

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 201

Summary of the Anschutz Drilling Co., Inc. - Einar Christianson #1
Renville County, North Dakota
Well No. 1689 - Permit No. 1701

by Robert Eisenhard and Jay Garske
October 1958

Anschutz Drilling Co., Inc. - Einar Christianson #1. Location: Center NE 1/4 NW 1/4 Section 7, T. 158N., R. 81W. Elevation: 1532 K.B. Total Depth 6970 feet. Plug Back Depth 4575 feet.

The Anschutz Drilling Co., Inc. - Einar Christianson #1 was spudded December 13, 1957 and completed February 21, 1958 as a new oil discovery (Glenburn Field).

Logs:

Laterolog - gamma ray, microlaterolog, electrical, and gamma ray-neutron.

Cores:

#1 4479-4499
#2 4499-4519
#3 4519-4539

Tests:

DST #1: 4466-4479. Open 3 hours, shut in 30 minutes. Good blow, decreasing to fair and remaining constant, gas to surface in 45 minutes. Recovered: 450 feet of gas, 1000 feet of heavily gas cut oil, and 90 feet of slightly mud cut, heavily gas cut oil, no water. Pressures: IFP 33#, FFP 512#, SIP 1988#, IHP 2525#, FHP 2525#.

DST #2: 4479-4499. Open 2 hours, shut in 45 minutes. Fair blow throughout, no gas to surface. Recovered: 270 feet of oil, 180 feet of heavily oil and gas cut mud, and 150 feet of oil and gas cut mud, no water. Pressures: IFP 50#, FFP 222#, SIP 2046#, IHP 2546#, FHP 2473#.

DST #3: 4499-4512 (Straddle). Open 2 hours, shut in 45 minutes. Fair blow decreasing slightly throughout. Recovered: 390 feet of gas cut oil, 90 feet of oil and gas cut mud, and 60 feet of salt water. Pressures: IFP 32#, FFP 197#, SIP 2066#, IHP 2481#, FHP 2481#.

DST #4: 4512-4539. Open 3 hours, shut in 1 hour. Fair blow decreasing to weak, gas to surface in 2 hours and 5 minutes. Recovered: 180 feet of oil and gas cut muddy salt water, and 720 feet of muddy salt water. Pressures: IFP 25#, FFP 445#. Rock under seal valve: No SIP. HP 2443#.

DST #5: 5788-5845. Open 3 hours, shut in 45 minutes. Good blow throughout. Recovered: 3375 feet of water. Pressures: IFP 40#, FFP 1788#, SIP 2590#, HP 3138#.

DST #6: 6704-6754. Failed.

DST #7: 6694-6754. Open 3 hours, shut in 45 minutes. Weak blow decreasing to very weak. Recovered: 60 feet of water cut mud, and 360 feet of muddy water.

Pressures: IFP 60#, FFP 201#, SIP 2306#, IHP 3884#, FHP 3771#.

Perforations:

Perforated the Mission Canyon formation from 4450-4459 (corrected) with 4 shots per foot and acidized with 250 gallons of mud acid.

Completion Data:

Initial production was 205 barrels of oil per day (11% water), based on a 24 hour pump test. Gas-oil ratio 60, API gravity 25.5.

Casing Record:

10 3/4" casing set at 311 feet with 245 sacks of cement.

5 1/2" casing set at 4575 feet with 250 sacks of cement.

Formation tops were determined from samples and electrical logs, corrected to the electrical logs. Doubtful or obscure formations were not picked. Colors and descriptive numbers were taken from the Goddard, et. al., 1951 Rock Color Chart distributed by the Geological Society of America, New York, N.Y.

