

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 92

Summary of Socony-Vacuum Oil Company, Inc. Charles Dvorak #F 42-6-P  
Dunn County, North Dakota  
Permit No. 521 Well No. 505

By LaVerne B. Nelson  
October, 1954

Socony Vacuum - Dvorak #F 42-6-P, Dunn County, North Dakota, SE NE  
Section 6, T. 141N., R. 94W. (660' from East line and 1980' from North line),  
Elevation G.L. 2285', K.B. 2296'.

The Socony Vacuum - Dvorak was spudded December 22, 1953. 13 3/8" casing  
was set to a depth of 716 feet and cemented with 540 sacks of cement 7" casing  
was set to a depth of 8850 feet and cemented with 1200 sacks of cement. The  
well was drilled to a total depth of 12,556 feet, plugged and abandoned May  
22, 1954.

DST's

- DST #1 8835-8937  
Hookwall packer failed.
- DST #2 8735-8937  
Hookwall packer failed.
- DST #5 8834-8937  
Open hole packer set in, casing failed.
- DST #4 8826-8937  
Double open-hole packers set in 7" casing. Tool open 4 hours, shut in  
40 minutes. Weak blow dying in 22 minutes, dead 40 minutes then weak  
blow 40 minutes, dead remainder of test. Drill pipe split 33  
IFP-210, FFP-275, SIP-1585, HH-4680.
- DST #5 8937-8967  
Mis-run.
- DST #6 8899-8967 Tool open 3 hours, shut in 30 minutes. Very weak blow, dead  
after 20 minutes. Recovered 290' of very slightly water-cut mud with  
sulfur odor and trace of green oil. IFP-275, FFP-275, SIP-1100, HH-  
4900.
- DST #7 8906-9050  
Tool open 3 hours, shut in 20 minutes. Very weak blow for 20  
minutes, dead remainder of test. Recovered 460' salty, sulfur  
water-cut mud. IFP-10, FFP-300, SIP-2750, HH-5200.
- DST #8 10,293-10,402  
Tool open 30 minutes, shut in 20 minutes. Fair to good blow  
throughout. Recovered 730' water-cut mud and salt water. IFP-300,  
FFP-600, SIP-4800, HH-5900.

DST #9 12,100-12,188  
 2000' water cushion. Tool open 3 hours, shut in 30 minutes. Weak initial blow, dead in 5 minutes. Very weak blow last hour of test. Recovered 3210' of fluid, as follows: 180' of water, 1080' mud, 1530' slightly gas-cut muddy water, 420' mud. IFP-150, FFP 1500, SIP-3425, HH-6350. Chart showed tool open only last hour of test.

#### Core Record

#### Cores:

#1	8382-8405½
#2	8749-8799
#3	8799-8813
#4	8813-8825
#5	8825-8840
#6	8840-8855
#7	8855-8914
#8	8914-8936
#9	8937-8967
#10	8967-8997
#11	8997-9050
#12	9050-9108
#13	9108-9166
#14	9591-9640
#15	9802-9860
#16	9933-9991
#17	9991-10,000
#18	10,000-10,058
#19	10,058-10,116
#20	10,116-10,132
#21	10,132-10,139
#22	10,139-10,154
#23	10,154-10,169
#24	10,169-10,183½
#25	10,183½-10,199
#26	10,199-10,215
#27	10,215-10,225
#28	10,225-10,240
#29	10,240-10,255
#30	10,255-10,270
#31	10,270-10,286
#32	10,286-10,302
#33	10,302-10,316
#34	10,316-10,331
#35	10,331-10,347
#36	10,347-10,363
#37	10,363-10,378
#38	10,378-10,386
#39	10,386-10,402
#40	11,016-11,024
#41	11,024-11,040
#42	11,040-11,054

#43	11,054-11,068
#44	11,094-11,110
#45	11,110-11,126
#46	11,126-11,135
#47	11,135-11,152
#48	11,152-11,209
#49	11,209-11,218
#50	11,264-11,278
#51	11,278-11,294
#52	11,294-11,303
#53	11,303-11,317
#54	11,317-11,333
#55	11,333-11,348
#56	11,348-11,362
#57	11,362-11,378
#58	11,378-11,392
#59	11,392-11,408
#60	11,408-11,409
#61	11,456-11,471
#62	11,471-11,482
#63	11,482-11,483
#64	11,523-11,540
#65	11,540-11,556
#66	11,556-11,571
#67	11,571-11,585
#68	11,585-11,601
#69	11,601-11,606
#70	12,130-12,188
#71	12,188-12,246
#72	12,246-12,298
#73	12,298-12,356
#74	12,356-12,371
#75	12,371-12,429
#76	12,429-12,466
#77	12,466-12,513

#### Plugging Record

12,350' W/4 sacks  
11,650' W/4 sacks  
10,350' W/4 sacks  
8,845' W/18 sacks  
1,600' W/50 sacks  
685' W/40 sacks  
Top of surface W/10 sacks.

Formation tops were determined from samples and electric logs. Depths were determined from electric log depth unless otherwise stated. Colors were determined from rock color chart.

