

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 101

Summary of the Blackwood & Nichols Company - M. E. Gilman #1
Golden Valley County, North Dakota
Well #470 - Permit #486

By Clarence G. Carlson
January 1955

Blackwood & Nichols Company - Gilman and Lang #1, Golden Valley County, North Dakota C NE 1/4 SE 1/4 Section 15, T. 140N., R. 105W. (2030 feet from South line and 660 feet from East line. Elevation K.B. 2867.

The Blackwood and Nichols - Gilman #1 was spudded November 10, 1953, and 13 3/8 inch casing was set at 624 feet and cemented with 525 sacks of cement. 7 5/8 inch casing set at 8564 with 300 sacks of cement. The well was completed as a dry hole March 21, 1954. Total depth 12,692 feet.

TESTS

- DST #1 9058-9135 Tool open 78 minutes, weak blow 60 minutes and died. Recovered 2160 feet of fluid, of which 180 feet was salt water and gas cut mud and 1980 feet of drilling mud. F.B.H.P. 295-400#
- DST #2 9260-9290 Tool open 75 minutes, no blow. Recovered 225 feet of oil, gas, and water cut mud.
- DST #3 9287-9319 Tool open 4 hours, weak blow of air which increased slightly after 50 minutes with intermittent blow to the end of the test. Recovered 1620 feet of fluid, 180 feet was gas and salt water cut mud, 900 feet of muddy sulfur water and 540 feet of heavily water and gas cut drilling mud. Flowing pressure 110-835#, S.I.P. 3475#.
- DST #4 9245-9287 Tool open 4 hours, shut in 45 minutes. Weak blow for 1 hour and 39 minutes and died. Recovered 120 feet gas and sulphur water cut mud. 720 feet gas cut, muddy sulphur water. F.P. 0-445#, 45 minutes S.I.P. 3755#, H.P. 4980#.
- DST #5 10,423-10,467 Tool open 2 1/4 hours, shut in 3 hours, and 45 minutes. Recovered 9380 feet of salt water, top 60 feet muddy and gas cut. F.P. 225-4450#, 30 minutes S.I.P. 4760#, H.P. 5475#.
- DST #6 11,013-11,063 Tool open 4 hours, shut in 30 minutes. Slight blow increasing to fair blow. Recovered 2340 feet of fluid, 390 feet was muddy, slightly gas cut salt water. 1860 feet gas cut salt water, 90 feet muddy salt water with few flecks green oil. F.P. 110-1130#, 30 minutes S.I.P. 4970#, H.P. 5890#.
- DST #7 11,525-11,570 Tool open 3 hours, slight blow. Recovered 690 feet total fluid. 195 feet was slightly gas cut, muddy salt water and 495 feet was slightly oil cut salt water. F.P. 125-295#. Tool did not close for S.I.P.

DST #8 11,728-11,778 Tool open 3 hours, weak blow throughout. Recovered 2740 feet of slightly gas cut salty sulphur water. F.P. 0-1375#, 30 minutes S.I.P. 4475#, H.P. 6100#.

DST #9 11,830-11,860 Tool open 2 hours, weak blow throughout. Recovered 660 feet of water blanket, 690 feet mud, 15 feet of salt water, F.P. 720-810#, 30 minutes S.I.P. 3900 H.P. 6150#.

DST #10 11,826-11,860 Tool open 3 hours, very weak blow throughout. Recovered 1000 feet of water blanket. 123 of slightly gas cut, salt water cut mud. Testing 132,000 PPM Chloride F.P. 435-505#, H.P. 6150#.

DST #11 11,919-11,974 Tool open 1 hour and 10 minutes, no blow. Recovered 1000 feet of water blanket. 550 feet of muddy salt water testing 266,000 PPM Chloride F.P. 660-685#, H.P. 6125#.

DST #12 11,917-11,974 Tool open 2 1/2 hours, weak blow 10 minutes and died. Recovered 1000 feet water blanket. 240 feet slightly oil and gas cut drilling mud, 270 feet slightly gas cut muddy salt water with rainbow of oil. F.P. 550-885#, 30 minutes S.I.P. 4780, H.P. 6075#.