FORMATION TOPS

Cretaceous System	
Pierre formation	510
Niobrara formation	1771
Greenhorn formation	2152
Fall River sandstone	2668
Jurassic System	3008
Rierdon formation	3247
Piper limestone	3542
Triassic System	
Spearfish formation	3794
Mississippian System	
Charles formation	4037
Mission Canyon formation (MC-3)	4470
Lodgepole formation	4819
Englewood formation	5430
Devonian System	
Lyleton formation	5462
"Nisku" formation	5550
Duperow formation	5641
Souris River formation	6040
Dawson Bay formation	6280
Prairie Evaporite	6431
Winnipegosis formation	6665
Ashern formation	6770
Silurian System	
Interlake group	6827

330-360 Siltstone, white, very calcareous; lignite; some medium to very coarse sand grains, subangular to rounded, mostly quartz and some limestone, etc.

360-370 Siltstone, white to very light olive gray (5Y7/1) calcareous, much glauconite.

370-480 Siltstone, white to very light olive gray (5Y7/1) argillaceous, calcareous; lignite; medium to very coarse sand grains, subrounded to rounded, mostly quartz.

480-510 Siltstone, white to very light olive gray (5Y7/1) calcareous, argillaceous, much glauconite.

510-570 Shale, light gray, silty.

570-600 Shale, medium light gray and pale yellow brown.

600-660 Shale, medium light gray.

660-690 Shale, medium light gray; minor medium gray calcite.

690-1560 Shale, medium light gray.

1560-1570 Shale, medium light gray and medium dark gray, flaky; minor white bentonite.

1570-1680 Shale, medium light gray to medium dark gray, some light olive gray ironstone fragments.

1680-1710 Shale, medium light gray.

1710-1800 Shale, medium light gray to medium dark gray.

1800-1830 Shale, as above; medium dark gray calcareous shale with abundant white specks.

1830-1860 Shale, medium dark gray, calcareous, with abundant white specks.

1860-1920 Shale, as above and medium light gray.

1920-1950 Shale, dark gray.

1950-2010 Shale, medium light gray and medium dark gray, calcareous with abundant white specks.

2010-2040 Shale, medium light gray to medium dark gray.

2040-2070 Shale, as above, minor dark gray calcareous shale with abundant white specks.

2070-2130 Shale, medium light gray to medium dark gray, some medium dark gray calcareous shale with abundant white specks.

2130-2220 Shale, medium light gray and medium dark gray, minor medium dark gray calcareous shale with abundant white specks.

2220-2250 Shale, dark gray, abundant *Inoceramus* fragments and minor dark gray calcareous shale with abundant white specks and other fossil debris.

2250-2280 Shale, medium light gray to dark gray, minor dark gray calcareous shale with abundant white specks.

2280-2310 Shale, medium dark gray, calcareous, with abundant white specks; abundant *Inoceramus* fragments.

2310-2370 Shale, medium dark gray, some calcareous, with abundant white specks.

2370-2400 Shale, medium dark gray and dark gray.

2400-2470 Missing.

2470-2500 Shale, medium gray and medium dark gray.

2500-2530 Shale, medium gray,

2530-2680 Shale, medium gray and medium dark gray.

2680-2730 Sand, coarse, rounded to subangular, clear quartz; some shale from above.

2730-2790 Sand, coarse, rounded to subrounded, clear quartz; medium gray shale.

2790-2820 Shale, medium gray to medium dark gray; some sand as above; some moderate red and dusky yellow carbonate nodules.

2820-3010 Sandstone, iron stained, medium to coarse, subrounded to sub-angular quartz grains; medium gray shale.

3010-3100 Shale, medium dark gray to medium light gray.

3100-3280 Shale, medium dark gray and minor grayish yellow green, minor white very fine grained sandstone; much pyrite.

3280-3370 Shale, medium dark gray and greenish gray (5GY6/1).

3370-3400 Shale, medium dark gray, medium gray and greenish gray (5GY6/1).

3400-3460 Shale, medium dark gray, medium gray, grayish red (10R4/2) and greenish gray (5GY6/1); minor white very fine grained calcareous siltstone.

3460-3490 Shale, as above; some subrounded very fine to fine grained white calcareous sandstone.