# Formation Tops

Cretaceous System	
Pierre	1855
Niobrara	3716
Greenhorn	4310
Muddy Zone	4851
Dakota	5149
Jurassic System	
Top of Jurassic	5370
Piper lime	5850
Triassic System	
Spearfish	6222
Permian System	
Minnekahto	6683
Opeche	6752
Minnelusa	7080
Mississippian System	
Amsden	7263
Big Snowy	7420
Kibbey	7950
Kibbey Lime	8000
Charles	8362
Mission Canyon	8912
Lodgepole	9240
Englewood	10,010
Devonian System	
Lyleton	10,080
Nisku	10,297
Duperow	10,383
Souris River	10,564
Dawson Bay	10,700
Prairie Evaporite	10,839
Winnipegosis	10,973
Ashern	11,215
Silurian System	
Interlake	11,310
Ordovician System	
Upper Stony Mountain	12,113
Lower Stony Mountain	12,224
Red River	12,310

20-60	Siltstone; light gray, very shaly and bentonitic, calcareous, a little black lignite.
60-80	Siltstone; as above, much medium gray shale.
80-120	Shale; medium gray, lumpy, disaggregated, bentonitic calcareous, very silty, some black lignite.
120-140	Shale; very light gray, lumpy, spongy, calcareous, bentonitic, little black lignite.
140-200	Siltstone; medium light gray, very argillaceous, bentonitic, calcareous, some medium light gray shale.
200-240	Shale; very light gray, earthy, lumpy, compact, bentonitic, calcareous.

240-260	Shale; light gray, lumpy, bentonitic, calcareous, very silty.
260-280	Lignite; black.
280-300	Poor sample.
300-320	Lignite; black some medium light gray, silty, calcareous, bentonitic, shale.
320-340	Lignite; black.
340-380	Shale; very light gray, lumpy, bentonitic, calcareous, some black lignite.
380-420	Shale; light olive gray, lumpy, bentonitic, calcareous, very silty, some black lignite.
420-460	Shale; light gray, lumpy, bentonitic, slightly silty.
460-580	Shale; light gray and light olive gray, lumpy, bentonitic, calcareous, silty, little white, micaceous bentonite.
580-620	Lignite.
620-640	Siltstone; to very fine sandstone, well cemented, pyrite concretions, some shale and lignite as above, some fragmental limestone.
640-680	Sandstone; very fine, calcite cemented, some pyrite concretions and fragmental limestone.
680-770	Shale; light gray to light olive gray, lumpy, calcareous, bentonitic, silty, some black lignite.
770-810	Shale; as above, little greenish gray, sucrosic to grainy, limestone fragments, much black lignite.
810-870	Shale; light gray and light olive gray, flaky, disaggregated, bentonitic, calcareous, silty, much black lignite.
870-910	Siltstone; medium light gray, very shaly, bentonitic, much lignite, trace of light brown and greenish gray, grainy limestone fragments.
910-930	Sandstone; very fine grained, medium light gray, shaly, calcareous, cemented, glauconitic.
930-1050	Shale; medium light gray, lumpy, calcareous, bentonitic, numerous fine quartz grain inclusions, silty, glauconitic.
1050-1190	Shale; medium light gray and light olive gray, flaky and lumpy, bentonitic, calcareous, silty, little black lignite.
1190-1330	Shale; medium light gray, lumpy, bentonitic, calcareous, very silty.
1330-1390	Siltstone; medium light gray, shaly, bentonitic calcareous.
1390-1530	Shale; medium light gray, lumpy, earthy, silty, bentonitic, calcareous, some black lignite, much shaly siltstone.
1530-1570	Siltstone; medium light gray, very shaly, calcareous, bentonitic.
1570-1610	Shale; medium light gray and light olive gray, lumpy, bentonitic, calcareous, very silty.
1610-1810	Missing samples.
1810-1910	Shale; medium light gray, lumpy, micromicaceous, bentonitic, calcareous, slightly silty.
1910-1970	Shale; medium light gray, lumpy, micromicaceous, bentonitic, trace of dense lithographic limestone.
1970-2130	Shale; medium gray, lumpy to platy, disaggregated, bentonitic. Traces of bluish white bentonite, 2070-2090 some bluish white bentonite.
2130-2430	Medium gray, lumpy, bentonitic, little pyrite, little white to bluish white, micaceous bentonite traces of light olive gray, grainy limestone.