CORES

8560'-8565'	9290'-9305'
8854'-8860'	9305'-9319'
9074'-9084'	9332'-9362'
9084'-9099'	11,007'-11,037'
9260'-9275'	11,037'-11,063'
9275'-9290'	12,405'-12,425'

Cement plugs were set at the following depths:

11,555-11,730	- 35 sacks
11,050-10,835	- 35 sacks
10,380-10,205	- 35 sacks
8,670- 8,470	- 45 sacks
630- 625	- 5 sacks
0- 20	- 5 sacks

Left 7,890 feet of 7 5/8 inch casing and 624 feet of 13 3/8 inch casing in hole.

Formation tops determined by sample, electric and gamma ray neutron logs, not all lithologic tops called in following list.

TOPS

Cretaceous System	
Pierre Formation	1610
Niobrara Formation	3960
Greenhorn Formation	4532
Muddy Sand	5210
Dakota	5495
Jurassic System	

	Morrison Formation	5785
	Sundance Formation	5930
	Piper Lime	6685
Triassic System		
	Spearfish Formation	6820
Permian System		
	Minnekahta Formation	7345
	Opeche Formation	7385
Pennsylvanian System		
	Minnelusa Formation	7685
Mississippian System		
	Amsden Formation	7800
	Big Snowy Group	8095
	Kibbey Sand	8420 samples
	Kibbey Limestone	8520
	Charles Formation	8660
	Mission Canyon Formation	9200
	Lodgepole Formation	9650
	Englewood Formation	10,255
Devonian System		
	Lyleton	10,340
	Nisku	10,410
	Duperow	10,458
	Souris River	10,745
	Dawson Bay	10,828
	Ashern	10,992
Silurian System		
	Interlake Group	11,018
Ordovician System		
	Upper Stony Mountain	11,525
	Lower Stony Mountain	11,638
	Red River Formation	11,705
	Winnipeg Formation	12,265
	Winnipeg Sand	12,380
Cambrian System		
	Deadwood Formation	12,545
0-50	Sandstone, light gray, fine to medium grained, lignite, pyrite; shale, dark gray to black.	
50-80	Sandstone, light gray, fine grained, much lignite, shell fragments, little shale, greenish gray, limestone, light gray, dense, pyrite.	
80-120	Sandstone as above, much lignite, pyrite, little shale, greenish gray and dark gray, shell fragments.	
120-140	Lignite, pyrite, little sandstone as above.	
140-190	Sandstone, fine to medium grained, light gray, much lignite, some shale, greenish gray, reddish brown, dark gray, pyrite.	
190-210	Lignite, some sandstone as above, pyrite, shell fragments.	
210-220	Lignite.	
220-280	Lignite, sandstone, light gray, fine to medium gray, slightly calcareous.	
280-310	Sandstone as above, much lignite, pyrite, shell fragments.	
310-320	Lignite, pyrite, little sandstone as above.	

320-380 Sandstone as above, much lignite, pyrite, shell fragments, little limestone, light gray, dense, shale greenish gray.

380-430 Lignite, pyrite, much sandstone as above.

430-500 Sandstone as above, much lignite, pyrite, shell fragments, little limestone, light gray, dense, shale, greenish and brownish gray.

640-670 Lignite, limestone, light brownish gray, fine grained, silty, some sandstone light gray, fine to medium grained, calcareous.

670-800 Lignite.

800-830 Lignite, little limestone, light brownish gray, earthy, silty.

850-910 Sandstone, very light brownish gray, medium to fine grained, argillaceous.

910-1000 Sandstone, light brownish gray, fine to coarse.

1000-1110 Sandstone, light gray, fine to coarse grained, some shale, yellowish brown, light gray, silty.

1110-1130 Sandstone, light gray, medium to coarse grained, calcite cement, some siltstone, light brownish gray.

1130-1220 Sandstone, light gray, fine to medium grained, calcareous, siltstone as above.

1220-1280 Sandstone, light gray, light brownish gray, fine grained, silty, little shale, very light gray, brownish gray.

1280-1310 Shale, light gray, brownish gray, silty, sandstone, light gray, light brown, medium to fine grained, very calcareous.

1310-1320 Sandstone as above, limestone conglomerate, white to light gray, shale as above.

1320-1380 Sandstone, brownish gray, medium to fine grained, silty.

1380-1510 Sandstone, light gray, fine to coarse grained, some silty.

1510-1530 Lignite, sandstone as above.

1530-1550 Sandstone as above, much lignite.

1550-1580 Sandstone, light gray, medium to fine grained, silty, shale, brownish gray.