3490-3520 Shale as above; some pinkish gray very fine crystalline limestone.

3520-3540 Shale, as above.

3540-3570 Shale, as above, with minor white calcareous very fine grained sandstone.

3570-3620 Shale as above; minor white to very light gray very fine crystalline limestone.

3620-3650 Limestone, pinkish gray, very fine crystalline, with minor quartz grain inclusions, shale as above.

3650-3710 Limestone, pinkish gray, very fine crystalline; medium dark gray to medium light gray, greenish gray (5GY6/1) and moderate reddish brown shale.

3710-3740 Limestone, pinkish gray, very fine crystalline; greenish gray (5GY6/1) and (5G6/1), medium dark gray and grayish red (R4/2) shale.

3740-3760 Limestone and shale, as above; minor white slightly calcareous very fine grained sandstone.

3760-3770 Shale, as above, minor limestone and sandstone as above.

3770-3800 Shale and minor limestone, as above; minor white fine crystalline and sublithographic anhydrite.

3800-3830 Shale, medium dark gray to medium light gray, greenish gray (5GY6/1) and grayish red (10R4/2) minor white fine crystalline and sublithographic anhydrite.

3830-3860 Shale, as above; minor moderate reddish orange siltstone.

3860-3910 Sandstone, moderate reddish orange slightly calcareous, rounded to subrounded, frosted, iron stained, very fine, quartz grains; medium dark gray to medium light gray, greenish gray (5GY6/1) and (5G6/1) and grayish red (10R4/2) shale cavings.

3910-3990 Sandstone as above with some grains up to medium sand size; shale cavings as above.

3990-4000 Shale, greenish gray (5GY6/1) very light olive gray (5Y7/1); very light olive gray (5Y7/1) siltstone; sandstone as above.

4000-4010 Shale, medium greenish gray (5G7/1); some shale and siltstone, as above.

4010-4040 Shale, as above; minor white calcareous siltstone; minor fine crystalline white anhydrite.

4040-4045 Dolomite, pale red, very fine crystalline with some white very fine crystalline anhydrite; shale and siltstone, as above.

4045-4050 Shale, greenish gray (5GY6/1); minor white calcareous very fine grained sandstone.

4050-4055 Shale, as above; minor grayish orange pink dolomite, minor white fine crystalline and sublithographic anhydrite, minor white calcareous very fine sandstone.

4055-4060 Siltstone, pale red (10R6/2) very dolomitic, shale and minor anhydrite as above.

4060-4070 Dolomite, pale red and grayish orange pink, very fine crystalline and some silty; shale and minor anhydrite as above.

4070-4075 Dolomite, grayish orange pink to pale red (10R6/2) with white sublithographic and fine crystalline anhydrite; greenish gray (5GY6/1) shale.

4075-4085 Limestone, pinkish gray (5YR8/1) very fine crystalline to oolitic, some crystalline pale yellowish brown anhydrite inclusions; shale as above.

4085-4090 Shale, greenish gray (5GY6/1) and minor moderate reddish orange; minor white sublithographic anhydrite and minor light gray siltstone.

4090-4100 Limestone, pale red (10R6/2) to grayish orange pink, very fine crystalline, dolomitic, pinkish gray oolitic limestone, shale as above.

4100-4115 Shale, greenish gray (5GY6/1); pinkish gray fine crystalline limestone with yellowish brown crystalline anhydrite inclusions; shale (4100 to 4145) apparently cavings-logs indicate somewhat porous limestone.

4115-4120 Shale, greenish gray (5GY6/1); minor limestone, as above.

4120-4125 Shale, medium dark gray and greenish gray; minor, limestone as above.

4125-4130 Shale, greenish gray (5GY6/1) and (5G6/1).

4130-4140 Shale, as above and minor moderate reddish brown.

4140-4145 Shale, greenish gray (5GY6/1) and (5G6/1), moderate reddish brown and medium dark gray.

4145-4150 Anhydrite, grayish pink, fine crystalline; shale cavings.