2430-2460	Missing samples.
2460-2480	Shale; medium gray, lumpy, bentonitic.
2480-2880	Shale; medium gray, lumpy, compact, firm, little brown hard siltstone, trace of Inoceramus fragments, trace of pyrite cemented quartz grains.
2880-3420	Shale; medium gray, lumpy, spongy, bentonitic, slightly calcareous in part little white micaceous bentonite, slight traces of Inoceramus fragments, trace of limestone fragments. 3300 limestone fragments increase in amount.
3420-3480	Shale; medium gray lumpy and flaky, disaggregated, bentonitic, calcareous in part, traces of limestone and dolomite fragments.
3480-3520	Shale; medium gray and light olive gray, lumpy and flaky, disaggregated, bentonitic, traces of pyrite, siltstone, dolomite and limestone fragments.
3520-3560	Shale; medium gray, lumpy and flaky, disaggregated, bentonitic, silty traces of pyrite, dolomite and limestone fragments.
3560-3680	Shale; medium gray, flaky, disaggregated, silty, carbonaceous streaks, traces of fragments of limestone, dolomite, and siltstone.
3680-3720	Shale; dark gray, fissile, disaggregated, calcareous, traces of pyrite, limestone, siltstone fragments.
3720-3780	Shale; medium dark gray, fissile, compact, calcareous, first white specks.
3780-3820	Shale; dark gray, fissile, compact.
3820-3890	Shale; medium gray, lumpy and flaky, disaggregated, trace of pyrite.
3890-3900	Shale; medium dark gray, flaky and lumpy, disaggregated, trace of pyrite, siltstone and limestone.
3900-4060	Shale; medium gray, flaky and lumpy, trace of pyrite.
4060-4230	Shale; dark gray and light olive gray, flaky, disaggregated, trace of pyrite.
4230-4320	Shale; dark gray, platy, trace of pyrite.
4320-4380	Shale; dark gray, fissile, calcareous, silty, second white specks, some fragmental limestone and Inoceramus fragments.
4380-4450	Shale; dark gray, calcareous, trace of orange stained fragmental limestone magnetite, trace of pyrite.
4450-4500	Shale; medium gray, platy, calcareous, bentonitic, some calcareous bentonite, little pyrite.
4500-4540	Shale; dark gray, platy calcareous, trace pyrite and Inoceramus fragments, some gray bentonite.
4540-4834	Shale; dark gray, platy to fissile.
4834-4850	Shale; dark gray, fissile, some medium gray, silty shale grading to shaly sandstone.
4850-4930	Shale; dark gray and light brownish gray, fissile, compact, some white, well cemented, fine sandstone and siltstone.
4930-5120	Shale; dark gray, platy.
5120-5150	Shale; as above, light brown, siltstone.
5150-5170	Sandstone; white very fine grained, cemented.
5170-5180	Shale; light brown, platy.
5180-5200	Sandstone; fine grained, cemented, white ironstone concretions.
5200-5210	Shale; grayish white, waxy luster, friable.
5210-5230	Sandstone; fine grained, cemented, white, numerous red and light brown ironstone concretions.
5230-5240	Siltstone; light gray, argillaceous, little light brown siderite pellets.

5240-5250 Sandstone; white with light brown mottling, fine grained, cemented, some moderate red and light brown siderite pellets. Some varicolored, waxy luster, varicolored shale.

5250-5260 Siltstone; medium gray siltstone, and fine grained, cemented quartz grains.

5260-5300 Siltstone; medium gray and light brown, some fine grained, cemented quartz and siderite.

5300-5370 Sandstone; medium grained, subangular, frosted, white uncemented, few siderite pellets, some light brown silt and pyrite cemented quartz grains, few large subangular quartz pebbles.

5370-5450 Shale; varicolored shale, waxy luster, much medium gray shale, trace of medium grained, glauconitic sandstone.

5450-5530 Shale; medium gray and light brown, waxy to earthy luster, firm, slightly silty, some green shale.

5530-5570 Shale; moderate yellowish brown, compact, soapy luster.

5570-5650 Sandstone; fine grained, well cemented, slightly glauconitic, white subangular.

5650-5690 Shale; light olive gray and medium gray.

5690-5730 Sandstone; fine grained, well cemented, gray white, subangular.

5730-5760 Shale; greenish gray, soapy luster.

5760-5860 Shale; medium gray and light olive gray, flaky some green and greenish gray shale.

5860-5880 Sandstone; fine to medium grained, uncemented, clear and frosted, angular to subangular.

5880-5920 Limestone; light olive gray, dense, argillaceous.

5920-5960 Shale; medium gray and greenish gray, waxy, some varicolored shale.

5960-5970 Limestone; white, grainy, chalky.

5970-5980 Shale; green gray, moderate brown, and medium gray, friable.

6980-5990 Limestone; as 5960-5970.

5990-6020 Shale; greenish gray and medium gray, soapy luster, some moderate brown shale.

6020-6040 Shale; moderate yellowish brown, calcareous, resinous luster, silty, friable to brittle, streaks of argillaceous.

6040-6050 Limestone; greenish gray, argillaceous, sublithographic.

6050-6060 Shale; medium gray, calcareous, brittle.

6060-6090 Limestone; very pale orange; sublithographic, dense, dolomitic, anhydrite inclusions and vein, traces of white milky chert and chalky limestone.

6090-6100 Shale; green gray, calcareous, brittle.

6100-6110 Limestone; very pale orange, sublithographic.

6110-6130 Shale; greenish gray, calcareous, flaky, some moderate reddish brown, brittle, calcareous shale.

6130-6140 Limestone; very pale orange, argillaceous, soft shaly appearance.

6140-6150 Limestone; pinkish gray, dense, sublithographic, anhydrite inclusions.

