

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 220

Summary of the Mobil Producing Co. - Solomon Birdbear, et al F22-22-I
Dunn County, North Dakota
Well No. 793 - Permit No. 806

by William P. Eastwood & Dan E. Hansen
December, 1959.

Mobil Producing Company - Birdbear F22-22-I located in C SE 1/4, NW 1/4, sec. 22, T. 149N., R. 91W., Dunn County, North Dakota. Elevation of Kelly bushing - 2102 feet; ground level - 2091 feet. Drilling contractors - Lowell Drilling Co., Denver, Colorado.

The well was spudded on December 4, 1954 and total depth of 13,481 feet was reached on April 29, 1955. The well was non-productive and was plugged and abandoned; the rig was released May 8, 1955.

Core Record:

- #1 7,055-7,140 recovered 79 feet.
- #2 7,140-7,193 recovered 55 feet.
- #3 8,250-8,318 recovered 64 feet.
- #4 8,353-8,413 full recovery.
- #5 8,413-8,503 recovered 72 feet.
- #6 8,504-8,558 recovered 56 feet.
- #7 8,558-8,583 full recovery.
- #8 8,583-8,626 full recovery.
- #9 8,626-8,656 full recovery.
- #10 8,656-8,681 full recovery.
- #11 8,681-8,706 recovered 25 feet.
- #12 8,706-8,731 full recovery.
- #13 8,731-8,756 recovered 25 feet.
- #14 8,756-8,781 full recovery.
- #15 8,781-8,806 recovered 25 feet.
- #16 8,806-8,853 recovered 47 feet.
- #17 8,853-8,916 recovered 63 feet.
- #18 8,916-8,940 full recovery.
- #19 8,940-8,979 full recovery.
- #20 8,979-9,036 full recovery.
- #21 9,036-9,088 full recovery.
- #22 9,570-9,648 full recovery.
- #23 9,648-9,702 recovered 54 feet.
- #24 9,702-9,718 full recovery.
- #25 9,718-9,787 full recovery.
- #26 9,787-9,830 full recovery.
- #27 9,832-9,851 full recovery.
- #28 9,940-10,030 full recovery.
- #29 10,030-10,054 full recovery.
- #30 10,054-10,082 full recovery.
- #31 10,082-10,100 full recovery.
- #32 10,100-10,188 recovered 85 feet.
- #33 10,188-10,253 recovered 67 feet.
- #34 10,253-10,341 full recovery.
- #35 10,341-10,388 full recovery.

#36 10,388-10,469 full recovery.
#37 10,469-10,509 recovered 39 feet.
#38 10,537-10,613 full recovery.
#39 10,612-10,635 recovered 21 feet.
#40 10,635-10,724 recovered 89 feet.
#41 10,724-10,758 recovered 32 feet.
#42 10,758-10,818 full recovery.
#43 10,818-10,908 full recovery.
#44 10,908-10,991 recovered 83 feet.
#45 10,993-11,081 recovered 87 feet.
#46 11,081-11,171 recovered 90 feet.
#47 11,171-11,239 full recovery.
#48 11,239-11,328 recovered 10-15 feet.
#49 11,328-11,365 recovered 22 feet.
#50 11,365-11,454 full recovery.
#51 11,454-11,544 full recovery.
#52 11,544-11,633 full recovery.
#53 11,633-11,723 full recovery.
#54 11,723-11,790 full recovery.
#55 11,790-11,880 full recovery.
#56 11,880-11,947 recovered 63 feet.
#57 11,947-12,037 full recovery.
#58 12,037-12,122 full recovery.
#59 12,122-12,156 full recovery.
#60 12,156-12,190 full recovery.
#61 12,190-12,260 full recovery.
#62 12,260-12,296 full recovery.
#63 12,296-12,316 recovered 17 feet.
#64 12,316-12,375 recovered 56 feet.
#65 12,375-12,429 full recovery.
#66 12,429-12,459 recovered 22 feet.
#67 12,459-12,467 recovered 8 feet.
#68 12,467-12,472 recovered 1 1/2 feet.
#69 12,472-12,495 recovered 1 foot.
#70 12,495-12,548 full recovery.
#71 12,548-12,578 full recovery.
#72 12,578-12,624 recovered 46 feet.
#73 12,624-12,704 full recovery.
#74 12,704-12,771 full recovery.
#75 12,771-12,786 full recovery.
#76 12,786-12,855 full recovery.
#77 12,855-12,907 full recovery.
#78 12,907-12,994 full recovery.
#79 12,994-13,084 full recovery.
#80 13,084-13,170 full recovery
#81 13,170-13,248 full recovery.
#82 13,249-13,310 recovered 59 feet.
#83 13,310-13,396 recovered 90 feet.
#84 13,396-13,481 full recovery.

DST #1: (8175-8205) Single packer. Open 1 3/4 hours, shut in 15 minutes.
Weak blow for 8 minutes, then died. Recovered 30' mud. IFP 50 psi,
SIP 2100 psi, FFP 50 psi, HHP 4900 psi.

DST #2: (8553-8583) Open hole test, packer at 8553'. Open 3 hours, 8 minutes, shut in 30 minutes. Weak blow throughout. Recovered 630' black and brackish salty sulphur water with show of gas, and 45' muddy salt water. IFP 275 psi, FFP 400 psi, SIP 3225 psi, HHP 4875 psi.

DST #3: (8840-8940) Open 3 hours, shut in 30 minutes. West blow increasing to fair blow for one hour, weak blow for 5 minutes, dead remainder of test. Recovered 210' slightly gas-cut mud with specks of dark brown oil, no water. IFP 275 psi, FFP 300 psi, SIP 2225 psi, HHP 5080 psi.

DST #4: (8999-9036) Open 1 1/2 hours, shut in 30 minutes. Fair blow 15 minutes, increasing to good blow for 1 hour, decreased to fair blow for remainder of test. Recovered 284' gas-cut, muddy salt water with scum of oil, 930' black, salty sulphur water. IFP 0, FFP 625 psi, SIP 3875 psi, HHP 5175 psi.

DST #5: (9976-10,054) Open 4 hours, 3 minutes, shut in 30 minutes. Very weak blow throughout. Recovered 510' mud, 210' slightly gas cut mud, 180' heavily gas-cut mud with slight show of green oil, 120' heavily gas-cut mud slightly oil-cut. IFP 225 psi, FFP 260 psi, SIP 350 psi, HHP 5050 psi.

DST #6: (10,045-10,100) Open 3 1/2 hours, SI 30 minutes. Very weak blow for 15 minutes, dead remainder of test. Recovered 100' mud, 360' slightly gas cut mud, 150' heavily gas-cut mud. IFP 0, FFP 250 psi, SIP 350 psi, HHP 5000 psi.

DST #7: (10,326-10,388) Open 3 hours, 2 minutes, SI 30 minutes. Very weak blow throughout. Recovered 360' muddy water cushion, 390' water-cut mud, 270' heavily water-cut mud, 630' muddy salt water, 1800' salt water. IFP 375 psi, FFP 1675 psi, SIP 4275 psi, HHP 5250 psi.

DST #8: (10,712-10,724) Open 4 hours, SI 30 minutes. No blow. Closed tool after 40 minutes, equalized and reopened, no result. Recovered 210' mud and 720' water cushion, slightly oil flecked. IFP 355 psi, FFP 375 psi, SIP 1975 psi, HHP 5325 psi.

DST #9: (12,626-12,771) Open 4 hours, SI 30 minutes. Very weak blow for one minute, dead remainder of test. Recovered 660' clear water cushion, 1740' brownish water with scum and residue, 150' muddy water, 90' drilling mud. IFP 1260 psi, FFP 1270 psi, SIP 4540 psi, HHP 6550 psi.

DST #10: (12,770-12,855) Open 4 hours, SI 30 minutes. Very weak blow for 2 minutes, dead remainder of test. Recovered 2760' water cushion and 105' drilling mud. IFP 1190 psi, FFP 1275 psi, SIP 4715 psi, HHP 6450 psi.

DST #11: (13,075-13,170) Open 4 hours, SI 30 minutes. Weak blow one minute, dead remainder of test, Recovered 3010' water cushion and 20' drilling mud. IFP 1400 psi, FFP 1405 psi, SIP 3950 psi, HHP 6425 psi.

T.D. 13,481. P.B. 8,943. D.O. 9,016. Perforated 2" tubing 8995-9001' with four 1/2" bullets per foot. Set packer at 8941, acidized with 1500 gallons of 15% HCl. Initial injection pressure 3,400 psi, breaking to 3,000 psi. After treating pressure stood at 2100 psi.

Set packer at 8923' with stinger at 9000'. Swabbed black, salty sulphur water down to 3000'. Unable to swab below 3000'. Set cast iron retainer at 8975', squeezed 20 sacks cement through perforations, left 10 sacks cement on top of retainer. Well plugged and abandoned.

Casing Record:

13 3/8" surface casing at 485' with 400 sacks.
7" casing cemented at 9089 with 640 sacks; cut and recovered from 5240'.

Plugging Record:

#1 13,160-12,960 40 sacks cement
#2 11,750-11,550 40 sacks cement
#3 10,400-10,200 40 sacks cement
#4 9,016- 9,135 35 sacks cement (across shoe of 7" casing).
#5 Retainer at 8975', perforations 8995-9001 squeezed with 20 sacks.
10 sacks on top of retainer.
#6 Top of 7" casing at 5240' with 40 sacks.
#7 5,600- 4,880 50 sacks cement.
#8 500- 450 40 sacks cement (across shoe of surface pipe)
#9 10 sacks cement on top of surface pipe.

Logs Run:

Schlumberger Microlaterolog 6000'- T.D.
Schlumberger Laterolog-Gamma Ray 490'- T.D.
Schlumberger Gamma Ray-Neutron 100'- 9100'
Schlumberger Caliper log 6000'- T.D.

Formation tops were determined from samples and the electrical logs. In case of apparent disparity between the recorded depths of the samples and the depth as indicated by the logs, the log depth was used. Color names are those used in the Rock-Color Chart of the National Research Council.

FORMATION TOPS

Cretaceous System	
Pierre formation	1864
Niobrara formation	3655
Greenhorn formation	4178
Mowry formation	4593
Inyan Kara formation	4951
Jurassic System	
Swift formation (?)	5423
Rierdon formation	5794
Piper formation	5942
"Piper limestone"	6051
Triassic (?) System	
Spearfish formation	6300
Permian (?) System	
Minnekahta formation	6500
Opeche formation	6538
"Opeche salt"	6594
"Base/Opeche salt"	6670
Pennsylvanian (?) System	

Minnelusa formation"	6881
Mississippian System	
Heath formation	7395
Otter formation	7508
Kibbey formation	7643
"Kibbey lime"	7802
Charles formation	7961
Base last salt	8403
"Nesson marker"	8576
Mission Canyon formation	
(Base of last anhydrite)	8,656
Bakken formation	10,000
Devonian System	
Three Forks formation	10,076
Birdbear formation	10,310
Duperow formation	10,400
Souris River formation	10,743
Dawson Bay formation	11,052
Winnipegosis formation	
"Prairie evaporite"	11,170
Winnipegosis carbonates	11,344
Silurian System	
Interlake Group	
Upper Interlake beds	11,703
Middle Interlake beds	12,270
Lower Interlake beds	12,642
Ordovician System	
Stony Mountain formation (?)	12,850
Gunton mem. (?)	12,905
Shale mem.	12,980
Red River formation.	13,060
T.D.	13,481

0-210	Clay and silt, light brownish gray and light gray, with traces of light gray sandstone, very fine-grained.
210-240	Clay, light gray, and lignite.
240-500	Clay and silt, light brownish gray and light gray.
500-650	Clay and silt, light gray. Traces of lignite.
650-830	Lignite and clay and silt, as above.
830-860	Sandstone, light to medium gray, very fine to medium grained, angular, calcareous cement.
860-920	Clay and silt, light gray, traces of lignite, and sandstone, as above.
920-950	Clay and silt, light gray, small amounts of lignite.
950-1280	Clay and silt, light gray, with small amounts of very fine grained sand, loose quartz grains.
1280-1310	Sandstone, light to medium gray, very fine to medium grained, angular, calcareous cement.
1310-1430	Lignite and light silt and clay.
1430-1610	Clay and silt, light gray, with small amounts of lignite and loose, fine to medium grained, angular quartz grains.
1610-1730	Sandstone, fine to medium grained, angular, for the most part quartz grains. Clay and silt light gray. Traces of very light gray chert. Traces of pyrite.