4150-4160 Shale, pale yellowish brown, greenish gray (5GY6/1), and medium dark gray; minor light brownish gray to pinkish gray fragmental and fine crystalline limestone. Shale probably cavings.

4160-4180 Shale, greenish gray (5GY6/1), probably cavings; very minor white crystallized anhydrite.

4180- Shale as above; some silty, calcareous greenish gray (5GY6/1) shale, probably cavings. Logs indicate anhydritic limestone.

4180-4205 Shale, as above and some silty calcareous greenish gray (5GY6/1) shale, probably cavings; minor dark reddish brown shale with clear crystallized anhydrite. Logs indicate anhydritic limestone.

4205-4225 Shale, as above; some white fine crystalline and light gray sublithographic anhydrite.

4225-4230 Limestone, very pale yellowish brown (10YR7/2) to pinkish gray, fine crystalline with quartz grain inclusions; much shale cavings.

4230-4250 Limestone, brownish very light gray to pinkish gray, fragmental; some white to moderate orange pink crystalline anhydrite; shale cavings.

4250-4255 Shale cavings; probably anhydrite, white, very fine crystalline.

4255-4260 Anhydrite, white fine crystalline and very light gray sublithographic; shale caving.

4260-4270 Limestone, very pale yellowish brown, fragmental; some anhydrite, as above; shale cavings.

4270-4290 Anhydrite, very light gray, sublithographic, shale cavings.

4290-4295 Limestone, pinkish gray, very fine crystalline; anhydrite as above; shale cavings.

4295-4300 Limestone, very light brownish gray (5YR7/1) to pinkish gray, very fine crystalline and fragmental; shale cavings.

4300-4305 Limestone, as above and some oolitic; shale cavings.

4305-4310 Limestone, very light brownish gray (5YR7/1) to pinkish gray, very fine crystalline and fragmental with pale yellowish brown anhydrite crystals; shale cavings.

4310-4315 Limestone, by logs; samples greenish gray (5G6/1) and light olive gray (5Y5/2) shale cavings.

4315-4340 Limestone, pinkish gray, very fine crystalline; much shale cavings.

4340-4345 Limestone, pinkish gray, very fine crystalline and oolitic. Samples still mostly shale caving.

4345-4350 Limestone, as above and shale caving in sample. Log indicates anhydrite.

4350-4360 Anhydrite, light gray, sublithographic, shale cavings.

4360-4370 Limestone, pinkish gray, very fine crystalline and oolitic. Much cave material.

4370-4470 Anhydrite, white to very light gray, sublithographic. Much cave material in samples.

4470-4480 Anhydrite, as above, some yellowish gray fragmental and oolitic limestone with some vuggy porosity, good fluorescence and good cut.

Core #1

4479-4480 Limestone, very pale yellowish brown (10YR7/2) oolitic and fine crystalline, good fluorescence and cut.

4480-4481 Limestone, brownish very light gray, very fine crystalline and oolitic, good fluorescence, good cut.

4481-4482 Limestone, very pale yellowish brown, fragmental and oolitic, some inter-oolitic porosity some clear calcite in porosity, some stain and cut.

4482-4483 Limestone, as above, vuggy some clear crystallized anhydrite, clear crystallized calcite filling part of vugs.

4483-4484 Anhydrite, medium light gray, very fine crystalline, slightly calcareous.

4484-4485 Limestone, pale yellowish brown, very fine crystalline, dense, some cut.

4485-4487 Limestone, brownish very light gray, microsugrosic and oolitic, some scattered good porosity some fluorescence and fair cut.

4487-4488 Limestone, very pale yellowish brown, coarse oolitic and microsugrosic, good porosity, very good cut.

4488-4499 No recovery.

Core #2

4499-4501 Limestone, brownish very pale orange, very fine crystalline with fair pinpoint porosity, some clear calcite crystals, fair cut.