6150-6160 Shale; greenish gray and grayish red, anhydritic, slightly calcareous in part.

6160-6190 Shale; grayish red, calcareous, anhydrite, resinous luster.

6190-6200 Limestone; pale yellowish brown, sublithographic, anhydrite.

6200-6220 Shale; grayish red, silty, calcareous, anhydritic.

6220-6500 Salt and anhydrite; possibly salt or salty anhydrite, lost circulation microlog looks like a salt section. Samples are greenish gray shale.

6500-6510 Anhydrite; white, chalky and crystalline.

6510-6550 Siltstone; moderate reddish orange, anhydritic, some moderate reddish brown, silty anhydritic shale, traces of pink limestone.

6550-6570 Shale and siltstone; greenish gray, flaky, anhydritic shale and moderate reddish brown, anhydrite siltstone.

6570-6630 Siltstone and shale; greenish gray shale and moderate reddish orange siltstone, anhydrite, some white crystalline anhydrite and gypsum.

6630-6660 Poor samples. Samples are cave from above.

6660-6690 Shale; moderate reddish orange and moderate reddish brown, silt and shale some white crystalline anhydrite.

6690-6740 Anhydrite; white and grayish pink, massive and white chalky gypsum, some crystalline anhydrite.

6740-6970 Salt.

6970-7000 Shale; moderate reddish orange and moderate reddish brown, anhydritic calcareous, some crystalline anhydrite.

7000-7010 Shale; medium gray, flaky, some shale and silt as above.

7010-7040 Shale; moderate reddish brown and moderate reddish orange, anhydrite, calcareous siltstone and shale.

7040-7075 Salt.

7075-7085 Shale; medium gray, flaky.

7085-7100 Salt and anhydrite lenses.

7100-7130 Sandstone; poorly sorted, fine to medium well cemented, reddish orange, radioactive (high radioactivity or gamma ray with high resistivity.)

7130-7140 Dolomite; pale red purple, sucrosic some pale red purple calcareous sandstone.

7140-7220 Salt; streaks of argillaceous anhydrite and reddish orange anhydritic siltstone and shale.

7220-7230 Shale; moderate reddish orange and moderate reddish brown siltstone and shale, some fine grained quartz.

7230-7270 Salt; anhydrite.

7270-7330 Anhydrite; pale reddish purple, massive, some dolomite.

7330-7360 Shale; medium gray, flaky streaks of anhydrite.

7360-7420 Anhydrite; pale red purple, massive some white chalky gypsum, some moderate reddish orange anhydritic siltstone and shale.

7420-7430 Shale; medium gray, flaky.

7430-7970 Anhydrite; moderate reddish orange and reddish brown, anhydrite siltstone and shale, white and pale red massive anhydrite.

7470-7480 Shale; medium gray, flaky.

7480-7500 Siltstone; moderate reddish orange, anhydritic siltstone, some anhydrite.

7500-7510 Shale; medium gray, flaky.

7510-7530 Dolomite; white, dense, sublithographic.

7530-7540 Shale; medium dark gray, flaky.

7540-7580 Siltstone; moderate reddish orange, calcareous, anhydrite.

7580-7590 Shale; pale red purple, brittle.

7590-7610 Siltstone; moderate reddish orange, calcareous, anhydritic.

7610-7630 Limestone; white to light brown, sublithographic.

7630-7660 Shale; pale red purple, brittle, calcareous some greenish gray shale.



7660-7680 Siltstone; pale reddish brown, very calcareous, shaly and anhydritic.

7680-7710 Shale; medium dark gray, flaky, brittle, some pale red purple shale.

7710-7720 Siltstone; moderate reddish orange, calcareous, shaly, anhydritic.

7720-7760 Missing samples.

7760-7780 Shale; moderate reddish orange, silty, calcareous, some white chalky limestone.

7780-7790 Shale; greenish gray and pale red purple.

7790-7800 Limestone; yellowish gray, dense, sublithographic.

7800-7870 Shale; greenish gray and moderate reddish brown, silty, calcareous.

7870-7890 Limestone; white, dense, sublithographic.

7890-7960 Shale; green waxy shale.

7960-7980 Shale; medium dark, gray, flaky, resinous luster.

7980-8000 Sandstone; very fine grained, loosely cemented, some white, soft, chalky limestone.

8000-8040 Limestone; white, soft, chalky.

8040-8070 Shale; medium dark gray and greenish gray, flaky.

8070-8100 Limestone; white, soft chalky, some moderate reddish orange, calcareous, siltstone and very fine grained sandstone.

8100-8140 Shale and siltstone; moderate reddish orange calcareous siltstone and pale red purple shale, some white to light gray chalky limestone.

8140-8220 Siltstone; moderate reddish orange, calcareous, anhydrite, some pale red purple shale, calcareous, traces of limestone and anhydrite.

8220-8240 Shale; greenish gray and medium dark gray, some anhydrite siltstone.

8240-8270 Missing samples.

8270-8320 Salt.

8320-8360 Limestone; gray lithographic, some white soft anhydrite, medium gray, flaky shale.