1580-1590 Sandstone as above, lignite.

1590-1600 Sandstone as above, shale, light gray, reddish brown.

1610-1620 Sandstone as above, lignite, shale, light gray, reddish brown.

1630-1720 Shale, light greenish gray, bentonitic, silty.

1720-1740 Shale, medium gray and dark gray.

1740-1750 Shale, light greenish gray, bentonitic, silty.

1770-1800 Shale as above.

1850-1870 Shale, medium gray, bentonitic.

1880-1930 Shale as above.

2000-2010 Shale, medium light gray, bentonitic.

2150-2200 Shale, medium light gray.

2200-2240 Shale, medium gray.

2240-2250 Shale, medium gray, little bentonite, white.

2250-2310 Shale, medium gray, slightly bentonitic, shell fragments.

2320-2390 Shale, medium gray, bentonitic, pyrite.

2390-2470 Shale, medium gray, bentonitic, shell fragments.

2470-2490 Shale, medium gray, slightly bentonitic, pyrite, shell fragments, little white bentonite with Biotite.

2490-2530 Shale, medium to medium light gray, bentonitic, shell fragments, pyrite.

3340-3350 Shale, medium light gray, bentonitic, shell fragments, pyrite.

3400-3440 Shale, medium gray, bentonitic, pyrite.

3450-3490 Shale, as above.

3500-3520 Shale, medium gray, bentonitic, pyrite, shell fragments.

3520-3590 Shale, medium to medium dark gray, slightly bentonitic, shell fragments, pyrite.

3640-3650 Shale, medium gray, pyrite, shell fragments, little bentonite, white with Biotite.

3690-3720 Shale, medium gray, bentonitic, pyrite, shell fragments.

3720-3730 Shale as above, pyrite, shell fragments, bentonite, white.

3730-3860 Shale, medium gray, bentonitic, pyrite, shell fragments.

3860-3880 Shale, medium gray, bentonitic, pyrite, forams.

3880-3920 Shale, medium gray, bentonitic, pyrite.

3920-3950 Shale, medium gray to medium dark gray, slightly calcareous, pyrite, shell fragments.

3950-3960 Shale, medium gray, bentonitic, shell fragments, little white bentonite.

3960-3980 Shale as above, pyrite, shell fragments, little sandstone, fine grained, very calcareous.

3980-4000 Shale, medium gray, bentonitic, few white specks, little sandstone as above.

4000-4030 Shale, medium gray, bentonitic.

4030-4180 Shale as above, pyrite, shell fragments.

4180-4220 Shale, medium gray, bentonitic, pyrite.

4220-4250 Shale as above, bentonitic, pyrite, few shell fragments.

4250-4260 Shale, as above, bentonitic, pyrite, shell fragments, little light gray bentonite, micaceous.

4260-4290 Shale, medium to medium dark gray, bentonitic, pyrite, shell fragments.

4290-4440 Shale, medium dark gray, few shell fragments.

4440-4550 Shale, dark gray, platy.

4550-4620 Limestone, white to light gray, fragmental, shale as above, shell fragments.

4620-4660 Shale, dark gray, little limestone as above.

4660-4710 Shale, dark gray, pyrite, shell fragments.

4710-4720 Shale as above, little white bentonite.

4720-4840 Shale, dark gray, pyrite, shell fragments.

4840-4850 Shale, dark gray, little white bentonite.

4850-4870 Shale, dark gray, pyrite, shell fragments.

4880-5050 Shale, dark gray, pyrite, shell fragments.

5050-5210 Shale, dark gray, little pyrite, few shell impressions and fragments.

5210-5230 Sandstone, light brownish gray, medium grained.

5230-5250 Sandstone as above, shale, dark gray.

5250-5270 Shale, dark gray, little sandstone as above.

5270-5340 Shale, dark gray and light gray, bentonitic.

5400-5520 Shale, dark gray.

5520-5530 Shale as above, sandstone, light gray, fine grained, argillaceous.

5530-5540 Shale as above, sandstone, light gray, fine grained, argillaceous, glauconitic.

5540-5560 Sandstone, light gray, fine grained, argillaceous, thinly laminated.

5560-5580 Sandstone as above, and light gray, medium to coarse grained, subrounded quartz.

5580-5610 Sandstone, light gray, medium to coarse, subrounded quartz grains.

5610-5630 Sandstone as above, also light gray, fine grained, some shale, medium gray, silty.