4501-4502 Limestone, brownish very pale orange, microsugrosic, and oolitic, some porosity, good cut, stylolites.

4502-4503 Limestone, brownish light gray, oolitic and microsugrosic, much clear, crystallized calcite, slight porosity.

4503-4507 Limestone, brownish light gray, oolitic and very fine crystalline, good porosity, some clear crystallized calcite filling part of porosity, good cut.

4507-4508 Limestone, brownish light gray, oolitic and very fine crystalline, some vuggy porosity, some clear crystallized calcite filling in part of porosity, good cut.

4508-4509 Limestone, as above, but with clear crystallized anhydrite filling most porosity, slight cut.

4509-4511 Limestone, very light gray, microsucrosic with medium gray oolites, slight porosity.

4511-4512 Limestone, very light brownish gray (5YR7/1) oolitic and fragmental, much clear crystallized anhydrite and calcite.

4512-4513 Limestone, very pale yellowish brown (10YR7/2) oolitic and fragmental some porosity and some clear calcite crystallized in porosity, fair stain and good cut.

4513-4519 No recovery.

Core #3

4519-4520 Limestone, very pale yellowish brown (10YR7/2) microsucrosic with few oolites, slight very fine porosity, slight cut.

4520-4521 Limestone, very pale yellowish brown (10YR7/2) very fine crystalline, oolitic and fragmental, some clear calcite and clear anhydrite crystals; very slight porosity and slight cut.

4521-4522 Limestone, light gray, microsucrosic with some fragments and oolites, very slight cut.

4522-4523 Limestone, pale yellowish brown, oolitic and fragmental, slight porosity, fair cut.

4523-4524 Limestone, very light gray, microsucrosic, few oolites, good pinpoint porosity, slight cut.

4524-4525 Limestone as above, partially fragmental, slight porosity and cut.

4525-4526 Limestone, brownish very pale orange, microsucrosic and slightly fragmental and oolitic, fair pinpoint porosity with fair cut.

4526-4527 Limestone, pale yellowish brown, fragmental and oolitic, good porosity, some clear crystallized calcite, good cut.

4527-4528 Limestone, yellowish gray, microsucrosic and fragmental, some pinpoint porosity, very slight cut.

4528-4529 Limestone, very light gray, fragmental and microsucrosic, good pinpoint porosity.

4529-4530 Limestone, as above, slight porosity and very slight cut.

4530-4531 Limestone, very pale yellowish, fragmental, some oolites, slight porosity, good cut.

4531-4532 Limestone, light gray, microsucrosic, slightly fragmental with very small oolites, good pinpoint porosity, slight cut.

4532-4534 Limestone, brownish light gray, microsucrosic and very fragmental with few oolites, some pinpoint porosity, thin medium brownish gray streaks.

4534-4539 No recovery.

Samples

4540-4545 Cavings.

4545-4555 Limestone, very pale yellowish brown oolitic and fragmental; much caving.

4555-4585 Limestone, very pale yellowish brown, microsucrosic fragmental, some porosity.

4585-4600 Limestone, very pale yellowish brown, argillaceous, sucrosic, good porosity.

4600-4610 Limestone, yellowish gray, sucrosic and fragmental, some porosity.

4610-4615 Limestone, yellowish gray to pinkish gray, fragmental.

4615-4625 Limestone, light gray to pinkish gray, fragmental and oolitic, some porosity.

4625-4630 Limestone, brownish light gray to pinkish gray, fragmental.

4630-4635 Limestone, as above with some oolitic.

4635-4655 Limestone, light gray and pinkish gray, fragmental, sucrosic and very fine crystalline.

4655-4665 Anhydrite, light gray, sublithographic.

4665-4680 Limestone, pinkish gray, oolitic, fragmental and minor medium grained calcarenite.

4680-4692 Limestone, very light gray, oolitic, and fragmental.

4692-4699 Limestone, pinkish gray, microsucrosic, some oolitic and fragmental.