8360-8390 Anhydrite; medium dark gray to light gray, massive.

8390-8400 Dolomite; gray, dense, limey, shaly appearance.

8400-8410 Salt.

8410-8430 Poor samples.

8430-8460 Anhydrite; gray and white, massive, some gray, lithographic dolomite.

8460-8470 Limestone; light brownish gray, dense, sucrosic.

8470-8480 Shale; medium gray, flaky.

8480-8530 Limestone; light brownish gray, dense, slightly argillaceous, sucrosic.

8530-8540 Shale; moderate brown, calcareous, anhydritic.

8540-8590 Salt.

8590-8630 Limestone; yellowish gray to light brownish gray anhydrite, dense, some light gray massive anhydrite.

8630-8690 Anhydrite; gray massive, some limestone as above, slight fluorescence and cut in CCL4.

8690-8740 Limestone; dark brown, fractured, some pinpoint porosity.

8740-8885 No samples.

Core 8855-9166

8855-8860 Anhydrite; medium dark gray, massive, dense, dolomitic.  
 8860-8862 Anhydrite; light brownish gray, massive, dense.  
 8862-8863 Anhydrite; light brown, massive, limestone inclusions.  
 8863-8865 Anhydrite; medium dark gray, massive.  
 8865-8907 Anhydrite; white to very light gray, stylolites filled with calcite and dark gray shale.  
 8907-8908 Limestone; dark brown, dense, anhydrite, slightly crystalline, carbonaceous streaks. Good fluorescence, no porosity.  
 8908-8909 Anhydrite; light gray, massive, slightly limey.  
 8909-8910 Anhydrite; dark gray, massive, slightly limey.  
 8910-8914 Dolomite; medium gray, dense, argillaceous, sublithographic, spotted fluorescence.  
 8914-8916 Dolomite; medium gray, fine grained, pinpoint porosity.  
 8916-8917 Dolomite; light brownish gray, dense, limey, anhydrite inclusions.  
 8917-8925 Limestone; light brownish gray, dolomitic, dense, fine grained, numerous anhydrite inclusions, slightly crystalline, spotted fluorescence.  
 8925-8927 Limestone; light brownish gray, oolitic, fine grained, dense matrix, some filled fractures.  
 8927-8931 Limestone; light brownish gray, dense, crystalline, anhydrite inclusions.  
 8931-8934 Limestone; brownish gray, dense, crystalline, good fluorescence.  
 8934-8939 Limestone; light brownish gray, dense fine grained, good fluorescence.  
 8939-8940 Dolomite; brownish gray to brownish black, limey, fine grained, dense, stylolitic partings filled with carbonaceous material.  
 8940-8945 Dolomite; medium gray, limey, fine grained, dense.  
 8945-8946 Dolomite; dark gray, crystalline in part, limey, fine grained matrix.  
 8946-8956 Limestone; medium gray, slightly crystalline, fine grained matrix, slight fluorescence, stylolitic partings filled with carbonaceous material.  
 8956-8957 Limestone; medium gray, crystalline with fine grained matrix, numerous anhydrite inclusions and black carbonaceous material in stylolitic partings.  
 8957-8968 Limestone; medium gray, crystalline with fine grained matrix, stylolitic partings, spotted fluorescence.  
 8968-8974 Limestone; brownish gray, crystalline with fine grained matrix, dense, spotted fluorescence.  
 8974-9007 Limestone; medium gray, dense, crystalline with fine grained matrix, spotted fluorescence, stylolitic partings filled with carbonaceous material.  
 9007-9015 Limestone; light gray, dense, fragmental, dense, sub-lithographic matrix spotted fluorescence, stylolitic partings.  
 9015-9021 Limestone; light gray to brownish gray, fragmental, sucrosic matrix anhydrite inclusions, slight spotted fluorescence, some secondary calcite rhombs.  
 9021-9040 Limestone; brownish gray, dense, crystalline in and fine grained matrix, slightly crinoidal, spotted fluorescence.  
 9040-9056 Limestone; as above, some brachiopod fossils.  
 9056-9076 Limestone; light brownish gray, dense, crystalline in fine grained matrix, some fluorescence.

9076-9078 Dolomite; light gray, dense, fragmental, medium grained matrix.  
 9078-9090 Limestone; brownish gray, crystalline in fine grained matrix.  
 9090-9094 Limestone; light gray, very fine grained, dense, argillaceous, some vertical fracturing, good fluorescence and oil cut in CC14.  
 9094-9098 Dolomite; light gray, fine grained, some pinpoint porosity.  
 9098-9102 Limestone; light brownish gray, dense, sublithographic to fine grained, slight spotted fluorescence.  
 9102-9108 Limestone; light brownish gray, crystalline in fine grained matrix dense, spotted fluorescence. Anhydrite inclusions.  
 9108-9140 Limestone; brownish gray, fine to lithographic dense; traces of brachiopod shells.  
 9140-9170 Limestone; pale yellowish brown, dense, fine grained.

End of cored section.