5630-5650 Shale, medium gray, silty, some sandstone as above.

5650-5730 Shale, medium gray and greenish gray 5GY6/1, some sandstone as above.

5730-5790 Shale, medium gray, dark gray, sandstone, colorless, medium to coarse grain, subangular.

5790-5810 Shale, medium gray and greenish gray 5GY6/1, sandstone as above.

5810-5840 Shale, medium to dark gray, sandstone light gray, medium to fine grain.

5833 Circulation. Sandstone, light gray, medium to fine grain, shale as above.

5840-5860 Shale, light gray, dark gray, silty, sandstone as above.

5860-5880 Shale, light to dark gray, silty, siltstone, light brownish gray, calcareous, some sandstone as above.

5880-5940 Shale as above and greenish gray 5G6/1.

5935 Circulation 1 hour. Shale, greenish gray, brownish gray, medium to dark gray.

5940-5970 Shale as above, little sandstone, light gray, fine grained.

5970-6000 Shale, medium to dark gray, greenish gray, light brownish gray.

6000-6050 Shale as above, little sandstone, light gray, fine grained, glauconitic.

6050-6060 Shale, brownish gray, dark to light gray, gray bentonite.

6060-6250 Shale as above.

6258 Circulation 1 hour. Shale as above, little sandstone, light gray, fine grain.

6250-6270 Shale, brownish gray, greenish gray, light gray, little white earthy limestone and sandstone as above.

6270-6340 Shale as above.

6350-6400 Shale, light greenish gray, light brownish gray, light gray, platy.

6400-6450 Shale as above, little sandstone, light brownish gray, very fine grain.

6450-6480 Shale, light brownish gray, greenish gray 5GY6/1.

6480-6560 Shale as above, some sandstone, light brownish gray, fine grain.

6560-6600 Shale, grayish red 10R4/2, greenish gray, brownish gray.

6600-6610 Shale as above, limestone, light gray, fine grained.

6620-6650 Shale as above.

6670-6680 Shale as above, little sandstone, light gray, very fine grained.

6690-6700 Shale, as above, little gypsum, white crystalline.

6700-6730 Limestone, white to light above gray, dense, shale as above.

6730-6740 Shale as above, sandstone, moderate reddish orange, fine grained, calcareous.

6740-6760 Shale, brownish gray, greenish gray 5G6/1, grayish red 10R4/2 silty, calcareous, little limestone, light gray, dense.

6760-6780 Shale as above, limestone as above and moderate red dense, dolomite, light pink, fine grained.

6780-6830 Siltstone, moderate reddish brown, 10R4/6, little gypsum.

6830-6860 Shale, moderate reddish brown 10R4/6, silty, siltstone, moderate reddish orange 10R6/6 to pale reddish brown 10R5/4, arenaceous, slightly calcareous.

6860-6880 Shale as above.

6880-6930 Shale as above, siltstone, moderate reddish orange 10R6/6, gypsum.

6930-6960 Shale as above.

6960-7020 Shale as above, little gypsum, siltstone as in 6880-6930.

7020-7060 Shale as above, gypsum, colorless, crystalline.

7060-7130 Shale and gypsum as above, siltstone, moderate reddish orange.

7130-7190 Shale, moderate reddish brown 10R4/6, silty, little gypsum.

7190-7360 Shale, gypsum as above, siltstone as in 7060-7130.

7360-7380 Limestone, grayish pink 5R8/2, microcrystalline, slight to fair porosity.

7380-7450 Siltstone, moderate reddish brown 10R4/6, shaly, slightly calcareous, some gypsum, colorless to white.

7450-7510 Shale, moderate reddish brown, 10R4/6, silty, slightly calcareous.

7510-7550 Siltstone, moderate reddish orange, very calcareous.

7550-7700 Siltstone as above, shale, grayish red 10R4/2, little gypsum.

7700-7720 Sandstone, medium grained, subrounded, frosted, siltstone as above.

7720-7760 Sandstone, very light gray, fine grained, and as above.

7760-7820 Sandstone, very light gray to pale red 5R6/2, fine grained, calcareous.

7820-7960 Dolomite, grayish pink, fine grained, limey sandstone as above.

7960-7970 Limestone, grayish orange pink, fine grained, dolomitic.

7970-7990 Limestone as above, shale, dusky red, dolomitic.