1864 Top of Pierre formation.

1730-1890 Clay and silt, light gray, with sandstone, fine grained, traces of glauconite.

3655 Top of Niobrara formation.

1890-3700 Shale, medium gray to medium light gray, lumpy to massive.

3700-4060 Shale, medium gray, traces of calcite prisms. Rare traces of pyrite, light gray bentonite.

4060-4080 Shale, medium gray, with small amounts of dark gray shale, soft.

4178 Top of Greenhorn formation.

4080-4230 Shale, medium dark gray to dark gray, soft, massive to flaky.

4230-4350 Shale, dark gray, "white specks", calcareous. With small amounts of calcite prisms and traces of pyrite and light blue-gray bentonite.

4593 Top of Mowry formation.

4350-4610 Shale, medium dark gray, soft, massive to flaky. Traces of light gray silt from 4550-4600.

4610-4930 Shale, dark gray, soft, massive to flaky, traces of very fine grained glauconitic quartzose sandstone at 4720-4730. Traces of light gray silt from 4720-4930.

4951 Top of Inyan Kara formation.

4930-5010 Shale, as above. With very fine to fine grained quartzose sandstone, light gray.

5010-5230 Shale, as above. With traces of loose, coarse grained angular quartz and light gray silt, and small amounts of light brownish gray to reddish gray, iron carbonate - siltstone "pellets".

5230-5250 Shale, as above. With loose quartz grains, fine to granular, clear and white, angular to rounded.

5250-5280 Shale, as above. With loose quartz grains, fine to medium grained, clear, angular to subrounded. Small amounts of light brownish gray to reddish gray iron carbonate - siltstone "pellets".

5280-5340 Shale, as above. Loose quartz grains, medium grained to granular, clear to white, angular to rounded.

5340-5400 Shale, as above. With medium grained quartzose sandstone, light brownish (rusty) gray. Traces of pyrite. Traces of olive gray and light brownish gray shale and light gray glauconitic (?) siltstone to very fine grained sandstone.

5400-5410 Shale, as above. Traces of light gray, glauconitic (?) very fine grained sandstone and very argillaceous and arenaceous limestone.

5410-5420 Shale, as above. With loose, medium grained quartz, light brownish gray iron carbonate - siltstone "pellets" and traces of pyrite.

5423 Top of Swift formation.

5420-5430 Shale, as above. With brownish gray, reddish brown, and olive gray shale. Small amounts of light gray, very fine grained sandstone, glauconitic (?) and siltstone.

5430-5550 Shale, as above. With fine grained, white to light gray, calcareous, glauconitic, quartzose sandstone. Small amounts of reddish brown and greenish gray shale.

5550-5560 Shale, medium dark gray, massive to splintery. Traces of greenish gray and reddish brown shales.

5560-5620 Shale, as above. No traces of greenish gray or reddish brown shales. Shale has the same physical characteristics of the Cretaceous shales above.

5620-5660 Shale, as above. Small amounts of fine grained, calcareous, quartzose sandstone.

5660-5740 Shale, greenish gray, splintery and soft, laminated, silty. With calcareous, glauconitic, fine grained quartzose sandstone. Gray shale as above.

5740-5760 Shale and sandstone as above. Trace of arenaceous limestone.

5760-5790 Shale, greenish gray, splintery and soft, laminated, silty. Traces of fine grained, calcareous sandstone, and fine-medium grained, biotitic, very calcareous sandstone.

5794 Top of Rierdon formation.

5790-5820 Shale, greenish gray, splintery and laminated, silty, calcareous. Traces of dense, very fine grained, slightly calcareous, light gray sandstone.

5820-5850 Shale, as above. With small amounts of olive gray shale, brownish gray, dense limestone, fragmental and argillaceous grading into a slightly, calcareous brownish gray silty shale.

5850-5910 Shale, as above. With traces of fossil fragments.

5942 Top of Piper formation.

5910-5950 Shale, as above. With a very fine grained, calcareous sandstone, dense, grading into arenaceous limestone. A few of the sandstone fragments contain traces of glauconite.

5950-5970 Shale, greenish gray, splintery to massive, calcareous and shale, red brown, calcareous, massive. Small amounts of angular, medium, quartz grains.

5970-6010 Shales, as above. With white to very light gray, dense, to very coarse crystalline - limestone. Many Charophyta; Aclistochara (?) sp.

6010-6020 Shales, as above, and much medium dark gray shale. Limestone, light gray to light pinkish gray, dense to very coarse crystalline.

6020-6040 Shales, as above. Limestone, very arenaceous, light gray, varying to a calcareous, fine grained, dense sandstone, glauconitic.

6051 Top of "Piper lime".

6040-6060 Shale, medium dark gray. With small amounts of greenish gray shale and traces of calcareous, fine grained quartzose sandstone and dense, very light gray limestone.

6060-6100 Shale, medium to medium dark gray. Very small amounts of dense, very light gray to pinkish gray, very fine grained to sub-lithographic limestone.

6100-6230 Limestone, very light gray to pinkish gray, dense, fine grained to sublithographic, from 6100-6130, traces of white chert, limestone, fragments with inclusions of quartz and anhydrite, and limestone fragments with vugular porosity. Shale, as above. Small amounts of pale red, shaly limestone.

6230-6300 Shale, medium dark gray. Small amounts of limestone as above and traces of red-brown shale.

6300 Top of Spearfish formation.

6300-6350 Shale, as above. Small amounts of red-brown massive shale and traces of pink anhydrite.

6500 Top of Minnekahta formation.

6350-6550 Siltstone, shale and very fine grained sandstone, all pale reddish brown. Traces of medium grained, rounded, frosted quartz grains.

6538 Top of Opeche formation.

6550-6760 Medium dark gray shale. Small amounts of siltstone, shale, and sandstone as above. Poor samples.

6760-6770 Shale and dolomite, both pale red, the dolomite is dense, very fine grained, and shaly. Small amounts of pale red, fine grained sandstone.

6770-6820 Shale, medium dark gray. Traces of reddish brown shale.

6820-6880 Shale, as above. Small amounts of pale reddish brown to moderate reddish orange shale, siltstone and pale red very fine grained sandstone. Much cave. Also small amounts of moderate red shale and traces of rounded, frosted quartz grains.

6881 Top of Minnelusa formation.

6880-6900 Shale, medium and medium dark gray shale, cave from above. Traces of moderate red shale.

6900-7010 Sandstone, pale red to light red, fine-medium grained, quartzose with moderate pink to moderate red shale. The sandstone is calcareous in part and, at times, grades into an arenaceous limestone or dolomite.

7010-7050 Sandstone, dolomitic, and dolomite, very pale red. The sandstone is dense and very fine grained, the dolomite very dense, fine grained to sublithographic - shaly.

7050-7055 Samples missing.

Core Chip Description

Core #1 (recovered 79 feet, 7055-7140)

7055-7060 Shale and siltstone, very arenaceous, red-purple, dolomitic.

7060-7070 Dolomite, very arenaceous, very pale red purple.

7070-7080 Chert, white with some anhydrite. Good porosity from 7077-7080 is indicated on the microlog and coupled with the deflection on the gamma ray log a shale is indicated.

7080-7090 Sandstone, grayish pink, fine grained, quartzose, porous, dolomitic. Shale, grayish red purple, dolomitic.

7090-7100 No core chips.

7100-7110 Sandstone, very pale red purple, very dolomitic, very fine grained.

7110-7120 Dolomite, pale red purple, slightly argillaceous and arenaceous.

7120-7130 Limestone, light brownish gray, very fine grained, dolomitic and argillaceous, fair porosity.

7130-7140 Dolomite, pale red purple, very arenaceous and light gray-white anhydrite.

Core #2 (recovered 55 feet ?, 7140-7193).

7140-7153 Siltstone, pale purplish red, dolomitic and very pale purple red, argillaceous, dolomite.

7153-7163 Dolomite, pale purple red, very argillaceous and limy, fair porosity.

7163-7173 Sandstone, white, very fine grained, calcareous cement, mottled with purple staining. Dolomite, light brownish gray, dense, argillaceous, stained red in part.

7173-7183 Dolomite, grayish pale purple red, dense, argillaceous, very fine grained to sublithographic.

7183-7193 Siltstone, grayish pale purple red, dolomitic. Dolomite and shale, moderate red and pale red, very dense. End of core.

Sample Descriptions.

7193-7195 No samples.

7195-7230 Dolomite and sandstone, pale red purple, as above and moderate red shale. Much gray shale.

7230-7270 Dolomite, grayish pink, granular, fine-medium grained, slightly arenaceous and argillaceous. Dolomite and sandstone, as above.

7270-7300 Shale, moderate red, massive to splintery. Dolomite, grayish pink, dense, sublithographic to fine grained granular.

7300-7370 Dolomite, very limy, pinkish gray to very light brownish gray, sublithographic. With shale as above and medium dark gray shale (cavings).

7395 Top of Heath formation.

7370-7400 Shale, pale reddish brown and dolomite, pinkish gray to pale red purple, dense, fine grained to sublithographic. Much gray shale cavings.

7400-7410 Abundant moderate reddish brown siltstone and fine grained silty sandstone; common black shale (cavings?); common white fine crystalline limestone, rare moderate red fine grained silty sandstone; very rare loose rounded coarse quartz grains.

7410-7420 Abundant olive gray to medium gray shale; common siltstone and silty sandstone as above; common black shale as above; rare white and light pink limestone as above.

7420-7430 Common white to pink limestone; common red siltstone and sandstone as above; common black shale as above; rare medium gray shale as above; rare red shale and very rare moderate yellow shale.

7430-7440 Shale, siltstone, and sandstone as above; rare limestone as above.

7440-7450 Abundant red shale, siltstone and sandstone as above; rare limestone as above; common black shale; rare medium gray to light gray shale.

7450-7460 Abundant red shale and siltstone as above; very common black shale as above; rare limestone and medium gray shale as above.

7460-7470 As above with rare white to very light pink gypsum.

7470-7480 As above with gypsum as above and rare white shale.

7480-7490 Very abundant black to dark gray shale; rare limestone and red shale and siltstone as above; rare medium gray shale.

7490-7500 As above with one subangular quartz fragment.

7508 Top of Otter formation.

7500-7510 As above with rare moderate yellow shale; no quartz seen.

7510-7520 As above, some of the shale fragments coated with halite; very rare green shale; no moderate yellow shale seen.

7520-7530 As above; no halite.

7530-7540 As above with rare green shale and light green shaly limestone, rare white gypsum.

7540-7550 Black shale and red shale and siltstone as above; rare green shale and green limy shale; rare white limestone and white gypsum and anhydrite.

7550-7560 As above; green shale more common.