9170-9210 Limestone; pale yellowish brown, fragmental, some pinpoint porosity, traces of spotted fluorescence.  
 9210-9240 Limestone, pale yellowish brown, fragmental and grainy, slight spotted fluorescence, some pinpoint porosity.  
 9240-9270 Limestone; dark gray; grainy, dense, fossiliferous (brachiopods), slight spotted fluorescence.  
 9270-9410 Limestone; medium gray, fragmental, dense, streaks of fair to good porosity, fossiliferous.  
 9410-9430 Limestone; dark gray, grainy to subcrystalline, dense.  
 9430-9460 Limestone; dark gray, dense, subcrystalline, argillaceous, some spotted fluorescence.  
 9460-9520 Limestone; medium gray, fragmental, fossiliferous, dense, spotted fluorescence.  
 9520-9590 Limestone; dark gray, dense, subcrystalline, argillaceous fossiliferous.

Core 9590-9650

9590-9650 Limestone; dark gray, dense, sublithographic, argillaceous, fossiliferous, interbedded dark gray, calcareous shale.  
 9650-9690 Limestone; dark gray, dense, sublithographic, argillaceous, fossiliferous.  
 9690-9770 Limestone; dark and medium gray, dense, fine grained, fossiliferous.  
 9770-9805 Limestone; dark gray, shaly appearance.

Core 9805-9860

9805-9845 Limestone; dark gray, slaty appearing, very shaly, sublithographic.  
 9845-9860 Limestone; dark gray, slaty, highly argillaceous, fossiliferous.

End of core.

9860-9880 Limestone; dark gray, dense, sublithographic, highly argillaceous.  
 9880-9930 Limestone; medium light gray, fine grained, dense, slightly argillaceous.

Core 9930-10,402

9930-10,010	Limestone; dark gray, sublithographic, dense, highly argillaceous.
10,010-10,020	Shale; dark gray, slaty, dense hard, highly calcareous, traces of pyrite.
10,020-10,027	Shale; grayish black, slaty, crinoid stem inclusions.
10,027-10,028	Shale; dark gray, slaty, bands of calcite crystals throughout, green glauconite inclusions.
10,028-10,038	Limestone; greenish gray, dense, sublithographic, anhydrite inclusions, bands of greenish gray, limey shale, traces of pyrite.
10,038-10,050	Shale; grayish black, dense, slaty, micaceous.
10,050-10,053	Shale; medium light gray, slaty, slightly calcareous.
10,053-10,056	Dolomite; medium light gray, subcrystalline, dense.
10,056-10,063	Limestone; medium gray, grainy, dense.
10,063-10,071	Limestone; medium gray, sucrosic, dense, slightly argillaceous.
10,071-10,075	Shale; grayish black, slaty, hard, some pyrite streaks.
10,075-10,110	Shale; greenish gray, slaty, hard, slightly calcareous, traces of pyrite.
10,110-10,123	Dolomite; grayish orange pink, dense, fine grained, greenish gray shale interbedded.
10,123-10,132	Dolomite; reddish orange, dense, fine grained, interbedded with greenish gray shale.
10,132-10,148	Dolomite; reddish orange, shaly, silty, fine grained.
10,148-10,152	Dolomite; grayish orange pink, dense, subcrystalline, green interbedded shale.
10,152-10,154	Shale; greenish gray brittle, slaty, slightly dolomitic.
10,154-10,160	Dolomite; as 10,148-10,152.
10,160-10,176	Shale; shale and dolomite interbedded as above.
10,176-10,180	Dolomite; greenish gray, highly argillaceous, dense, fine grained.
10,180-10,197	Dolomite; grayish red, dense, fine grained to sublithographic, argillaceous.
10,197-10,206	Shale; greenish gray, dolomitic, brittle, slaty, interbedded grayish orange, dense dolomite.
10,206-10,243	Dolomite, grayish red, dense, fine grained, argillaceous, some white massive anhydrite inclusions.
10,243-10,244	Shale; greenish gray, dolomitic, brittle, slaty.
10,244-10,258	Dolomite; as 10,206.
10,258-10,259	Dolomite; grayish orange pink, fine grained, dense.
10,259-10,261	Dolomite; as 10,206.
10,261-10,263	Shale; as 10,243.
10,263-10,279	Dolomite; as 10,206.
10,279-10,280	Shale; as 10,243.
10,280-10,286	Anhydrite; white, massive, with interbedded grayish red dolomite.
10,286-10,290	Dolomite; grayish red, crystals in fine grained, argillaceous limestone matrix.
10,290-10,294	Dolomite; grayish brown, dense, subcrystalline.
10,294-10,296	Limestone; grayish orange to very pale orange, sucrosic, dolomitic.
10,296-10,302	Dolomite; pale yellowish brown, dense subcrystalline, rhomb traces included, anhydrite inclusions.

10,302-10,303 Limestone; dark yellowish brown, dense, lithographic argillaceous.

10,303-10,304 Dolomite; pale yellowish brown, dense, subcrystalline.

10,304-10,313 Dolomite; greenish gray, dense, sublithographic, shaly, appearance, very argillaceous.