7990-8030 Shale as above, some limestone as above.

8030 Circulation. Shale as above, much reddish orange siltstone, little limestone, light gray, fine grained.

8030-8040 Shale, dusky red, dolomitic.

8040-8070 Shale, grayish red 10R4/2, pale red 5R6/2, dark reddish brown 10R3/4, dark gray, dolomitic.

8080-8120 Shale as above, many ostracods.

8116 Circulation 1 hour. Shale as above, many ostracods, reddish orange siltstone.

8120-8200 Shale, grayish red 5R4/2, dark reddish brown, light brownish gray, greenish gray, dark gray, some slightly dolomitic, some ostracods.

8205 Circulation 1 1/2 hours. Shale as above, some reddish orange siltstone.

8200-8240 Shale, dark gray, grayish red and brownish gray.

8240-8270 Limestone, very light gray, finely crystalline.

8270-8290 Limestone as above, shale, dark gray, brownish gray.

8290-8310 Shale, dark reddish brown, dark gray, greenish gray.

8304 Circulation. Limestone as above, siltstone, reddish orange, shale as above.

8310-8360 Shale, dark gray, light brownish gray, dark reddish brown.

8360-8390 Siltstone, moderate reddish orange, calcareous, shale as above, anhydrite.

8396 Circulation 1 hour. Siltstone, shale as above.

8390-8420 Shale, medium to dark gray, sandstone, light gray, fine grained calcareous, limestone, light gray, dense.

8420-8490 Sandstone, pale red, 5R6/2, fine grained, calcareous.

8490-8530 Sandstone, light gray to pale red, fine to medium grained, calcareous, shale, medium to dark gray, dark reddish brown, light brownish gray.

8530-8560 Siltstone, moderate reddish orange, anhydrite, white limestone, light brownish gray, finely crystalline.

Cores

8560-8562 Limestone, brownish gray, fine to medium grain, mostly dense, slightly vugular porosity.

8562-8565 Limestone, brownish gray, finely crystalline, dense.

8560 Circulation. Shale, dark gray.

Samples

8560-8570 Limestone, brownish gray, finely crystalline, dense.
8570-8590 Limestone, grayish orange pink, fine grained.
8590-8610 Limestone as above, also brownish gray, fine grained, shale, dark gray.
8610-8630 Limestone, pale red 10R6/2, fine grained, silty.
8630-8680 Limestone as above, anhydrite, white.
8680-8720 Limestone as above, anhydrite, dolomite, grayish red 10R4/2.
8720-8740 Limestone, medium light to medium dark gray, dense.
8740-8780 Limestone as above, anhydrite, white.
8765 Circulation. Limestone as above, anhydrite.
8780-8800 Limestone, very light gray, fine grained, dolomitic, limestone as above.
8800-8840 Limestone, very light gray to medium gray, finely crystalline.
8850 Circulation. Limestone as above.

Cores

8854-8858 Anhydrite, light gray, dense, brown stain.
8858-8860 Anhydrite, light gray to white, fragmental, shaly partings.
8860-8869 Anhydrite, light gray dense, brown stain.

Samples

8870-8910 Anhydrite, white to light gray, dense.
8914 Circulation. Anhydrite, light gray, dense, limestone, brownish gray, dense.
8910-8950 Limestone, medium gray to brownish gray, dense, anhydrite.
8953 Circulation. Limestone as above.
8960-8990 Limestone, light gray to brownish gray, dense, little anhydrite.
8990 Circulation. Limestone as above, much anhydrite, white, dense.
8990-9010 Limestone as above, white anhydrite.
9005 Circulation. Limestone as above, and very light gray, fine grained.
9010 Circulation 1 1/2 hours. Anhydrite, some limestone as above.
9010-9030 Limestone as above, some anhydrite.
9030-9060 Anhydrite, white to light gray, dense.
9067 Circulation 1 hour. Limestone, brownish gray, dense, anhydrite.
9060-9070 Limestone as above, much anhydrite.
9074 Circulation. Limestone as above, anhydrite.

Cores

9074-9077 Limestone, brownish gray to medium gray, finely crystalline, dense, little anhydrite.
9077-9078 Limestone, brownish gray, as above and yellowish gray, finely crystalline.
9078-9079 Limestone, light brownish gray, fine to medium crystalline, fair porosity.
9079-9083 Limestone, brownish gray, fine to medium crystalline, dense, slight oil stain in fractures.
9084-9086 Limestone, brownish gray, fine to medium crystalline, dense, oil stains.
9086-9089 Limestone, light brownish gray, fine to medium crystalline, slight oil stain in fractures.
9089-9091 Limestone, brownish gray, fine to medium crystalline, slight oil stain.