7560-7570 As above.

7570-7580 Black shale and red shale and siltstone as above; rare white to light pink limestone and green shale as above.

7580-7590 As above.

7590-7600 As above.

7600-7610 As above with rare medium gray limy shale, very rare green shale and very rare pyrite crystals.

7610-7620 Abundant medium gray limy shale; common black shale and red shale as above; rare limestone as above.

7620-7630 As above; rare anhydrite and pyrite crystals.

7630-7640 Shale and rare limestone as above.

7643 Top of Kibbey formation.

7640-7650 As above; common red limy shale.

7650-7660 Abundant red slightly limy shale; common black shale and medium gray limestone.

7660-7670 As above; rare anhydrite.

7670-7680 Abundant black shale (probably cavings); common red shale and siltstone; common medium gray shale; rare green shale; rare limestone and anhydrite.

7680-7690 As above with rare medium gray limestone.

7690-7700 Shale and siltstone as above; rare limestone and anhydrite as above.

7700-7710 As above, common limestone.

7710-7720 Black and red shale as above; rare moderate yellow limy shale; rare green shale as above; rare limestone and anhydrite.

7720-7730 As above with rare coarse white quartz sandstone with calcite cement.

7730-7740 As above with calcitic sandstone and sandy white limestone as above.

7740-7750 Black and red shale as above; rare limestone as above; rare loose rounded quartz grains.

7750-7760 Shale, as above; rare pink and white anhydrite and white limestone; very rare white sandy anhydrite.

7760-7770 Shale and very rare limestone as above; rare anhydrite as above.

7770-7780 Red and black shale and siltstone as above; rare moderate orange pink sandstone; rare medium gray shale; rare green shale; rare anhydrite, rare dusky red shale.

7780-7790 Abundant moderate orange pink very limy sandstone; rare pink limy anhydrite; black, red, and green shale as above.

7790-7800 As above.

7800-7810 Black, red and green shale as above; rare sandstone and anhydrite as above.

7810-7820 As above; rare white anhydrite and pink sandstone.

7820-7830 As above with common white anhydrite.

7830-7840 Shale and anhydrite as above; rare limy coarse grained sandstone as above and very rare medium gray limestone.

7840-7850 As above with rare fine grained white to pink limy sandstone.

7850-7860 Shale and anhydrite as above; rare medium gray limestone and rare sandstone as above.

7860-7870 Red and black as above; rare limestone as above; rare anhydrite as above; rare coarse grained limy sandstone.

7870-7880 Common light gray to medium gray limestone; shale, sandstone, and anhydrite as above.

7880-7890 As above with rare medium gray shale.

7890-7900 Shale as above; rare limestone as above.

7900-7910 As above.

7910-7920 As above.

7920-7930 Missing.

7930-7940 Red and black shale as above; common moderate orange pink fine grained limy sandstone; rare grayish olive shale.

7940-7950 Shale as above; badly caved.

7950-7960 Black and red shale as above; rare sandstone and grayish olive shale as above.

7961 Top of Charles formation.

7960-7970 As above with rare white limestone.

7970-7980 Red, black, grayish-olive and medium gray shale as above.

7980-7990 As above; rare white anhydrite.

7990-8000 As above.

8000-8010 As above; rare white anhydrite.

8010-8020 As above.

8020-8030 As above.

8030-8040 As above, white and pink anhydrite.

8040-8050 As above, badly caved.

8050-8060 Shale and anhydrite as above.

8060-8070 As above; rare halite coating some of the sample.

8070-8080 Shale and anhydrite with very rare light gray limestone.

8980-8090 As above; common green shale.

8090-8100 As above.

8100-8140 Missing.

8140-8150 Red and black shale; common white anhydrite.

8150-8160 As above; very rare halite.

8160-8170 Shale and anhydrite as above; rare halite.

8170-8180 Missing.

8180-8190 Shale, anhydrite and salt as above; rare very pale brown limestone.

8190-8205 Missing

8205 Circulation 1 1/2 hours. Red and black shale as above; common limestone as above; rare white anhydrite; rare green shale.

8205-8210 Abundant medium gray shale; common white anhydrite; common very light gray and very pale yellow-brown granular limestone; common red and black shale. Cavings.

8210-8220 Shale, anhydrite, and limestone as above; badly caved.

8220-8230 As above with pale yellow-brown very fine crystalline limestone and very rare pale yellow-brown oolitic and anhydritic limestone.

8230-8240 Shale and rare anhydrite as above.

8240-8250 As above; rare very light gray very shaly limestone.

Core #3

8250-8255 Dolomite, anhydritic, medium gray, fine crystalline, poor porosity.

8255-8260 Dolomite, medium gray, fine crystalline, tight.

8260-8265 Anhydrite, light gray to medium gray.

8265-8270 Limestone, pale yellowish brown, fine crystalline, tight, common small brown calcite crystals.

8270-8275 Limestone, as above with common masses of brown calcite.

8275-8280 Limestone, as above, fair porosity.

8280-8285 Limestone, pelletoid, pale yellow-brown, fine veins of clear calcite, poor porosity.

8285-8290 Pelletoid, limestone as above.

8290-8295 Limestone, pale yellowish-brown, finely granular, poor porosity and limestone, pale yellowish-brown, fine crystalline to finely granular, poor porosity, contained one conodont.

8295-8300 Limestone, granular and pelletoid, pale yellowish-brown, fair porosity.

8300-8305 Limestone, medium gray, fine crystalline, tight, faintly spotted with small clear calcite (?) masses.

8305-8310 Limestone, as above but slightly lighter in color and faintly granular.

8310-8315 Anhydrite, medium gray, finely crystalline, tight.
8315-8355 Missing.

Core #4

8355-8360 Dolomite, dark gray, argillaceous, laminated with black streaks, fair intergranular porosity.
8360-8365 Dolomite, grayish-olive, very finely granular, fair porosity.
8365-8370 Anhydrite, pale olive with inclusions of clear halite.
8370-8375 Halite with dark brown anhydrite.
8375-8380 Clear halite with brown anhydrite and clear fluid inclusions.
8380-8385 Colorless and light brown transparent halite.
8385-8390 Clear halite with brown anhydrite inclusions.
8390-8395 Halite, as above.
8395-8400 As above.
8400-8405 As above.
8405-8410 As above.
8410-8413 As above.

Core #5

8413-8415 Anhydrite, grayish olive, tight.
8415-3420 Anhydrite, as above.
8420-8425 Anhydrite, grayish olive laminated with olive gray anhydrite.
8425-8430 Limestone, grayish olive, argillaceous, very finely granular with white anhydrite inclusions, fair porosity.
8430-8435 Anhydrite, dark gray to olive gray.
8435-8440 Dolomite, pale olive, very finely granular, poor porosity, with disseminated pyrite inclusions.
8440-8445 Anhydrite, medium gray.
8445-8450 Anhydrite, medium gray, slightly dolomitic.
8450-8455 Anhydrite, as above.
8455-8460 Anhydrite, light gray, laminated with brown anhydrite.
8460-8465 Limestone, pale yellowish brown, granular and pelletoid with slight porosity and very faint glow; also dusky yellowish-brown fine crystalline, tight limestone with white anhydrite inclusions.
8465-8470 Limestone, pale yellowish brown, finely granular, slight porosity, with inclusions of brown anhydrite.
8470-8475 Anhydrite, white, with veins of brown fine crystalline limestone.
8475-8480 Limestone, dusky yellow brown, stained with dead oil, no glow.
8480-8485 Limestone, fine crystalline, as above.

Core #6

8505-8510 Limestone, pale yellowish-brown, fine crystalline to finely granular with white anhydrite and disseminated pyrite.
8510-8515 Limestone, dolomitic, pale yellowish brown, finely granular, fair porosity, no glow.
8515-8520 Anhydrite, dusky yellow brown.
8520-8525 Limestone, pale yellowish brown, finely granular, slight porosity.
3525-8530 Dolomite, very finely crystalline to finely granular and finely pelletoid. Fine crystalline dolomite has disseminated pyrite. Pale yellow-brown, poor porosity.
8530-8535 Limestone, dolomitic, pale yellowish-brown, granular and pelletoid with inclusions of white anhydrite, poor porosity.
8535-8540 Dolomite, limy, pale yellowish-brown, fine crystalline with scattered small pinpoint vugs. Poor porosity, staining in some of the vugs.

8540-8545 Limestone, finely granular and dark yellowish brown mottled with pale yellowish brown fine crystalline limy dolomite. Poor porosity.

8545-8550 Limestone granular, pale to moderate yellowish brown, pinpoint porosity, very faint glow.

8550-8555 Limestone, pelletoid, pale to moderate yellowish brown, pinpoint porosity.

8555-8558 Limestone, pale yellowish-brown, finely granular, good porosity.

Core #7

8558-8560 Limestone, pale yellowish-brown, bioclastic and pelletoid, pinpoint porosity, faintly laminated.

8560-8565 Dolomite, very finely granular, pale yellowish-brown, limy, fair porosity.

8565-8570 Limestone, pale yellowish-brown, very finely granular, good porosity with veins of calcite.

8570-8575 Limestone, pale yellowish-brown, finely granular, good intergranular porosity and in hairline vertical fractures. Fossil (?) fragments, faint glow, laminated with thin dark shale partings.

8576 Top of Nesson zone.

8575-8580 Limestone, pale yellowish-brown, fine crystalline with masses of medium gray shaly limestone, fair porosity.

8580-8583 Limestone, pale yellowish-brown, granular, laminated with dark brown anhydrite and limy anhydrite.

Core #8

8583-8588 Anhydrite, light gray.

8588-8593 Limestone, fine crystalline, pale yellowish-brown, poor porosity with large masses of light gray anhydrite.

8593-8598 Limestone pale yellowish-brown, dolomitic, finely granular, fair porosity, faint glow.

8598-8603 Limestone, dolomitic, pale yellowish-brown, granular and with small (2-3 mm.) vugs. Good porosity. Good glow and cut.

8603-8608 Limestone, pale yellowish-brown, granular and pelletoid, oil-stained, good porosity. Good glow and cut.

3608-8613 Oil stained limestone as above. A little tighter than above.

8613-8618 Limestone, pale yellowish-brown, finely granular, fair porosity, no oil stain, good glow.

8618-8623 Anhydrite, dark gray.

8623-3626 Anhydrite, as above.

Core #9

8626-8629 Anhydrite.

8629-8632 Anhydrite, limy.

8632-8635 Limestone, pale yellowish-brown, finely granular, anhydrite inclusions, slight staining, faint glow, fair porosity.

8635-8638 Limestone, pale yellowish-brown, finely granular, small anhydrite inclusions, very slight oil stain, good porosity laminated with thin anhydrite (?) streaks.

8638-8641 Anhydrite, light gray.

8641-8644 Limestone, dusky, brown, fine crystalline, tight, dead oil stain, very faint glow.

8644-8647 Anhydrite, light gray with veins of pale yellowish-brown, finely granular dolomite.

8647-8650 Finely granular pale yellowish brown dolomitic limestone with large masses of light gray anhydrite. Good porosity in the limestone.

8650-8653 Limestone, fragmental, dusky, yellowish-brown, dead oil stain, very weak glow, fair porosity, laminated with thin shale partings.

8653-8656 Anhydrite, light gray.

Core #10

8656 Top of Mission Canyon formation.

8656-8661 Limestone, oolitic, pale yellowish brown, matrix of fine crystalline limestone and white anhydrite, numerous small disconnected vugs, poor porosity, no stain, no glow.