4699-4705 Calcarenite, pinkish gray, medium size medium light gray and yellowish gray grains; much caving shale.

4705-4720 Limestone, light to pinkish gray, fragmental; much shale cavings.

4720-4725 Limestone, yellowish gray, microsucrosic, dolomitic.

4725-4735 Limestone, yellowish gray, microsucrosic and fragmental.

4735-4740 Limestone, yellowish gray, microsucrosic and fragmental with minor oolites.

4740-4745 Limestone, light gray, fragmental and very fine crystalline.

4745-4755 Limestone, pinkish gray, sucrosic and fragmental.

4755-4800 Limestone, as above and some sublithographic.

4800-4815 Limestone, pinkish gray, fragmental, much shale cavings.

4815-4845 Limestone, light gray to pinkish gray, fragmental.

4845-4860 Limestone, medium light gray to very light gray, fragmental and fine crystalline argillaceous.

4860-4888 Limestone, medium light gray and very light gray, fragmental and argillaceous.

4888-4900 Limestone, as above and light gray very fine crystalline and fragmental.

4900-5085 Limestone, light gray, fragmental.

5085-5095 Limestone, light gray, fragmental and fine crystalline.

5095-5160 Limestone, light gray, fragmental.

5160-5200 Shale, dark gray to medium light gray; some limestone, as above; and medium light gray argillaceous limestone.

5200-5210 Limestone, medium light gray fragmental; shale savings from above.

5210-5250 Limestone, medium light gray, fragmental and fine crystalline.

5250-5275 Limestone, light gray, fine crystalline, some recrystallized.

5275-5290 Limestone, as above, minor oolitic; a few fossil fragments.

5290-5300 Limestone, fine crystalline, medium light gray.

5300-5360 Limestone, fine granular, little pinpoint porosity, medium light gray and light brownish gray.

5360-5380 Limestone, fine crystalline, dense, light brownish gray to dark brownish gray 5YR3/1.

5380-5385 Shale, grayish black, fissile compact.

5385-5400 Shale as above, and some fine crystalline, dense, medium light gray limestone.

5400-5420 Limestone, very fine granular, dense, shaly in part, medium dark gray.

5420-5430 Limestone, very fine granular, chalky in part, very pale orange to dark yellowish brown.

5430-5440 Limestone, very fine granular, some slightly oolitic, very pale orange to pale yellowish brown.

5440-5450 Shale, black, carbonaceous, fissile, compact.

5450-5460 Dolomite, calcitic, sucrosic, light gray to medium dark gray, and few pieces of black carbonaceous shale.

5460-5465 Shale, dark gray, lumpy, spongy.

5465-5475 Limestone, dolomitic, sucrosic, very pale orange to pale yellowish brown.

5475-5485 Limestone as above to grayish orange pink.

5485-5495 Siltstone, moderate reddish orange, lumpy, soft.

5495-5500 Siltstone, as above to moderate reddish brown.

5500-5505 Missing.

5505-5520 Shale, light gray to grayish black, fissile compact, and little siltstone, as above.

5520-5530 Anhydrite, snowy to sugary, white to moderate orange pink.

5530-5535 Shale and siltstone as above (5505-5520).

5535-5555 Anhydrite, earthy, soft, white to moderate orange pink.

5555-5560 Limestone, fine granular, some pinpoint porosity, very pale orange to dark yellowish brown.

5560-5570 Limestone as above, and little medium oolitic limestone, dusky yellowish brown.

5570-5580 Limestone, fine granular as above, and little earthy, soft, white anhydrite.

5580-5585 Limestone, dolomitic, sucrosic, very pale orange to dark yellowish brown.

5585-5600 Limestone as above with good pinpoint porosity.

5600-5625 Dolomite, calcitic, sucrosic, good interstitial porosity, pale yellowish brown.

5625-5640 Dolomite as above, and some fine to medium fragmental limestone, soft, very pale orange to dark yellowish brown.