9091-9095 Limestone, light brownish gray, finely crystalline, pinpoint porosity.
9095-9098 Limestone, brownish gray, fine to medium crystalline.

Samples

9100-9130 Limestone, light gray to brownish gray, finely crystalline.
9130-9140 Limestone as above, shale, dark gray.
9143 Circulation 1 hour. Limestone as above.
9143 Circulation 1 1/2 hours. Limestone as above.
9140-9160 Limestone, light gray to brownish gray, finely crystalline dense, anhydrite.
9160-9210 Limestone as above.
9210-9260 Limestone as above, little anhydrite.

Cores

9260-9262 Limestone, brownish gray, finely crystalline, dense.
9262-9264 Limestone, yellowish gray, finely crystalline, pinpoint porosity.
9264-9265 Limestone, brownish gray, fine to medium crystalline, dense.
9265-9266 Limestone, yellowish gray, finely crystalline, slight intergranular porosity.
9266-9267 Limestone, brownish gray, fine to medium crystalline, slight intergranular porosity, slight oil stain.
9267-9271 Limestone as in 65-66.
9271-9272 Chert, light gray.
9272-9275 Limestone, light brownish gray, finely crystalline, slight porosity.
9275-9289 Limestone as above, slight stain in fracture.
9290-9306 Limestone, light brownish gray, fine to medium crystalline, dense.
9306-9307 Limestone, light brownish gray, fine to medium grained, slight oil stain.
9307-9312 Limestone as above, few brachiopod fragments.
9312-9319 Limestone, light brownish gray, fine to medium grained, dense to slight porosity.
9332-9336 Limestone, light brownish gray, fine grained, slight porosity, little anhydrite, 33-34.
9336-9349 Limestone, light brownish gray, fine to medium crystalline, dense.
9350-9352 Limestone as above.
9353-9355 Limestone, light brownish gray, fine to medium crystalline, fragmental, dense to slight pinpoint porosity, little anhydrite.
9355-9362 Limestone as above.
9360-9370 Limestone, light gray to brownish gray, fine to medium crystalline, dense.
9370-9390 Limestone, light gray to light brownish gray, fine to medium grained, dense to slight pinpoint porosity, little anhydrite.
9390-9430 Limestone as above, little anhydrite and dolomite, medium gray, sublithographic.
9430-9490 Limestone as above, little anhydrite.
9490 Circulation 1/2 hour. Limestone as above.
Circulation 1 hour. Limestone as above.
Circulation 1 1/2 hours. Limestone as above, few brachiopod fragments.
9490-9550 Limestone, light gray to light brownish gray, fine to medium grained, little anhydrite.
9550-9590 Limestone, light yellowish gray, microsucrosic, fair porosity.

9590-9620 Limestone as above, and light brownish gray, fine grained to fragmental.

9620 Circulation 1 hour. Limestone as above.

9620-9650 Limestone as above.

9660-9720 Limestone, light gray, fine grained to fragmental, some brachiopod fragments.

9720-9850 Limestone, light to medium gray, fine grained to fragmental, brachiopod fragments.

9850-9880 Limestone, light gray to brownish gray, fine grained to fragmental, dense.

9880-9930 Limestone, light to medium gray, fine grained, to fragmental, brachiopod fragments.

9930-9960 Limestone as above, and limestone, light gray, very fine grained, shaly.

9960-10180 Limestone, light to medium gray, fine grain to fragmental, brachiopod fragments.

10180-240 Limestone as above, and light gray, very fine grained, shaly.

10240-270 Limestone, light to medium gray, finely crystalline, dense.

10270-310 Limestone, very light gray, fine grained, slight porosity, also limestone as above.

10310-340 Limestone, light to medium gray, finely crystalline, dense.

10340-360 Limestone as above and as in 10270-310.

10360-370 Limestone, yellowish gray, fine grained, dolomitic.

10370-430 Dolomite, grayish red 10R4/2, fine grained, silty, limestone as above.

10430-450 Dolomite, very pale orange, fine grained, shale, dark gray.