8661-8666 Tight oolitic limestone as above with matrix composed of clear calcite and/or anhydrite with light gray fragmental tight limestone, with scattered oolites and with inclusions of clear anhydrite.

8666-8671 Limestone, fragmental and oolitic, pale yellowish-brown, fragments subrounded and composed of fine crystalline limestone, matrix of fine crystalline limestone and clear anhydrite. Poor porosity.

8671-8676 Limestone, oolitic, pale yellowish-brown, matrix of fine crystalline fragmental limestone, tight.

8676-8681 Oolitic and fragmental limestone as above with inclusion of clear and white anhydrite; and white massive anhydrite.

Core #11

8681-8685 Oolitic, anhydritic, limestone as above, stylitic.

8685-8690 Limestone, pale yellowish-brown, oolitic and pelletoid, small vugs good porosity; no show of oil.

8690-8695 Fragmental limestone, oolitic and stylitic, fair porosity, pale yellowish-brown, small vugs filled with clear calcite.

8695-8700 Limestone, pale yellowish-brown, fragmental, slightly oolitic, fair porosity, small masses of clear calcite, common disseminated pyrite, no fluorescence.

8700-8706 Limestone, pale yellowish-brown, fragmental and pelletoid, fair porosity, less common disseminated pyrite.

Core #12

8706-8711 Limestone, pale yellowish-brown, oolitic, matrix of finely crystalline yellowish-brown limestone and colorless calcite, scattered pinpoint vugs, low porosity.

8711-8716 Limestone, oolitic; large oolites floating in a matrix of small oolites and pellets with interstices filled with clear calcite, low porosity. Also pale yellowish-brown limestone with oolites and oolitic fragments floating in a matrix of fine-crystalline-fragmental limestone with interstices and small vugs filled with clear calcite, low porosity.

8716-8721 Limestone, pale yellowish-brown, oolites and oolitic fragments in matrix of fine-crystalline-fragmental to finely granular pale yellowish-brown limestone. Tight.

8721-8726 Limestone, as above, oolites and pseudo-oolites, small vugs filled with clear calcite. Tight.

8726-8731 Limestone, pale yellowish-brown, fragmental, fragments composed of fine-crystalline yellowish-brown limestone. Very tight.

Core #13

- 8731-8736 Limestone, pale yellowish-brown, oolitic, anhydritic. Oolites and pseudo-oolites in matrix of fragmental and pelletoid pale yellowish-brown limestone; common small vugs, some open and some filled with white and colorless anhydrite. Good Porosity. No glow.
- 8736-8741 Limestone, pale yellowish-brown, fine-crystalline-fragmental, rare small vugs filled with clear anhydrite crystals. Fair porosity, no show of oil.
- 8741-8746 Limestone, dark yellowish-brown, fragmental and pelletoid, vugs and small veins filled with clear anhydrite. Matrix of fine-crystalline limestone. Low porosity
- 8746-8751 Limestone, as above, rare oolites and/or pseudo-oolites.
- 8751-8756 Limestone, pale yellowish-brown, fragmental and pelletoid. Low porosity.

Core #14

- 8756-8760 Limestone, pale yellowish-brown, fragmental, slightly oolitic, interstices filled with fine-crystalline limestone. Numerous small masses of colorless anhydrite (?).
- 8760-8765 Limestone, pale yellowish-brown, fine-crystalline, common pseudo-oolites, numerous small masses of colorless anhydrite. Low porosity.
- 8765-8770 Limestone, pale yellowish-brown, granular and fossil-fragmental, rare pseudo-oolites, common masses of colorless anhydrite. Low porosity.
- 8770-8775 Limestone, pale to moderate yellowish-brown, pelletoid and pseudo-oolitic, stylitic with black carbonaceous (?) material concentrated along the seam. Interstices filled with fine-crystalline pale yellowish-brown limestone and colorless calcite. Low porosity. No vugs or cavities.
- 8775-8781 Limestone, pale to moderate yellowish-brown, oolitic, pelletoid and fragmental, Interstices filled with fine-crystalline limestone and colorless calcite. Rare vugs filled with colorless calcite and/or anhydrite. Low porosity.

Core #15

- 8781-8785 Limestone, moderate yellowish-brown, fine-crystalline-fragmental, low porosity; with dolomite, very pale orange, limy, finely granular, slight stain, weak glow, good porosity.
- 8785-8790 Limestone, as above.
- 8790-8795 Limestone, pale yellowish-brown, oolitic and pelletoid to finely granular, slight stain, good glow and cut, common small vugs some open and some filled with clear calcite. Good porosity.
- 8795-8800 Limestone, moderate yellowish-brown, oolitic with interstices filled with clear calcite and fine-crystalline limestone, small vugs filled with clear anhydrite; with limestone, pale yellowish-brown, fragmental and oolitic, anhydritic, low porosity, very weak glow.
- 8800-8806 Limestone, pale yellowish-brown, fine-crystalline-fragmental, veins and vugs filled with clear calcite, rare oolites, fair porosity, no fluorescence.

Core #16

- 8806-8810 Limestone, pale yellowish-brown, fine-crystalline-fragmental and sparsely oolitic, some open vugs, others filled with clear calcite, fair porosity.
- 8810-8815 Limestone, as above.
- 8815-8820 Limestone, as above, small vugs filled with clear calcite and white anhydrite.
- 8820-8825 Limestone, pale yellowish-brown, pelletoid and finely fragmental, algal (?) fragments, interstices filled with fine-crystalline limestone and clear calcite, fair porosity.
- 8825-8830 Limestone, moderate yellowish-brown, as above but slightly darker in color, low porosity, very weak fluorescence.
- 8830-8835 Limestone, as above.
- 8835-8840 Limestone, moderate yellowish brown, pelletoid, matrix of clear calcite, low porosity.
- 8840-8845 Limestone, finely granular, pale to moderate yellowish-brown, very weak fluorescence and cut, good porosity.
- 8845-8850 Limestone, fragmental, dark to dusky yellowish brown, dead oil stain, fair porosity, weak fluorescence and cut.
- 8850-8853 Limestone, dark brown, granular, laminated with much dark gray to black carbonaceous, slightly limy material, very weak fluorescence and cut.

Core #17

- 8854-8860 Limestone, moderate yellowish-brown, finely granular, faintly laminated low porosity.
- 8860-8865 Limestone, as above.
- 8865-8870 Limestone, dusky yellowish-brown, fragmental, bioclastic, low porosity, small stylolite.
- 8870-8875 Limestone, dark brown, fine-crystalline, rare fossil fragments. Low porosity, no fluorescence.
- 8875-8880 Limestone, pale yellowish-brown, fragmental, pelletoid, bioclastic, matrix of fine crystalline limestone and clear calcite, fair porosity, no fluorescence.
- 8880-8885 Limestone, dark yellowish brown, fragmental, bioclastic, low porosity, matrix of clear calcite. Fragments composed of fine-crystalline limestone and algal(?) fragments.
- 8885-8890 Limestone, fragmental, as above.
- 8890-8895 Limestone, pale yellowish-brown, coarsely fragmental bioclastic, small masses of white calcite, common echinoderm fragments, low porosity. Laminated with white calcite.
- 8895-8900 Limestone, as above, stylolitic with carbonaceous residue concentrated along the stylolite seam.
- 8900-8905 Limestone, as above.
- 8905-8910 Limestone, as above, laminated with thin carbonaceous streaks.
- 8910-8915 Fragmental, carbonaceous limestone as above. Dead oil stain, fair porosity, fair fluorescence and cut.

Core #18

- 8916-8920 Limestone, moderate yellowish-brown, fragmental, bioclastic, thin laminae of carbonaceous residue, common echinoderm remains, matrix of fine-crystalline yellowish-brown limestone, poor porosity.
- 8920-8925 Limestone, fragmental, algal (?), pale yellowish brown, matrix of fine crystalline moderate to pale yellowish-brown limestone, poor porosity.

8925-8930 Limestone, pale yellowish-brown, finely fragmental to granular, a few white calcite crystals, laminated with thin carbonaceous streaks, fair porosity.

8930-8935 Limestone, as above with pseudo-oolites and echinoderm and algal fragments, splotched with patches of very pale yellowish brown granular limestone, fair porosity, very weak fluorescence.

8935-8940 Limestone, moderate yellowish-brown, granular to finely fragmental, algal (?) fragments and rare pseudo-oolites, carbonaceous streak, fair porosity.

Core #19

8940-8945 Limestone, moderate yellowish-brown, medium crystalline, scattered small crystals of white calcite, poor porosity.

8945-8950 Limestone, moderate yellowish brown, fragmental, bioclastic, fair porosity.

8950-8955 Limestone, bioclastic, as above, fragments of echinoderms and horn corals.

8955-8960 Limestone, fragmental, bioclastic, algal, as above.

8960-8965 Limestone, as above, carbonaceous streak, no fluorescence.

8965-8970 Limestone, as above, faintly laminated with thin carbonaceous streaks, poor porosity.

8970-8975 Limestone, as above, oil stain, good fluorescence and cut. Good porosity.

8975-8979 Limestone, as above, good stain and fluorescence as above, good porosity.

Core #20

8979-8985 Limestone, pale yellowish-brown, finely granular, good porosity, no stain, fair fluorescence and cut.

8985-8990 Limestone, moderate to pale yellowish-brown, finely fragmental and finely pelletoid, matrix of clear calcite and fine crystalline, yellowish-brown limestone, scattered crystals of clear calcite, low porosity, good fluorescence and cut.

8990-8995 Limestone, dusky yellowish-brown to dark, fragmental and bioclastic, low porosity, very weak fluorescence. Carbonaceous streaks.

8995-9000 Limestone, as above.

9000-9005 Limestone, pale yellowish-brown, oolitic, matrix of clear calcite and very pale orange granular limestone, very good porosity, no fluorescence.

9005-9010 Oolitic limestone, as above.

9010-9015 Oolitic limestone, as above, fair porosity.

9015-9020 Oolitic limestone, as above, with dark brown fine-crystalline, bioclastic limestone, tight, no fluorescence.

9020-9025 Limestone, moderate to pale yellowish-brown, coarsely fragmental and bioclastic, matrix of clear to pale yellowish-brown calcite, fragments composed of pale yellowish-brown calcite and/or limestone and fossil fragments. Good porosity, no fluorescence.

9025-9030 Limestone, finely fragmental and pale yellowish-brown and medium gray dense fine crystalline limestone.

9030-9036 Limestone, finely fragmental, pale to moderate yellowish brown, low porosity.

Core #21

9036-9041 Limestone, fragmental, as above, scattered masses of white calcite, matrix of clear to yellowish-brown calcite.

9041-9046 Limestone, fine crystalline, dark yellowish-brown, tight.

9046-9051 Limestone, pale yellowish brown, fragmental and bioclastic, fragments of pale yellowish brown calcite and algal (?) material, matrix of very pale yellowish-brown, finely granular limestone, good porosity.

9051-9056 Limestone, pale yellowish-brown, finely granular, fair porosity, slight oil stain, weak fluorescence.

9056-9061 Limestone, moderate yellowish-brown, medium crystalline, low porosity, very weak fluorescence.

9061-9066 Limestone, as above.

9066-9071 Limestone, pale yellowish brown, coarsely fragmental, fragments of pale yellowish brown calcite, matrix of very pale orange limestone and clear and yellowish-brown calcite, good porosity, very weak fluorescence and cut.

9071-9076 Limestone, as above, fragmental with abundant algal (?) particles, good porosity. No fluorescence.

9076-9081 Limestone, dark yellowish brown, finely granular, common calcite veins, faint fluorescence and cut.

