublithographic. Traces of fossil fragments.
5110-5150	Limestone, light gray to very light brownish gray, dense, very fine grained, grainy to sublithographic. Traces of fossil fragments.
5150-5200	Limestone, light gray, fragmental, fine to medium grained to sublithographic and very fine grained, grainy. Circulation lost at 5164, ditch samples to 5230.
5200-5230	Limestone, as above, and greenish gray, thinly laminated shale. Ditch samples. Traces of fossil fragments.
5230-5260	Samples missing.
5260-5370	Shale, greenish gray, massive to splintery, small amounts of pyrite.
5371	Circulation, 90 minutes. Sandstone, fine to very coarse grained, angular to well rounded, frosted and clear loose quartz grains and calcite cemented fine-medium grained quartzose sandstone. Many fragments of pyrite.
5370-5380	Sandstone, as above.
5330-5400	Sandstone, light gray to light brownish gray, fine grained, quartzose, with many loose, medium to coarse grained, rounded, clear and frosted quartz grains.
5400-5430	Sandstone, light gray, quartzose, medium to coarse grained, angular to rounded, clear and frosted quartz with many fine grained loose quartz grains.
5430-5450	Sandstone, as above, except for much less of the fine grained quartz.
5450-5460	Sandstone, fine grained, yellowish gray, dolomitic and glauconitic. Sandstone as above. Greenish gray shale.
5460-5480	Sandstone, quartzose, medium to coarse grained, rounded and frosted with yellowish gray to very light brownish gray, sucrosic arenaceous dolomite grading into a very fine to fine grained sandstone and greenish gray shale.
5480-5490	Shale, greenish gray, massive to splintery with sandstone and dolomite as above.

5490-5500	Shale, as above. With grayish red purple to pale red, sucrosic, very arenaceous, very glauconitic dolomite and small amounts of dolomitic fine grained, glauconitic sandstone, yellowish gray. Small amounts of pale red and red orange clay.
5500-5550	Dolomite, as above, abundant glauconite and small amounts of fine grained sandstone, as above. Shale, as above.
5550-5609	Dolomite, sandstone, and shale, as above with some white, sucrosic, arenaceous dolomite.
5609	Circulation. 120 minutes. Sandstone, quartzose, loose, coarse grained, angular to well rounded, clear and frosted grains. With fragments of moderate orange feldspar and lesser amounts of biotite and quartz (granite).
5609	Circulation, 90 minutes. Granite, as above, with sandstone as above.
5609½	Total depth.