10450-470 Dolomite, light brownish gray, finely crystalline to micro-sucrosic.

10467 Circulation 2 hours. Dolomite, light brownish gray, finely crystalline, dense.

10470-490 Dolomite as above.

10490-520 Dolomite, light brownish gray, fine grained, little white gypsum.

10520-580 Dolomite as above, limestone very light gray, fine grain, earthy.

10580-590 Dolomite, light brownish gray, fine grain to microsucrosic, some shale, dark gray.

10590-630 Limestone, light brownish gray, fine grained, earthy, dolomite as above.

10630-650 Limestone, light gray to brownish gray, finely crystalline, dense, anhydrite some brownish gray, microsucrosic limestone.

10650-710 Dolomite, light brownish gray, microsucrosic, anhydrite, limestone as above.

10710-750 Limestone, light gray to brownish gray, fine to medium grain, dolomite as above.

10750-770 Limestone as above, some dolomite as above, little shale, dark gray.

10770-800 Limestone as above, dolomite as above, shale, pale reddish brown, calcareous.

10800-830 Dolomite, light gray, fine grained, limey, some limestone as above.

10830-860 Dolomite as above, some limestone as above and light gray, fine grained containing fine to medium quartz grains.

10860-900 Limestone, very light gray, fine grained, shaly, also light brownish gray, finely crystalline, dense.

10900-920 Limestone as above, some shale, reddish brown, very calcareous.

10920-950 Dolomite, brownish gray, finely crystalline, limestone, light gray, fine grained, some dolomite, reddish orange, fine grained.
 10950-970 Dolomite as above, sandstone, light greenish gray, fine grained, calcareous, few coarse rounded, frosted quartz grains.
 10970-11000 Sandstone, pinkish gray, fine to coarse, subrounded, frosted grains, calcareous and pyrite cement.
 11000 Circulation 2 hours. Dolomite, light brownish gray, dense sandstone as above.

Cores

11007-012 Dolomite, medium gray to brownish gray, dense.
 11012-019 Dolomite, light gray, dense, with a few fine to medium grain quartz.
 11019-020 Dolomite, brownish gray, dense.
 11020-022 Dolomite, light brownish gray to light gray, large percent of fine to medium rounded quartz grains.
 11022-026 Dolomite, very light gray, finely crystalline, dense, iron stained, with colorless crystalline anhydrite.
 11026-028 Dolomite, light gray, fine grained, containing few medium grained quartz grains iron stained, some anhydrite, good fluorescence.
 11028-032 Dolomite, light gray, fine to medium crystalline, mostly dense, some small vugular.
 11032-035 Dolomite, light gray, fine to medium crystalline, fair fluorescence 34-35.

Core

11037-044 Dolomite, grayish pink to light gray, fine to medium crystalline, dense.
 11044-046 Dolomite as above, some anhydrite.
 11046-051 Dolomite, white to light gray, finely crystalline, dense.
 11051-054 Dolomite as above, some anhydrite.
 11054-055 Dolomite, light brownish gray, finely crystalline, dense.
 11055-063 Dolomite, white to light gray, finely crystalline, mostly dense, some vugular porosity.
 11060-190 Dolomite, very light gray, fine grained.
 11190-230 Dolomite as above, small amounts of light gray, dense chert, sandstone, light gray, fine grained, calcareous.
 11230-240 Dolomite, very light gray, fine grained, dense, small amounts of chert.
 11240-360 Dolomite, white to light gray, fine grained, some anhydrite.
 11360-400 Dolomite as above, with a few medium quartz grains.
 11400-440 Dolomite, white to yellowish gray, fine grained.
 11440-490 Dolomite, very light gray, sublithographic, limey.
 11490-530 Dolomite, light brownish gray, finely crystalline, some dolomite as above.
 11530-550 Dolomite, light gray, fine grained, containing medium quartz grains, some as above.
 11550-590 Limestone, light brownish gray, finely crystalline, dolomite, light gray, fine grained, with medium to fine grained quartz, some dolomite, light brownish gray, fine grained.
 11590-610 Dolomite, light brownish gray, fine grain to microsucrosic, limey.
 11610-640 Dolomite, as above, little shale, medium dark gray, limestone, brownish gray, finely crystalline.