9081-9086 Limestone, pale yellowish brown, pseudo-oolitic and bioclastic pseudo-oolites, algal (?) and other fragments floating in a very pale orange, granular limestone matrix, good porosity, no fluorescence.

9086-9088 Limestone, as above.

9090-9095 Limestone, very pale orange to very light gray to pale yellowish brown when wet. Very fine grained with good intergranular porosity. Rare 4-5 mm vugs seen on large pieces.

9095-9100 Abundant limestone as above with common pieces of white to clear anhydrite and gypsum. None of the anhydrite seen in the limestone itself. Rare pieces of red siltstone.

9100-9105 Granular, slightly vuggy limestone as above. Vugs are spheroidal, possibly oolite cavities.

9105-9110 Limestone as above mottled reddish-brown.

9110-9115 As above, slightly mottled, slightly dolomitic.

9115-9120 As above.

9120-9125 Very light gray finely granular limestone as above, slightly argillaceous.

9125-9130 As above.

9130-9135 As above.

9135-9145 Common limestone as above with common medium gray and moderate brown fine crystalline psuedo-oolitic limestone.

9145-9150 Missing.

9150-9155 As above with common dark gray to black shale.

9155-9160 Limestone as above with rare small fragments of white anhydrite; rare black shale.

9160-9165 Common very light gray finely granular porous limestone as above; common moderate brown to medium gray finely crystalline limestone.

9165-9170 Limestone, as above; medium-brown limestone contains rare medium-sized pale brown calcite and/or dolomite crystals.

9170-9180 Limestone, as above.

9180-9190 Abundant pale yellowish-brown to dark gray fine crystalline limestone; rare very pale orange medium crystalline limestone; very rare black shale.

9190-9200 Abundant dusky yellowish-brown to very dark gray fine crystalline limestone. Very rare pale brown vuggy limestone (caving ?).

9200-9210 Dark limestone as above; rare fragments of brachiopod shells. Very rare white anhydrite.

9210-9220 Limestone, as above, stained reddish-brown; rare finely granular pale brown porous limestone.

9220-9230 Limestone, slightly dolomitic, finely granular to fine crystalline; grayish brown to dark gray with rare fragments of black shale and rare pieces of finely granular, soft, brassy-colored material (not pyrite).

9230-9240 Limestone, as above, iron-stained, reddish-brown, over-heated in drying oven.

9240-9250 Dolomitic limestone as above.

9250-9270 Missing.

9270-9280 Limestone, light, medium and dark gray; finely granular to fine crystalline; rare fossil fragments.

9280-9290 Limestone, fine crystalline, medium to dark gray, sparsely fossiliferous.

9290-9300 Limestone, medium gray; medium to fine crystalline; iron-stained, fragments of brachiopods more common than above.

9300-9310 Fine crystalline, fossiliferous, gray limestone, as above.

9310-9320 As above.

9320-9330 Fossiliferous limestone as above, rare dark gray shale.

9330-9340 Limestone, as above; rare fragments of medium gray pelletoid (?) limestone.

9340-9350 Limestone, as above, one rounded quartz grain seen.

9350-9360 Medium gray, fine crystalline limestone; rare brachiopod fragments.

9360-9370 Medium gray to light, gray, fine crystalline, fossiliferous limestone, slight iron-staining.

9370-9380 Limestone, as above.

9380-9390 As above.

9390-9400 Light gray to medium gray fine crystalline and finely pelletoid limestone.

9400-9410 Limestone, as above, brachiopod fragments.

9410-9420 As above.

9420-9430 Limestone, as above.

9430-9440 As above, iron-stained.

9440-9450 Iron-stained limestone, as above.

9450-9460 Limestone, as above, no fossil fragments seen.

9460-9470 Medium to dark gray fine-crystalline limestone.

9470-9500 Missing.

9500-9510 Limestone, finely granular, moderate reddish-brown, probably burnt in drying oven.

9510-9520 Limestone, as above, brachiopod fragments.

9520-9530 Limestone, medium to dark gray; fine crystalline rarely finely pelletoid, fossiliferous.

9530-9540 Limestone, as above.

9540-9550 Medium gray limestone as above, no fossils seen.

9560-9560 As above; sparse fossils.

Core #22

9570-9575 Limestone, dark brown to dark gray, fine crystalline, tight, no fluorescence, thin carbonaceous and/or argillaceous laminae.

9575-9580 As above.
 9580-9585 Dark gray limestone, as above.
 9585-9590 Limestone, as above.
 9590-9600 As above.
 9600-9605 As above, rare moderate yellowish brown calcite crystals.
 9605-9610 Dark gray, tight, fine crystalline limestone as above with thin black argillaceous and/or carbonaceous laminae.
 9610-9615 Dark gray, fine crystalline to sublithographic limestone. Tight.
 9615-9620 Limestone, as above.
 9820-9625 Limestone, dusky, yellowish brown, fine to medium crystalline.
 9625-9630 Limestone, as above.
 9630-9635 Limestone, as above, black carbonaceous laminae.
 9635-9640 Limestone, as above, no fluorescence.
 9640-9645 Limestone, as above.
 9645-9648 Limestone, as above.
 9648-9660 As above.
 9660-9670 As above, fine to medium crystalline.
 9670-9680 As above.

Core #23
 9680-9690 As above, rare fossil fragments.
 9690-9702 Fine crystalline dark gray limestone as above.

Core #24
 9702-9710 As above.
 9710-9718 As above, rare echinoderm fragments.

Core #25
 9718-9723 As above.
 9723-9728 As above.
 9728-9733 As above.
 9733-9738 As above.
 9738-9743 As above.
 9743-9748 As above.
 9748-9753 As above.
 9753-9758 Limestone, as above but medium gray.
 9758-9763 Dark gray, fine crystalline to sublithographic limestone as above.
 9763-9768 Limestone as above, argillaceous.
 9768-9773 As above.
 9773-9778 As above, not argillaceous.
 9778-9783 As above.
 9783-9787 As above.

Core #26
 9787-9797 Fine crystalline to sublithographic limestone as above.
 9797-9807 As above.
 9807-9817 As above.
 9817-9827 As above.
 9827-9830 Limestone, as above but medium gray.

Core #27
 9830-9836 As above.
 9836-9842 Dark gray, fine crystalline limestone.
 9842-9851 As above.

9851-9940 Missing.

Core #28
9940-9950 Limestone, medium gray, fine crystalline to sublithographic.
9950-9960 As above.
9960-9970 As above.
9970-9980 As above, rare thin calcite veins.
9980-9990 Limestone, as above, argillaceous. Ostrocodes (?) and brachiopod fragments.
9990-10000 Limestone, dark gray, fine crystalline, non-fossiliferous.
10000 Top of Bakken formation.

10000-10010 Shale, black, fissile.
10010-10020 Black, fissile, shale as above.
10020-10030 Siltstone, sandy, limy, pale olive.

Core #29
10030-10035 Silty, limy, fine grained sandstone, light olive gray.
10035-10040 As above with green dolomitic, shaly streaks.
10040-10045 Limestone, sandy, light gray.
10045-10050 Sandy limestone, as above.
10050-10054 Black, fissile shale.

Core #30
10054-10060 Black shale, as above.
10060-10065 Black shale, as above.
10065-10070 Black shale, as above, slightly limy.
10070-10075 Black limy shale as above.
10075-10080 As above.
10076 Top Qu'Appelle formation.
10080-10082 Black, argillaceous, dead oil stained medium grained sandstone. Good fluorescence. Fair porosity.

Core #31
10082-10085 Limestone, pale yellowish brown, fine crystalline laminated with black limy argillaceous streaks.
10085-10090 Sandstone, light gray, fine grained, dolomitic, good porosity, no fluorescence.
10090-10095 Dolomite, pale yellowish brown, sandy with green shale partings.
10095-10100 Laminated sandy dolomite and green shale as above.

Core #32
10100-10110 As above, granular, slightly sandy dolomite, rare small pyrite grains.
10110-10120 As above, pyrite crystals associated with the green shale laminae.
10120-10130 As above.
10130-10140 Siltstone, moderate reddish brown, dolomitic.
10140-10150 Laminated green shale and yellowish brown granular dolomite.
10150-10160 Dolomite, moderate orange pink, granular, thin green shale laminae.
10160-10170 Pale green slightly dolomitic shale as above with inclusions of yellowish-brown dolomite. Moderate reddish brown dolomitic siltstone with small inclusion of greenish shale.

- 10170-10180 Dolomite, granular, argillaceous, pale green to pale yellowish brown.
- 10180-10188 Dolomite, finely granular, argillaceous, banded pale green and moderate reddish brown.

Core #33

- 10188-10201 Siltstone, moderate reddish brown, dolomitic.
- 10201-10207½ Dolomite, granular, limy, pale green and moderate reddish brown.
- 10207½-10211 Shale, dark yellowish green, dolomitic, anhydrite (?) inclusions.
- 10211-10236½ Shale, dark yellowish green and dark reddish brown, dolomitic common anhydrite inclusions.
- 10236½-10243 Dolomite, dark yellowish green to pale yellowish green, granular, shaly.
- 10243-10248 Siltstone, reddish-brown, dolomitic; laminated with green dolomitic shale and white anhydrite.
- 10248-10253 Dolomite, dark yellowish green, shaly.

Core #34

- 10253-10290 Dolomite, dark yellowish green, shaly, rounded colorless anhydrite inclusions. With siltstone, reddish brown, dolomite.
- 1031 Top of Birdbear formation.
- 10290-10316 As above, reddish-brown siltstone contains green shale inclusions. With white anhydrite.
- 10316-10320 Anhydrite, dusky yellowish brown, dolomitic, very fine crystalline.
- 10320-10325 Dolomitic anhydrite as above.
- 10325-10330 As above.
- 10330-10335 Anhydrite, greenish gray, dolomitic, fine crystalline.
- 10335-10341 Dolomite, dark yellowish brown, fine crystalline, tight; and dolomite pale yellowish brown, good porosity, granular.

Core #35

- 10341-10345 Anhydrite, brownish gray, dolomitic, disseminate pyrite.
- 10345-10350 Dolomite, dark yellowish brown to pale yellowish brown. Poor porosity.
- 10350-10355 Limestone, dolomitic, pale to medium yellowish brown, fine crystalline to finely granular, poor porosity.
- 10355-10360 Limestone, as above, faint laminations of medium yellowish brown, fine crystalline limestone and pale yellowish brown fine crystalline to finely granular limestone. Rare white anhydrite inclusions.
- 10360-10365 Limestone, dark yellowish brown to pale yellowish brown, very pale orange calcite veins, common fossils (brachiopods?), fine to medium crystalline, poor porosity.
- 10365-10370 Limestone, as above. Horn corals and crinoid stems. Carbonaceous material in fractures. No cut or fluorescence. Poor porosity.
- 10370-10375 Limestone, fine crystalline to sublithographic, dark yellowish brown to dark brownish gray. Brachiopod molds.
- 10375-10380 Limestone, pale yellowish brown, granular, common small fossil fragments, poor porosity.
- 10380-10385 Limestone, moderate yellowish brown, fine crystalline to sublithographic common dark brown fossil fragments, brachiopod molds, poor porosity, colorless anhydrite inclusions.

10385-10388 Limestone, moderate yellowish brown, fine crystalline, poor porosity, rare small fossil fragments.

Core #36

10388-10395 Limestone, as above, carbonaceous material in fractures and stylolitic seams, no cut.

10395-10400 Fine crystalline, fossiliferous, limestone, as above.

10,400 Top of Duperow formation.

10400-10405 As above, carbonaceous material, no cut.