5640-5645 Limestone, sucrosic to medium fragmental, some interstitial porosity, very pale orange to dark yellowish brown.

5645-5650 Limestone as above, and some earthy, soft, white anhydrite.

5650-5660 Dolomite, microsucrosic, pale red 10R6/2 to pale reddish brown.

5660-5665 Dolomite as above, and some very fine granular, very pale orange limestone.

5665-5675 Dolomite, calcitic, sucrosic, fair to good interstitial porosity, dark yellowish brown.

5675-5685 Dolomite as above to light gray.

5685-5690 Limestone, cryptocrystalline to very fine crystalline, dense, very pale orange to dark yellowish brown.

5690-5695 Limestone, fine crystalline, dense, medium dark gray.

5695-5705 Anhydrite, earthy, soft, white.

5705-5710 Limestone, fine crystalline, to fine granular, little scattered porosity, very pale orange to dusky yellowish brown.

5710-5715 Anhydrite, earthy to snowy, soft, white to yellowish gray.

5715-5735 Limestone, fine to very fine granular, chalky in part, very pale orange to dark yellowish brown.

5735-5740 Dolomite, calcitic, very fine granular, light gray.

5740-5745 Dolomite, as above to light brown 5YR6/4.

5745-5755 Limestone, very fine to medium granular, very pale orange to pale yellowish brown.

5755-5785 Limestone, mostly very fine to medium granular, little medium oolitic, very pale orange to dark yellowish brown.

5785-5790 Limestone, very fine to medium granular, as above.

5790-5795 Limestone as above, with little black carbonaceous residue on a few pieces.

5795-5820 Limestone, very fine granular to sucrosic, very pale orange to dark yellowish brown.

5820-5840 Limestone, dolomitic in part, sucrosic, good pinpoint porosity and some scattered vuggular porosity, very pale orange to dark yellowish brown.

5840-5850 Poor samples, mostly cavings, probably limestone as above.

5850-5860 Dolomite, sucrosic, good interstitial porosity, dark yellowish brown.

5860-5865 Dolomite as above, with very good porosity and scattered dead oil stain, slight fluorescence, no cut.

5865-5910 Dolomite, as above (5850-5860).

5910-5950 Dolomite, as above, and little fine crystalline, dense, dusky yellowish brown limestone.

5950-5965 Limestone, very fine granular, chalky, very pale orange.

5965-5995 Limestone, very fine granular as above, and fine to medium fragmental, dense, dark yellowish brown.

5995-6010 Limestone, fine granular, fair porosity, very pale orange.

6010-6015 Limestone as above, and some dolomitic limestone, sucrosic, light gray.

6015-6030 Limestone, fine crystalline, dense, pale yellowish brown.

6030-6095 Limestone, dolomitic, fine granular, light brown 5YR6/4 and light gray.

6095-6105 Limestone, fine crystalline, dense, light gray to medium gray and yellowish gray 5Y8/1.

6105-6130 Limestone, very fine granular, yellowish gray to light gray.

6130-6150 Limestone, very fine granular as above to fine crystalline, dense, dark yellowish brown, to dusky yellowish brown.

6150-6155 Limestone, dolomitic, sucrosic, pale yellowish brown to dark yellowish brown.

6155-6160 Anhydrite, earthy to snowy, white and much caved material.

6160-6170 Dolomite, sucrosic, fair interstitial porosity, very pale orange to dark yellowish brown.

6170-6180 Dolomite as above and little black, fissile, compact shale.

6180-6190 Anhydrite, earthy, soft, yellowish gray 5Y8/1, with some dolomite and shale as above.

6190-6225 Limestone, dolomitic, argillaceous, very fine grained, very pale orange to dark yellowish brown.

6225-6230 Limestone as above, and some dolomite, medium fragmental, little scattered pinpoint porosity, dark yellowish brown to dusky yellowish brown.

6230-6255 Dolomite, fine crystalline to medium fragmental to rhombic, dense, dark yellowish brown to dusky yellowish brown.