11640-670 Limestone, light gray to light brownish gray, fine grain, shaly. Shale, pale reddish brown, calcareous, dark gray, dolomite, light brownish gray, fine grained.
 11670-700 Limestone, light gray, finely crystalline and fragmental.
 12700-740 Limestone, light gray to light brownish gray, finely crystalline, dense, few shell fragments.
 11740-780 Limestone, light gray, fine grained, shaly and limestone as above.
 11778 Circulation 1 hour. Limestone as above.
 11778 Circulation 2 hours. Limestone, light gray to brownish, gray, finely crystalline, dense.
 11780-810 Limestone as above.
 11820-840 Limestone, light gray to light brownish gray, finely crystalline, some shale, dark gray.
 11840-860 Limestone, light gray to light brownish gray, finely crystalline and fragmental. Dolomite, light brownish gray, fine grained, little pyrite.
 11860 Circulation 1 hour. Limestone and dolomite as above.
 11860 Circulation 2 hours. Limestone and dolomite as above, little shale, dark gray, pyrite.
 11860-900 Limestone, very light gray to light brownish gray, dense crystalline to fine grained.
 11900-930 Limestone, very light gray to light brownish gray, finely crystalline, dense and fine grained, shaly.
 11930-960 Limestone, medium gray, fine grained, shaly, dolomite, light brownish gray. microsucrosic.
 11960-980 Limestone, light to medium gray, fine grained, shaly, dolomite as above.
 11974 Circulation 1 hour. Limestone and dolomite as above.
 11974 Circulation 2 hours. Limestone and dolomite as above, little shale, dark green.
 11980-12040 Limestone, light gray to light brownish gray, fine grained, earthy, dolomite as above.
 12040-050 Limestone, light gray to light brownish gray, fine grained to microsucrosic, little shale, dark gray, chert, white.
 12050-060 Limestone as above, some shale, dark gray.
 12060-070 Limestone as above, shale, dark gray, little white chert.
 12070-080 Limestone, light gray to light brownish gray, fine grained, earthy.
 12080-090 Limestone as above, little shale, olive gray 5Y4/1.
 12090-120 Limestone, very light gray to light brownish gray, fine grained to dense crystalline.
 12120-150 Limestone as above, some white anhydrite.
 12150-170 Limestone as above.
 12170-210 Limestone, as above, some shale, olive gray.
 12210-280 Limestone, very light gray to brownish gray, finely crystalline, some anhydrite.
 12280-380 Shale, dark greenish gray 5R4/1, platy, some pyrite.
 12380-390 Shale as above, sandstone, greenish gray 5R6/1, fine grained.
 12390 Circulation 1 hour. Shale, dark greenish gray, platy.
 12390 Circulation 2 hours. Shale as above, some dark greenish gray, sandy.
 12390-400 Shale as above, sandstone, white, fine to medium grained.
 12405 Circulation 2 hours. Shale and sandstone as above.
 12405-407½ Sandstone, very light gray, fine to medium, rounded grains, shaly.

407½-408 Shale, greenish gray 5R6/1.
12408-409 Sandstone, vary light gray, fine to medium, rounded grains, shaly.
12409-416 Shale, greenish gray, 5R6/1 with sandy lenses.
12416-417 Sandstone, light greenish gray, fine to medium gray.
12417-419 Limestone, light brownish gray, dense, with a few shaly partings.
12419-423 Limestone, light gray, dense.

Samples

12425-430 Limestone, light gray, finely crystalline and fragmental, shale, dark greenish gray, with thin sand lenses.
12430-510 Limestone as above, shale as above, sandstone, light greenish gray to light gray, fine to medium grained, glauconitic, shaly.
12510-540 Shale, dark greenish gray with few small sand lenses, sandstone as above.
12540-560 Shale, dark greenish gray to dark gray, slightly sandy, some pyrite, little sandstone as above.
12560-600 Shale as above, little sandstone as above, little limestone, light gray, dense with glauconite nodules.
12600-620 Shale as above, some limestone as above.
12619 Circulation 2 hours. Shale, greenish gray to dark gray, slightly sandy.
12620-640 Shale as above, sandstone, light gray to light greenish gray, fine grained, calcareous, some limestone, light gray, dense with glauconite nodules.
12640-690 Limestone, white to light gray, fine grain to dense, with glauconite nodules, shale as above.
12692 Circulation 2 hours. Shale, greenish gray to dark gray, some pyrite, limestone as above, sandstone, light gray to light greenish gray, fine grain, glauconitic.