10,313-10,363 Limestone; pale yellowish brown, dense, sublithographic.

10,363-10,378 Limestone; pale yellowish brown, dense, microsugrosic, oolitic in part.

10,378-10,381 Shale; greenish gray, slaty, brittle, calcareous.

10,381-10,386 Dolomite; light olive gray, dense, subcrystalline.

10,386-10,402 Dolomite; grayish red, dense, fine to subcrystalline.

10,402-10,416 Anhydrite; grayish red and medium gray massive.

End of cored section.

10,416-10,440 Limestone, pale yellowish brown and grayish orange, sugrosic to sublithographic.

10,440-10,480 Limestone; light gray and very pale orange, oolitic and microsugrosic, dense.

10,480-10,540 Limestone; grayish orange and very pale orange, sugrosic.

10,540-10,570 Limestone; dark gray, dense, sublithographic.

10,570-10,640 Limestone; light gray, sugrosic and dark gray, dense, sublithographic, traces of fragmental limestone with some porosity.

10,640-10,660 Limestone; brownish gray, dense, sublithographic some light gray, sugrosic limestone.

10,660-10,670 Limestone; grayish orange pink sugrosic.

10,670-10,680 Dolomite; very pale orange to grayish orange pink, grainy.

10,680-10,700 Limestone; medium dark gray, dense, lithographic, some pinkish gray, sugrosic, limestone.

10,700-10,760 Limestone; grayish orange pink, sugrosic, some brownish gray limestone with pink inclusions.

10,760-10,780 Limestone; pale yellowish brown, sublithographic.

10,780-10,790 Limestone; medium dark gray, sublithographic and grayish orange pink sugrosic limestone.

10,790-10,830 Limestone; pale brown, fragmental.

10,830-10,880 Limestone; white to very pale orange, sublithographic to microsugrosic, dense, some anhydrite inclusions.

10,880-10,890 Limestone; as above, some pale brown dense sublithographic limestone.

10,890-10,920 Limestone; medium dark gray, dense, sublithographic.

10,920-10,940 Limestone; pale brown, dense, sublithographic, fragmental in part.

10,940-10,960 Limestone; brownish black, dense, sublithographic.

10,960-11,000 Limestone; grayish orange pink, sugrosic and brownish black sublithographic.

Cored interval 11,000-11,068

11,000-11,028 Limestone; brownish black, dense, sublithographic.

11,028-11,054 Dolomite; medium light gray to greenish gray.

11,054-11,068 Limestone; medium dark gray, dense, sublithographic.

End of cored interval.

11,070-11,090 Limestone; as above.

Cored interval 11,094-11,218

11,094-11,099 Limestone; medium dark gray, fine crystalline to sub-lithographic dense, dolomite.  
11,099-11,104 Limestone; pale yellowish brown, dense, sublithographic dolomitic.  
11,104-11,110 Dolomite; greenish gray, very fine grained, some porosity, limey.  
11,110-11,131 Dolomite; variegated greenish gray and pale red, very fine grained.  
11,131-11,152 Dolomite; greenish gray, dense, very fine crystalline, dense, anhydrite inclusions, very fossiliferous.  
11,152-11,160 Limestone; greenish gray, sublithographic, dense, fossiliferous.  
11,160-11,180 Limestone; medium gray to brownish gray, dense, fossiliferous, fragmental.  
11,180-11,195 Limestone; medium dark gray, dense, very fine grained to sublithographic, fossiliferous, anhydrite inclusions.  
11,195-11,202 Limestone; brownish gray, dense, fine grained, vugs and fractures filled with anhydrite.  
11,202-11,218 Limestone; dark gray, dense, argillaceous, sublithographic.

End of cored section.

11,218-11,240 Missing samples.  
11,240-11,260 Limestone; brown black, dense, lithographic some grayish orange pink sucrosic limestone.

Cored interval 11,264-11,409

11,264-11,302 Limestone; brown, black dense, sublithographic.  
11,302-11,309 Dolomite; grayish red, dense, very fine grained to sublithographic, with pinkish spots of anhydrite inclusions.  
11,309-11,311 Limestone; brownish gray, dense, sublithographic.  
11,311-11,333 Limestone; varicolored, reddish gray, greenish gray, dense, very fine grained, anhydrite and calcite inclusions, brecciated.  
11,333-11,378 Dolomite; pinkish gray, fragmental, calcite and anhydrite inclusions.  
11,378-11,409 Dolomite; very light gray, very fine crystalline, vuggy porosity, salt crystals in vugs.

End of cored section.

11,409-11,430 Dolomite; white, dense, crystalline, some pinpoint porosity, salty crystals in vugs.  
11,430-11,456 Limestone; grayish orange pink, sucrosic and sublithographic, dense.

Cored section 11,456-11,483

11,456-11,483 Limestone; yellowish gray, dense, sublithographic.

End of cored section.

11,483-11,520 Limestone; yellowish gray to grayish orange pink, very fine grained to sublithographic.

Cored section 11,523-11,606

11,523-11,546 Limestone; yellowish gray, very fine grained to sublithographic, anhydrite inclusions.