10405-10410 Fine crystalline, fossiliferous, limestone, as above, rare white anhydrite.

10410-10415 Limestone, dark yellowish brown, fragmental and oolitic and pseudo-oolitic, fragments composed of fine crystalline dark yellowish brown limestone, common gastropods, matrix of pale yellowish brown granular limestone and colorless calcite, small vugs between fragments and in fossil cavities lined with drusy calcite. Low porosity.

10415-10420 Dolomite, grayish olive, argillaceous, anhydritic, pyritic, fine-crystalline.

10420-10425 Anhydrite, dark, yellowish brown, dolomitic.

10425-10430 Anhydrite, pale olive, dolomitic.

10430-10435 Anhydrite, dark yellowish brown.

10435-10440 Dolomite, pale yellowish brown, limy, faintly laminated, granular to medium crystalline, faintly laminated with dusky yellowish-brown dolomite. Fair porosity.

10440-10445 Limestone, moderate yellowish brown, fine crystalline to sub-lithographic tight, rare colorless calcite crystals.

10445-10450 Dolomite, pale yellowish-brown, limy, finely granular, fair porosity.

10450-10455 Limestone, medium gray, finely granular, laminated with black shale. Poor porosity.

10455-10460 Anhydrite, dark yellowish brown, very limy, tight.

10460-10465 Dolomite, pale olive, anhydritic, fine crystalline.

10465-10469 Limestone, dark yellowish brown, fine crystalline, tight with common masses dark yellowish brown limy coarse crystalline anhydrite.

Core #37

10469-10474 Dolomite, pale olive, anhydritic, fine-crystalline, tight.

10474-10479 Limestone, dark yellowish brown, fine crystalline to sub-lithographic, tight, with common dark yellowish brown limy anhydrite (?) crystals.

10479-10484 Anhydrite, white, limy.

10484-10489 Limestone, pale yellowish brown, fragmental, matrix of clear calcite and/or anhydrite. Some of the matrix dissolved. Good porosity.

10489-10494 Limestone, moderate yellowish brown, fine crystalline, tight, abundantly fossiliferous, horn corals, bryozoans, algae (?).

10494-10499 Limestone, yellowish-brown, medium crystalline, fossiliferous, as above with brachiopods and ostracodes.

10499-10504 Limestone, dark yellowish brown, sublithographic, tight, laminae of black carbonaceous material.

10504-10509 Limestone, as above with common dark yellowish-brown dolomite (?) crystals.

10509-10537 Missing - not cored.

Core #38

10537-10542 Siltstone, pale olive dolomitic, laminated with black and dark greenish gray shale. Fair porosity.

10542-10547 Limestone, dark yellowish brown, sublithographic, tight, with rare anhydrite inclusions; and dolomite, limy, pale yellowish-brown, finely granular to microsucrosic with abundant white anhydrite inclusions. Good porosity.

10547-10552 Limestone, pale yellowish brown, sucrosic, brachiopods and small fossil fragments, fair porosity.

10552-10557 Limestone, as above, poor porosity.

10557-10562 Anhydrite, dusky yellowish brown, fine crystalline.

10562-10567 Limestone, dusky yellowish brown, tight, and massive white to yellowish brown anhydrite.

10567-10572 Two types of limestone; medium to fine crystalline moderate yellowish brown, tight; and medium granular and sucrosic pale yellowish brown, algal (?), with fair intergranular porosity. Good fluorescence and cut from both types of limestone. Carbonaceous material in a thin band along contact between the two limestones.

10572-10577 Dolomite, pale yellowish brown, anhydritic, finely granular fair porosity, no cut.

10577-10582 Limestone, medium gray, sublithographic, tight with common small dark brown anhydrite (?) crystals.

10582-10587 Limestone, pale yellowish brown, finely granular, abundant anhydrite, good porosity.

10587-10592 Dolomite, very pale yellowish brown, granular, limy, good porosity, no fluorescence, and no cut.

10592-10597 Limestone, dusky, yellowish brown, fine crystalline to sublithographic, tight.

10597-10602 Limestone, dark yellowish brown, medium crystalline to fine crystalline, carbonaceous streaks, tight.

10602-10607 Limestone, dark yellowish-brown, sub lithographic, tight.

10607-10613 Limestone, as above.

10613-10615 As above.

10615-10618 Anhydrite, dark yellowish-brown.

10618-10621 Shale, dark gray to black, limy, pyritic.

10621-10624 Limestone, dark yellowish-brown, sublithographic, tight.

10624-10627 Limestone, dark yellowish-brown to dark gray, sublithographic, tight, carbonaceous stringers. No cut.

10627-10630 Limestone, moderate yellowish-brown, sublithographic, tight, anhydritic, stylitic seams.

10630-10635 Missing.

Core #40

10635-10640 Dolomite, pale yellowish brown, limy, fine crystalline, tight, anhydrite filled cavities.

10640-10645 Dolomite, dark yellowish brown, limy, medium crystalline, carbonaceous stain, low porosity, no cut, no fluorescence.

10645-10650 Dolomite, as above, no stain, low porosity.

10650-10655 Limestone, moderate yellowish brown, medium crystalline, tight.

10655-10660 Anhydrite, dark yellowish-brown.

10660-10665 Limestone, medium gray and abundant white limy anhydrite.

10665-10670 Limestone, dusky, yellowish brown, medium to fine crystalline, low porosity, black shale laminae, no cut.

10670-10675 Limestone, as above, anhydritic.

10675-10680 Limestone, as above, sublithographic, no anhydrite.

10680-10685 Limestone, as above, carbonaceous streaks, no cut.

10685-10690 Limestone, as above with masses of fragmental dark yellowish-brown limestone containing abundant ostracodes. Also pale yellowish-brown fine crystalline, tight limestone.

10690-10695 Limestone, dark yellowish brown to dark gray, fine crystalline, anhydritic.

10695-10700 Limestone, pale to moderate yellowish-brown, fossil-fragmental, fine crystalline, low porosity.

10700-10705 Limestone, pale yellowish brown, sucrosic, common small vugs, good porosity.

10705-10710 Limestone, granular, pale yellowish brown, fair porosity, very weak fluorescence and cut.

10710-10715 Dolomite, light gray, granular, mottled with streaks of dark gray fine crystalline limestone, good porosity, no fluorescence of cut.

10715-10720 Limestone, dark yellowish brown, sublithographic, very low porosity.

10720-10724 Limestone, moderate yellowish brown, fine crystalline, fossil fragmental, low porosity, carbonaceous residue on bedding planes.

Core #41

10724-10729 Limestone, fine to medium crystalline, as above, rare dolomite rhombs, brachiopod fragments.

10729-10734 Dolomite, very light gray to moderate pink, fine crystalline, matrix porosity low, good porosity in fractures.

10734-10739 Limestone, moderate yellowish brown, sublithographic with concentrations of dusky yellowish brown dolomite (?) crystals.

10739-10744 Anhydrite, limy laminated pale and moderate yellowish brown and limestone, very pale orange, granular, dolomitic, good porosity, oil stained patches, weak cut.

10743 Top of Souris River formation.

10744-10749 Dolomite, pale yellowish brown, limy, finely granular, fair porosity, no fluorescence or cut.

10749-10754 Limy dolomite as above.

10754-10758 As above.

Core #42

10759-10765 Limestone, moderate yellowish brown, sublithographic, tight, scattered anhydrite crystals.

0765-10770 Limestone, moderate yellowish brown, medium to fine crystalline, algal (?), with masses of sublithographic moderate yellowish brown limestone.

10770-10775 Limestone, dusky, yellowish brown to dark gray, sublithographic.

10775-10780 Limestone, moderate yellowish brown, fine crystalline, laminated with gray green silty limestone and thin green shaly partings.

10780-10785 Limestone, moderate yellowish brown, fine crystalline to sublithographic, small fossil fragments, algal (?) tight.

10785-10790 Siltstone, limy, gray green, laminated with grayish olive streaks.

10790-10795 Dolomite, grayish olive, silty.
 10795-10800 Dolomite, dark gray, limy, anhydritic.
 10800-10805 Limestone, fine crystalline, tight, dark yellowish brown.
 10805-10810 Limestone, as above.
 10810-10818 Limestone, as above with dolomite granular, pale olive.

Core #43
 10818-10830 Limestone, dusky yellowish brown, granular, fine crystalline, fair porosity.
 10830-10840 Siltstone, dark greenish-gray, limy.
 10840-10850 Dolomite, medium gray, medium crystalline, laminated with dark green shale partings.
 10850-10860 Limestone, dusky yellowish brown, sublithographic, tight.
 10860-10870 Limestone, medium gray, finely granular, fair porosity.
 10870-10880 Limestone, as above, black shale laminae, no fluorescence.
 10880-10890 Limestone, dark yellowish brown, sublithographic.
 10890-10900 Anhydrite, dark yellowish brown.
 10900-10908 Dolomite, light gray, finely granular, fair porosity.
 10908-10918 Limestone, dark yellowish brown, sublithographic, common calcite crystals.
 10918-10928 Black, fissile shale.
 10928-10938 Dolomite, pale olive, granular, limy, good porosity.
 10938-10948 Dolomite, very pale orange, as above.
 10948-10958 As above, common dolomitized fossils (?).

Core #44
 10958-10968 Limestone, dark yellowish-brown, sublithographic, tight.
 10968-10978 Limestone, dark yellowish-brown, medium crystalline.
 10978-10988 Dolomite, gray green, granular, limy, good porosity.
 10988-10991 As above, very limy, anhydritic, tight.

Core #45
 10991-11000 Limestone, pale olive, fine crystalline, common crystalline calcite.
 11000-11010 Limestone, light gray, fine crystalline, common dolomite and anhydrite crystals.
 11010-11020 Dolomite, light gray, granular, limy, good porosity.
 11020-11030 Limy granular dolomite, as above, pale yellowish-brown.
 11030-11040 Limestone, dark yellowish-brown, sublithographic. Carbonaceous residue in fractures, no fluorescence.
 11040-11050 Dolomite, dusky, yellowish-brown to dark gray, finely granular, tight.
 11,052 Top of Dawson Bay formation.
 11050-11060 Limestone, dark yellowish brown, sublithographic, common calcite crystals tight. Unfossiliferous.
 11060-11070 As above.
 11070-11078 As above.

Core #46
 11081-11090 Limestone, moderate yellowish brown, medium to fine crystalline, tight.
 11090-11100 Medium crystalline limestone as above, fossil fragments.
 11100-11110 Limestone, as above, medium to coarse crystalline, common calcite crystals.

11110-11120 Limestone, dark yellowish brown, sublithographic, tight.
11120-11130 Limestone, as above.
11130-11140 As above.
11140-11150 Limestone, as above.
11150-11160 Anhydrite, dark gray, limy.
11160-11170 Dolomite, moderate, yellowish brown, finely granular, tight.

Core #47

11170 Top of "Prairie evaporite".
11170-11180 Siltstone, dark reddish brown, limy.
11180-11239 Missing.
11239 Halite.

Core #49

11239-11328 Halite, dark gray tight dolomite, and light gray siltstone.
11328-11343 Missing.
11344 Top of Winnipegosis formation.
11343-11355 Limestone, dark gray, silty with halite crystals; and pale yellowish brown silty limestone with common halite crystals.
11355-11365 Limestone, dark gray, as above, tight.
11365-11454 Missing.