6255-6260 Dolomite, calcitic, fine granular, very pale orange to light gray.

6260-6285 Dolomite, fine granular as above to fine crystalline, dense, dark yellowish brown to dusky yellowish brown.

6285-6295 Dolomite, fine crystalline to medium fragmental, dense, mottled, moderate brown 5YR3/4 to brownish black 5YR2/1.

6295-6330 Dolomite, sucrosic, good interstitial porosity, very pale orange to dark yellowish brown.

6330-6345 Dolomite, as above, mostly very pale orange.

6345-6360 Dolomite, fine granular, fair intergranular porosity, very pale orange to pale yellowish brown.

6360-6385 Dolomite, as above to dark yellowish brown.

6385-6395 Limestone, fine crystalline, dense, light brownish gray to brownish gray and yellowish gray 5Y8/1.

6395-6400 Dolomite, fine crystalline to fine granular, dense, light brownish gray to brownish gray.

6400-6405 Dolomite as above with some intergranular porosity.

6405-6410 Dolomite as above, and some fissile to splintery black shale.

6410-6420 Shale, as above.

6420-6430 Poor samples, mostly cavings, probably black shale, as above.

6430-6600 Salt indicated on logs; samples composed entirely of caved material.

6600-6670 Anhydrite, earthy to snowy, soft, white, with some included moderate reddish orange to moderate reddish brown shale and much caved material.

6670-6690 Dolomite, very fine granular, dense, very pale orange.

6690-6695 Dolomite, very fine granular, fair to good intergranular porosity, banded in part, very pale orange to pale yellowish brown.

6695-6700 Dolomite as above, with some scattered brownish black dead oil stain, slight fluorescence and cut.

6700-6705 Dolomite as above, with very slight fluorescence and cut.

6705-6710 Limestone, very fine grained, chalky in part, white, and very pale orange to pale yellowish brown.

6710-6725 Limestone as above, with some banding, little dead oil stain, and slight fluorescence and cut.

6725-6730 Limestone, as above with slight fluorescence and no cut.

6730-6735 Limestone, very fine granular, fair to good intergranular porosity, white, and very pale orange to pale yellowish brown, scattered black carbon residue slight fluorescence and no cut.

6735-6750 Limestone, very fine to fine granular to fine crystalline, some good intergranular porosity, very pale orange to dark yellowish brown, little scattered staining, no fluorescence or cut.

6750-6755 Missing.

6755-6760 Anhydrite, earthy, white to grayish orange pink and much caved material.

6760-6765 Limestone, very fine granular, chalky in part, white to very pale orange.

6765-6790 Dolomite, calcitic, fine granular, fair intergranular porosity, grayish orange pink 5YR7/2.

6790-6810 Shale, moderate reddish orange to moderate reddish brown, dolomitic, brittle.

6810-6825 Anhydrite, earthy, lumpy, white, and some shale as above.

6825-6835 Limestone, very fine granular to fine crystalline, grayish orange pink to moderate reddish orange, and some anhydrite and shale as above.

6835-6840 Dolomite, calcitic, very fine granular, white to very pale orange.

6840-6850 Dolomite as above, and some lithographic limestone, dense, grayish orange pink 5YR7/2.

6850-6865 Dolomite, very fine granular as above to subcrystalline, glassy, dense, white to grayish orange pink 5YR7/2.

6865-6900 Dolomite, sublithographic, dense, very pale orange to pale orange 10YR7/2, and subcrystalline as above.

6900-6925 Dolomite, sublithographic to subcrystalline, dense, white to very pale orange.

6925-6940 Dolomite, subcrystalline, glassy, dense, white to very pale orange.

6940-6950 Dolomite as above (6900-6925).
6950-6970 Dolomite, calcitic, sucrosic, very pale orange to pale yellowish
brown and some sublithographic to subcrystalline dolomite, dense,
white to very pale orange, and grayish orange pink 5YR7/2.
6970- Total depth.