11,546-11,549 Dolomite; white to yellowish gray, fragmental slightly calcareous.

11,549-11,582 Limestone; yellowish gray, dense, very fine crystalline to subcrystalline, anhydrite filled fractures.

11,582-11,585 Limestone; white, fragmental, dense, anhydrite filled pore spaces.

11,585-11,592 Dolomite; yellowish gray, dense, very fine crystalline to sublithographic anhydrite inclusions.

11,592-11,606 Dolomite; yellowish gray, dense, sucrosic, calcareous.

End of cored section.

11,606-11,690 Dolomite; grayish orange pink, sucrosic, dense, trace of white milky chert.

11,690-11,700 Limestone; yellowish gray, dense, sublithographic, chalky in part.

11,700-11,770 Dolomite; grayish orange pink, sucrosic, dense, some limestone as above, traces of milky chert.

11,770-11,790 Dolomite; as above becoming more calcareous.

11,790-11,940 Dolomite; yellowish gray, dense, subcrystalline, sucrosic in part, calcareous, some gypsum.

11,940-11,960 Dolomite; yellowish gray, dense, sublithographic.

11,960-11,980 Dolomite; white, dense, microsucrosic.

11,980-12,000 Dolomite; light brownish gray, dense, sucrosic.

12,000-12,010 Dolomite; grayish orange pink, very fine crystalline, highly iron stained.

12,010-12,030 Dolomite; light brownish gray, dense, very fine grained to sublithographic.

12,036 Circulation 1 3/4 hour. Dolomite as above.

12,030-12,050 Dolomite; brownish gray, dense, sucrosic, in part fragmental.

12,050-12,060 Dolomite; medium light gray, dense, sublithographic.

12,060-12,130 Dolomite; brownish gray, dense, sublithographic to very fine crystalline quartz grain inclusions.

Cored section 12,130-12,511

12,130-12,136 Dolomite; medium dark gray, very fine crystalline, dense.

12,136-12,142 Limestone; grayish brown, sublithographic, dense, fractures filled with anhydrite.

12,142-12,148 Dolomite; brownish gray, very fine crystalline, dense, anhydrite inclusions and fractures.

12,148-12,159 Anhydrite; yellowish brown, massive.

12,159-12,160 Dolomite; medium dark gray, dense, very fine crystalline fractures filled with anhydrite.

12,160-12,166 Dolomite; greenish gray, dense, sublithographic, argillaceous, shale fracture.

12,166-12,172	Limestone; grayish brown, dense, fine crystalline, with cleavage faces visible.
12,172-12,184	Dolomite; greenish gray, dense, very fine crystalline, pyritic.
12,184-12,194	Dolomite; grayish brown, dense, lithographic and sucrosic in part.
12,194-12,206	Dolomite; yellowish gray, sucrosic, some pinpoint porosity, black carbonaceous residue in fractures, some fluorescence, calcareous.
12,206-12,274	Limestone; brownish gray to dark gray, dense, very fine crystalline, pyritic, slightly fossiliferous, argillaceous.
12,274-12,332	Dolomite; dark gray, dense, sublithographic to very fine crystalline.
12,332-12,339	Dolomite; yellowish gray, dense, sublithographic bands of dark carbonaceous material.
12,339-12,355	Limestone; brown black, dense, sublithographic.
12,355-12,356	Limestone; grayish brown, dense, sucrosic.
12,356-12,358	Anhydrite; grayish brown, dense, massive.
12,358-12,360	Dolomite; medium dark gray, dense, sublithographic.
12,360-12,373	Anhydrite; grayish brown and white, massive.
12,373-12,377	Dolomite; pale yellowish brown, sucrosic, some pinpoint porosity, calcareous, slight fluorescence.
12,377-12,384	Limestone; grayish brown, sucrosic to subcrystalline, dense, anhydrite inclusions.
12,384-12,386	Dolomite; pale yellowish brown, dense, very fine crystalline to sublithographic, some oil stain.
12,386-12,402	Limestone; grayish brown, dense, sublithographic, fossiliferous.
12,402-12,426	Limestone; brownish black, dense sublithographic fossiliferous, anhydrite filled fractures and inclusions, carbonaceous material in stylolites.
12,426-12,442	Anhydrite; brownish black, dense, massive.
12,442-12,444	Dolomite; pale yellowish brown, very fine crystalline to sublithographic, dense.
12,444-12,445	Limestone; brownish black, dense, very fine crystalline.
12,445-12,453	Dolomite; as 12,442-12,444.
12,453-12,456	Anhydrite; brownish black massive, dense.
12,456-12,458	Limestone; as 12,444-12,445.
12,458-12,466	Dolomite; as 12,442-12,404, black carbonaceous, residue in fractures.
12,466-12,477	Dolomite; pale yellowish brown, very fine grained, fossiliferous.
12,477-12,511	Limestone; grayish brown, dense, lithographic.
End of cored section.	
12,511-12,520	Missing samples.
12,520-12,556	Limestone; grayish brown, lithographic, dense.
12,556	Total Depth