Core #51

11454-11459 Limestone, dark yellowish brown, fine crystalline, rare small fossil fragments, tight. And limestone, dark yellowish brown, medium crystalline, common fossil fragments.
11459-11464 Limestone, fossiliferous, as above. Bryozoa, brachiopods.
11464-11469 As above, horn corals, gastropods.
11469-11474 Limestone, dark yellowish brown, fine crystalline, anhydrite, fossiliferous (snails), tight.
11474-11479 Limestone, dusky, yellowish brown, fine crystalline, tight.
11479-11484 Limestone, as above.
11484-11489 As above, fossiliferous.
11489-11494 As above, no fossils.
11494-11499 As above, rare brachiopods and small horn corals.
11499-11504 As above.
11504-11509 As above.
11509-11514 As above.
11514-11519 As above.
11519-11524 As above.
11524-11529 Fossiliferous, tight, limestone, as above.
11529-11534 As above.
11534-11539 As above.
11539-11544 As above, calcite crystals.

Core #52

11544-11549 Dark yellowish-brown, sublithographic, tight limestone, as above.
11549-11554 As above.
11554-11559 Siltstone, dark gray, limy.
11559-11564 Siltstone, as above.
11564-11569 Limestone, silty, dusky yellowish-brown, fine crystalline, tight.
11569-11574 Limestone, sublithographic, as above, not silty.

11574-11579 As above.
 11579-11584 Missing.
 11584-11589 Sublithographic limestone, as above.
 11589-11594 As above, common oolites and pseudo-oolites.
 11594-11599 Limestone, as above, fine crystalline to sublithographic, no oolites.
 11599-11604 As above, pyrite crystals.
 11604-11609 As above.
 11609-11614 As above, limy dolomite masses.
 11614-11619 Sublithographic, dusk yellowish-brown to dark gray limestone.
 11619-11624 As above, fractures filled with limy dolomite.
 11624-11629 Limestone, with limy pink dolomite crystals as above.
 11629-11633 Limestone, as above with abundant brown limy anhydrite.

Core #53

11633-11638 Dense, dark-colored limestone, as above.
 11638-11643 As above.
 11643-11648 As above.
 11648-11653 Dolomite, dark reddish brown, limy, fine crystalline to finely granular low porosity.
 11653-11658 Dolomite, as above.
 11658-11663 Limestone, dark gray, fine crystalline, silty.
 11663-11668 As above, dolomite.
 11668-11673 Dolomite, dark yellowish brown to dark gray-green, limy, argillaceous.
 11673-11678 Limestone, dark yellowish brown, dolomitic, argillaceous, medium crystalline.
 11678-11683 Argillaceous limestone as above with veins and masses of white anhydrite.
 11683-11688 Dolomite, dark gray, medium crystalline.
 11688-11693 Dolomite, moderate reddish brown, finely granular, with white anhydrite masses.
 11693-11698 Reddish-brown dolomite as above.
 11698-11703 Dolomite, finely granular, variegated light red and white, high porosity fractures parallel to bedding.
 11703 Top of Upper Interlake.
 11703-11708 Limestone, fine crystalline, variegated reddish brown and pale greenish gray, low porosity.
 11708-11713 Dolomite, white, finely granular with common colorless and reddish brown anhydrite in masses and fractures.
 11113-11718 Dolomite, white, finely granular with many open vugs, limy, carbonaceous residue along a stylitic seam.
 11718-11723 Limestone, white, finely granular with open vugs lined with dolomite crystals. High porosity.

Core #54

11723-11728 Pale yellowish-brown fine crystalline dolomitic limestone with common calcite veins; and light red pelletoid limestone, pellets of light red fine - crystalline limestone, matrix of clear calcite and reddish brown fine crystalline limestone. Seam of colorless calcite along the contact between the two types of limestone.
 11728-11733 Reddish brown pelletoid limestone as above, laminated with bands of crystalline calcite, sorting of pellets good to poor.

11733-11738 Pelletoid limestone with calcite banding and laminae as above, limestone silty.

11738-11743 Limestone, white, pelletoid, matrix of clear calcite, pellets of white fine crystalline limestone, low porosity.

11743-11748 Dolomite, light gray, brecciated, limy, silty, common open vugs and white, finely granular, porous dolomite.

11748-11753 White, finely granular, slightly limy dolomite, as above.

11753-11758 As above, laminated with grayish red limy dolomite.

11758-11763 White to light gray limy dolomite as above.

11763-11768 Three types of limestone; dark gray and fine crystalline, light gray and fine crystalline, and reddish brown and silty.

11768-11773 Limestone, white, pelletoid and fragmental, common calcite veins, low porosity.

11773-11778 Limestone, coarsely crystalline, light gray to moderate orange pink.

11778-11783 White, well sorted, pelletoid limestone, matrix of clear calcite, pellets formed of white earthy limestone, common calcite veins.

11783-11788 Limestone, white, and dolomitic, with calcite veins, pelletoid.

11788-11790 Limestone, as above, pelletoid and fragmental.

Core #55

11790-11795 Dolomite, light gray pelletoid, with calcite veins and patches of white earthy limestone.

11795-1800 Limestone, light gray to white, dolomitic, pelletoid veins and matrix of clear calcite, pellets of white limy earth dolomite.

11800-11805 White pelletoid limestone.

11805-11810 Dolomite, pale yellowish brown, finely granular, limy.

11810-11815 Limestone, light gray to light red, coarsely crystalline with patches of reddish brown silt. Dolomite, dark gray fine crystalline dense and dolomite, white, pelletoid.

11815-11820 Limestone, white, finely granular with pale brown crystalline dolomite and dolomitized fossils (?).

11820-11825 Limestone, light red, dolomitic, finely granular with veins of fossils of calcite.

11825-11830 Dolomite, light gray, slightly limy coarsely crystalline, and dolomite, white, finely granular, limy with scattered calcite crystals.

11830-11835 White granular, limy dolomite with calcite crystals, as above and, dolomite, pale yellowish-brown pelletoid, slightly limy.

11835-11840 Two types of limy dolomite, as above.

11840-11845 Pelletoid limy dolomite, as above.

11845-11850 Pelletoid dolomite, as above, but light red. Dolomite, finely granular white, limy, with calcite crystals.

11850-11855 Dolomite, pale yellowish brown, fine crystalline, limy with white anhydrite crystals and limestone, white, dolomitic, finely granular silty with calcite crystals.

11855-11860 Dolomite, pale yellowish brown, fine crystalline and pelletoid, limy.

11860-11865 Dolomite, pale yellowish brown, fine crystalline, very slightly limy, and white, finely granular, limy dolomite.

11865-11870 Dolomite, moderate red, very limy, finely granular, scattered small pyrite cubes.

11870-11875 Moderate red limy dolomite as above; and white, pelletoid and oolastic limy dolomite.

11875-11880 Limestone, white to very pale orange, fine crystalline, dolomitic, veins and crystals of calcite.

11880-11885 Limestone, as above.

11885-11890 Limestone, as above, with white, finely granular limy dolomite.

11890-11895 Limestone, pale yellowish brown, fine crystalline, slightly dolomitic, and white, fossil fragmental, silty, limy, dolomite.

11895-11900 Dolomite, as above, with very pale orange, finely granular limy dolomite.

11900-11905 Limestone, moderate greenish yellow with reddish-brown anhydrite crystals, dolomitic, silty.

11905-11910 White granular limy dolomite with pale yellowish-brown medium to fine crystalline limestone.

11910-11915 Dolomite, white, limy, finely granular with pale yellowish brown dolomitic pellets.

11915-11920 Dolomite, white, granular limy with common masses of pale yellowish brown fine crystalline dolomite. Limestone, very light gray fine crystalline, scattered calcite crystals.

11920-11925 Dolomite, very pale orange to white, limy, finely granular with numerous small vugs lined with calcite.

11925-11930 Granular limy dolomite as above; with dolomite, pale yellowish brown, fine crystalline, slightly limy.

11930-11935 Dolomite, white, limy, finely pelletoid faith scattered yellowish brown dolomite crystals.

11935-11940 As above, scattered small vugs.

11940-11945 Dolomite, white, limy, pelletoid, pellets of white earthy dolomite, matrix of clear dolomitic calcite, veins of white calcite.

11945-11947 Dolomite, pale yellowish-brown, fine crystalline, limy, pelletoid, scattered crystals of white anhydrite.

11947-11952 Dolomite, as above with white, finely granular limy dolomite.

11952-11957 Limestone, light gray, sublithographic. Limestone, pale yellowish-brown, pelletoid; pellets of white earthy dolomite, matrix of pale yellowish-brown dolomitic limestone. Common small open vugs.

11957-11962 Dolomitic pelletoid limestone as above. And limestone, white, finely granular with colorless calcite crystals and yellowish-brown dolomite masses.

11962-11967 Dolomite, very light gray, fine crystalline, slightly limy, with common small vugs.

11967-11972 Limestone, very pale orange; fine crystalline; dolomite, very pale orange, fine crystalline with inclusion of white limy silt (?); dolomite, dark gray, fine crystalline.

11972-11977 Limestone, white, finely granular, good porosity.

11977-11982 Limestone, dolomitic, as above with pale yellowish-brown dolomite crystals.

11982-11987 Limestone, very light gray, fine crystalline and dolomitic, pale yellowish brown, limy, finely granular.

11987-11992 Limestone, pale yellowish brown to very pale orange, fine crystalline to sublithographic, low porosity.

11992-11997 Dolomite, pale yellowish brown, fine crystalline, and dolomite, limy pale yellowish brown, finely granular and pelletoid.

11997-12002 Granular limy dolomite as above, not pelletoid.

12002-12007 Dolomite, pale yellowish brown, fine crystalline with masses and veins of white granular limestone.

12007-12012 Dolomite, pale yellowish brown, limy, fine crystalline, common open vugs; and dolomite, white, finely granular, limy.

12012-12017 Granular, limy dolomite as above. Good porosity.

12017-12022 As above, common yellowish-brown dolomite crystals.

12022-12027 As above.

12027-12032 Limestone, very light gray to white, fine crystalline, and pelletoid common calcite - filled cavities and fractures.
Limestone, pale yellowish-brown, fine crystalline.

12032-12037 Limestone, white, finely pelletoid and granular, matrix of clear calcite and white fine-crystalline limestone.

12037-12047 Dolomite, very light gray to very pale orange, fine crystalline, limy, rare small vugs.

12047-12057 As above.

12057-12067 Limestone, pale yellowish brown, fine crystalline, tight, very slightly dolomitic.

12067-12077 As above.

12077-12087 As above, with thin veins of clear calcite.

12087-12097 Dolomite, very light gray, very finely granular, fair porosity.

12097-12107 Dolomite, limy, very pale orange, medium crystalline to finely granular, low porosity.

12107-12117 Limy dolomite as above; and dolomite, very light gray, finely granular, limy, numerous small vugs, good porosity.

12117-12122 Dolomite, pale yellowish brown, slightly limy, anhydritic, with numerous small open vugs and pores, fine crystalline, good porosity. Limestone, light gray, granular, dolomitic, good porosity.

12122-12130 Dolomite and limestone, as above.

12130-12135 Dolomite, very pale orange, limy, sucrosic, good porosity.

12135-12140 Dolomite, light gray to white, finely granular with common calcite crystals. Dolomite, pale yellowish brown, fine crystalline, tight.

12140-12145 Dolomite, white, limy, finely granular with yellowish brown dolomite crystals, good porosity.

12145-12150 Dolomite, very pale orange, limy, pelletoid, with many small vugs, good porosity.

12150-12156 Pelletoid limy dolomite as above; and dolomite white, finely granular, limy, with common yellowish-brown dolomite crystals, good porosity.

12156-12160 Dolomite, pale yellowish brown, limy, pelletoid and fragmental, calcite crystals.

12160-12170 Limestone, white and pale yellowish brown, dolomite, finely granular, good porosity.

12170-12180 Dolomite, pale yellowish brown, fine crystalline with vugs and veins of white, finely granular limestone.

12180-12190 Dolomite, pale yellowish brown, limy, pelletoid, and pseudo-oolitic, matrix of white finely granular limy dolomite. Good porosity.

12190-12210 Dolomite, white, finely granular, with small crystals of clear calcite, good porosity.

12210-12220 Dolomite, grayish pink, very finely granular, fair porosity.

12220-12230 Dolomite, medium gray, limy, fine crystalline, with masses of white limestone, low porosity.

12230-12240 Dolomite, medium gray, fine crystalline, tight.
 12240-12260 As above with reddish-brown medium crystalline limy dolomite.
 12260-12265 Dolomite, finely granular, limy, mottled medium gray and moderate red.
 12265-12270 Dolomite, medium gray, medium crystalline, slightly limy, low porosity.
 12270 Top of Middle Interlake.
 12270-12275 Dolomite, very light gray to pinkish gray, fine crystalline, very low porosity.
 12275-12280 Dolomite, very pale orange, fine crystalline, tight.
 12280-12285 Dolomite, white, medium crystalline, slightly limy, low porosity.
 12285-12290 As above, fine crystalline, tight.
 12290-12296 As above.
 12296-12300 Dolomite, pale yellowish brown, fine crystalline, tight.
 12300-12305 As above.
 12305-12310 As above.
 12310-12316 Dolomite, pale yellowish brown, medium crystalline, slightly limy, vuggy, low porosity.
 12316-12326 As above, fair intergranular porosity.
 12326-12336 Dolomite, as above, styolitic.
 12336-12346 Chert, white, limy, porous, with remnants of fossils.
 12346-12356 Dolomite, pale yellowish brown, very slightly limy, fine crystalline, tight.
 12356-12366 As above.
 12366-12375 As above.
 12375-12379 As above, finely granular, low porosity.
 12379-12389 As above, very pale orange.
 12389-12405 Dolomite, pale yellowish brown, medium granular, many interconnected vugs, intergranular porosity very high.
 12405-12410 Dolomite, limy, as above, no vugs, medium porosity.
 12410-12420 As above.
 12420-12423 Dolomite, pale yellowish brown, fine crystalline, tight.
 12423-12429 Dolomite, pale yellowish brown, fine to medium crystalline, vuggy, styolitic, fair porosity.
 12429-12435 Dolomite, pale yellowish brown, fine crystalline, faintly banded with moderate yellowish brown dolomite, tight.
 12436-12440 Chert, white, brecciate, limy.
 12440-12445 Dolomite, pale yellowish brown, fine crystalline, styolitic, tight and white fossiliferous limy chert.
 12445-12459 Missing.
 12459-12467 Dolomite and chert, as above with very pale orange, finely granular dolomite.
 12467-12472 Dolomite, pale yellowish brown, fine crystalline, tight.
 12472-12495 As above.
 12495-12505 As above.
 12505-12515 As above, moderate yellowish brown.
 12515-12525 As above, very pale orange.
 12525-12535 As above, pale yellowish brown.
 12535-12545 Dolomite, pale yellowish brown, finely granular, low porosity.
 12545-12548 Missing.
 12548-12560 Granular, dolomite as above.
 12560-12576 Dolomite, dark yellowish brown, granular, vuggy, low porosity, no fluorescence.

12576-12578 Dolomite, pale yellowish brown, fine crystalline, tight.
 12578-12588 As above.
 12588-12590 As above.
 12590-12598 Missing.
 12598-12618 Dolomite, as above.
 12618-12624 As above.
 12624-12634 As above.
 12634-12644 Dolomite, dark yellowish brown, fine crystalline, tight, no
 fluorescence.
 12642 Top of Lower Interlake.
 12644-12654 As above, banded with carbonaceous residue, no fluorescence.
 12654-12664 Limestone, dusky yellowish brown to dark gray, tight.
 12664-12674 Anhydrite, dark yellowish brown.
 12674-12684 Tight, dusky yellowish brown limestone.
 12684-12694 Limestone, as above.
 12694-12704 Limestone, as above, with dolomite, pale yellowish brown, fine
 crystalline, low porosity.
 12704-12714 Dolomite, as above, dead oil stain.
 12714-12724 Dolomite, as above, slightly limy, with veins of anhydrite.
 12724-12734 Anhydrite, limy, pale yellowish-brown.
 12734-12744 Limestone, pale yellowish brown, finely granular, brown
 anhydrite crystals, fair porosity.
 12744-12754 Limestone, dark yellowish brown, fine crystalline, tight.
 12754-12764 Limestone, as above.
 12764-12771 As above.
 12771-12776 As above.
 12776-12781 As above.
 12781-12786 As above.
 12786-12796 Limestone, as above, faint fluorescence with dolomite, medium
 gray, fine crystalline, tight.
 12796-12806 Dolomite, pale yellowish-brown, fine crystalline tight.
 12806-12816 Anhydrite, dark yellowish-brown.
 12816-12826 Dolomite, moderate yellowish brown, fine crystalline, tight.
 12826-12836 Dolomite, as above.
 12836-12846 As above.
 12846-12855 Dolomite, pale olive, fine crystalline, tight.
 12856-12860 Dolomite, pale yellowish-brown, fine crystalline.
 12860-12865 Dolomite, grayish green, fine crystalline, very slightly limy,
 pyritic.
 12865-12870 Dolomite, as above.
 12870-12875 Dolomite, as above, slightly argillaceous.
 12875-12880 Limestone, dark yellowish brown, coarse crystalline, with common
 masses of white calcite crystals.
 12880-12885 As above, limestone, slightly pelletoid.
 12885-12890 Dolomite, pale yellowish brown, medium crystalline, sandy with
 common medium grained rounded quartz grains.
 12890-12895 Dolomite, pale yellowish brown, medium crystalline, not sandy.
 12895-12900 Dolomite, dark gray, argillaceous.
 12900-12907 Limestone, dark yellowish brown, fine crystalline, slightly
 silty, fossiliferous, algae (?) and bryozoans (?), rare
 fragments of brachiopod shells.
 12907-12914 Limestone, dark yellowish brown, fine crystalline, with common
 yellowish brown dolomite crystals. Sandstone, blue-gray, fine
 grained rounded quartz grains.

12914-12924 Anhydrite, dark yellowish brown.
 12924-12934 Dolomite, granular, limy, pale yellowish brown, with scattered dark brown anhydrite crystals. Good porosity. No fluorescence.
 12934-12944 Dolomite, pale yellowish brown, finely granular, fair porosity.
 12944-12954 As above.
 12954-12964 Dolomite, medium gray, fine crystalline, common horizontal fractures.
 12964-12974 As above, dark gray shaly partings.
 12974-12984 Limestone, medium to light gray to grayish green with finely disseminated pyrite. Common brachiopods.
 12984-12994 Limestone, medium gray as above, coarsely crystalline, abundantly fossiliferous, forams (?), algae (?), shell material. Scattered masses and crystals of pyrite.
 12994-13004 Dolomite, grayish green, limy, silty.
 13004-13014 As above, pyritic.
 13014-13024 Silty dolomite as above.
 13024-13034 As above.
 13034-13044 As above with silty grayish green limestone.
 13044-13054 Silty, limy, dolomite.
 13054-13064 As above, common brachiopods.
 13064-13074 Limestone, dark yellowish brown, fine crystalline, tight, common brachiopods.
 13074-13084 Limestone, dark yellowish brown, fine crystalline, tight, brachiopods and conodonts.
 13084-13094 As above with rare white anhydrite crystals.
 13094-13104 Limestone, as above, anhydritic, weak fluorescence and black dolomitic, shale.
 13104-13114 Limestone, dark yellowish brown, fine crystalline, tight.
 13114-13124 As above.
 13124-13134 Anhydrite and grayish-green silty limestone,
 13134-13144 Dolomite, pale yellowish brown, finely granular, good porosity, very weak fluorescence.
 13144-13154 As above, with dark brown anhydrite (?) crystals.
 13154-13164 Finely granular pale yellowish brown, limy dolomite.
 13164-13170 Limestone, dark yellowish brown, fine crystalline, tight, dead oil stain.
 13170-13175 As above.
 13175-13180 As above, fine crystalline to sublithographic, anhydritic.
 13180-13185 As above.
 13185-13190 Limestone conglomerate. Small pebbles of dark yellowish-brown limestone and grayish green limy siltstone, anhydritic, black shaly lenses.
 13190-13195 Anhydrite, dark yellowish-brown, limy.
 13195-13200 Anhydrite, as above and pale yellowish brown, finely granular anhydritic limestone.
 13200-13205 Anhydrite, as above.
 13205-13210 Dolomite, pale yellowish brown, medium crystalline, tight, slightly limy.
 13210-13215 As above.
 13215-13220 Dolomite, pale yellowish brown, fine crystalline to sublithographic, tight.
 13220-13225 Limestone, pale yellowish brown, fine crystalline, tight and limestone, dark yellowish brown, sublithographic, tight.
 13225-13230 Tight, dark yellowish brown, sublithographic limestone as above.
 13230-13235 As above.

13235-13240 As above.
 13240-13245 As above.
 13245-13248 As above.
 13249-13255 As above.
 13255-13260 As above.
 13260-13265 As above.
 13265-13270 As above, pyritic.
 13270-13275 As above.
 13275-13280 Limestone, pale yellowish brown, fossiliferous, fine crystalline, composed of pale yellowish brown faecal pellets (?) in a matrix of clear calcite. Bahamite (?). Algae, and shell material.
 13280-13285 Limestone, pale yellowish brown, fine crystalline to finely granular, low porosity.
 13285-13290 Limestone, moderate yellowish brown, fine crystalline to sub-lithographic tight.
 13290-13295 Dolomite, pale to dark yellowish brown, fine to medium granular, moderate porosity.
 13295-13300 Limestone, moderate yellowish brown, coarsely crystalline, low porosity.
 13300-13305 Limestone, dark yellowish brown limestone, fine crystalline, dead oil stain.
 13305-13310 Limestone, as above.
 13310-13320 Limestone, as above, anhydritic.
 13320-13330 Limestone, pale yellowish brown, fine crystalline to finely granular, moderate porosity.
 13330-13340 Limestone, pale yellowish brown, fine crystalline to sub-lithographic, tight, algal (?).
 13340-13350 As above.
 13350-13360 As above, anhydritic (?).
 13360-13370 As above.
 13370-13380 As above, dead oil stain, very weak fluorescence.
 13380-13390 As above with dead oil stain.
 13390-13396 Limestone, as above, no stain.
 13396-13400 As above, with masses of finely granular limestone.
 13400-13405 As above.
 13405-13410 As above.
 13410-13415 Limestone, pale yellowish brown, finely granular, low porosity.
 13415-13420 Limestone, moderate yellowish brown, medium crystalline, tight, small open vugs.
 13420-13425 As above.
 13425-13430 As above, common yellowish brown dolomite crystals.
 13430-13435 Limestone, dark yellowish brown, fine crystalline to finely granular, tight.
 13435-13440 Limestone, pale yellowish brown, as above.
 13440-13445 As above.
 13445-13450 As above.
 13450-13455 As above.
 13455-13460 As above, shell fragments, dead oil stain.
 13460-13465 Limestone, pale yellowish brown, sublithographic.
 13465-13470 As above, rare small fossil fragments.
 13470-13475 As above.
 13475-13480 As above, slightly granular, dead oil stain.
 13480-13481 Sublithographic, pale yellowish brown, tight limestone.
 13481 Total depth.