

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 14

Summary of the Wanete Oil Company, M. O. Lee and Silas Engen No. 1

Ward County, North Dakota

By Sidney B. Anderson  
April, 1953

Wanete Oil Company - M. O. Lee No. 1, Ward County, North Dakota, Section 24 T., 156 N., R. 85 W., (660 feet S. of N. line, 1980 feet E. of W. line, Section 24) Elevation 1824 G.L. and 1839 K.B.

The Wanete Oil Company M. O. Lee No. 1 was spudded March 20, 1952 and 130 feet of 13 3/8 inch conductor pipe was set with 100 sacks. 1202 feet of 9 5/8 inch surface casing was set with 400 sacks. 5992 feet of 5 1/2 inch casing was set with 1625 sacks and left in hole from 3600 to 9592.

Bridge plugs were set in 5 1/2 inch casing at 9365, 7750, 7430, 7260, 5930, 5895, 5840, and 5340. Cement plugs were set at 3500, 1202, and surface 15 sacks each. The well was abandoned on July 29, 1952.

The well was extensively tested and cored, with some of the cores having oil shows.

Core 7295-7297 Heavily stained with dull even fluorescence, but could not get a cut.

Core 9329 1/2-9339 Fair fluorescence and cut with carbon tetra-chloride.

Core 9339-9341 Good fluorescence and live oil cut with carbon tetra-chloride.

Core 9341-9343 Film of oil on fracture surfaces. Good fluorescence and live oil cut with, carbon tetra-chloride.

Core 9400 1/2-9411 1/2 Live oil on fracture surfaces, fluorescence on fractures. Oil cut with carbon tetra-chloride.

The upper core was cut in the upper part of the Devonian Woodbend equivalent with the remainder taken in the Upper Ordovician Red River.

TESTS

DST #1 5766'-91'

Tool open 45 minutes, shut in 15 minutes. Recovered, 420' salty black sulfur water and 30' mud. No show. H.P. - 0, I.F.P. - 0, F.F.P. - 215#, S.I.P. - 2475, H.P. - 3300.

DST #2 5862'-91'

Tool open 4 hours, 5 minutes, shut in 30 minutes. Recovered 2730 feet of salty sulphur water, and 100 feet of mud. May have had slight show of gas. I.F.P. - 0, F.F.P. - 1750, S.I.P. 2750, H.P. - 3500. Core had dark stain and fair fluorescence.

DST #3 7728'-7776'

Tool open 1 hour, 45 minutes, shut in 30 minutes. Recovered 210 feet of salty slightly gas cut drilling mud. I.F.P. - 0, F.F.P. - 75, S.I.P.- 3000, H.P. - 4500.

DST #4 8410'-8474'

Tool open 2 hours, shut in 30 minutes. Recovered 630 feet of slightly gas cut salt water and 720 feet of muddy salt water, I.F.P. - 200, F.F.P. - 808, S.I.P. - 3900, H.P. - 4900.

DST #5 9031'-84'

Tool open 2 1/2 hours, shut in 30 minutes. Strong steady blow. Recovered 3240 feet of salt water and 2000 feet water cushion. I.F.P. - 890, F.F.P. - 2740, S.I.P. - 4150, H.P. - 5230.

DST #6 9125'-9150'

Tool open 2 hours, shut in 30 minutes. Recovered 450 feet salty drilling mud, 1170 feet salt water. I.F.P. - 625, F.F.P. - 1350, S.I.P. - 3800, H.P. - 5400.

DST #7 9516'-9541'

Tool open 2 hours, shut in 30 minutes. Recovered 2000 feet water cushion and 10 feet of slightly oil and gas cut mud. I.F.P. - 0, F.F.P. - 0, S.I.P. - 3300, H.P. 3650.

DST #8 9398 1/2' -9409'

Tool open 1 1/2 hours, shut in 30 minutes. Recovered 2000 feet water cushion, 210 feet gas cut salty sulfur water. Sample from tool had slight live oil fluorescence and cut. Baroid gas meter showed 37 units total gas, 20 units methane in muddy sample. Perforated 9401-9409. I.F.P. - 1500, F.F.P. - 1600, S.I.P. - 6500, H.P. - 7800.

DST #9 9311'-9336'

Perforated 9320'-9336'. Tool open 1 hour and 5 minutes. Immediate strong blow for 20 minutes, then died. Recovered 350 feet fluid, 120 feet mud cut salt water with sulfur odor and sulphide gas.

DST#10 7686'-7706'

Perforated 7700'-7706' with 24 shots. Good blow for 30 minutes. Swabbed salt water with sulfur odor for 5 hours.

DST #11 7379'-7402'

Perforated 7392'-7402' with 40 shots. Weak blow for 5 minutes. Swabbed 3 hours, recovered only a little mud. Recovered 2900 feet of salt water with sulfur odor when tubing was pulled.

DST #12 5878'-5902'

Perforated 5886'-5902' with 64 shots. Strong blow for 1 hour, then died. Swabbed for 8 hours and recovered salt water with strong sulfur odor.

DST #13 7212'-7242'

Perforated 7230'-7242' with 40 shots. Strong blow for 45 minutes. Swabbed for 3 hours. Recovered only salt water with sulfur odor.

DST #14 5900'-5905'

Perforated 5900'-5905' with 20 shots. Weak blow died in 45 minutes. Swabbed for 5 hours and recovered only black sulfur water.

DST #15 5860'-5890'

Perforated 5870'-5890'. Strong blow for 1 hour and 20 minutes. Swabbed 11 hours. Recovered black salty sulfur water.

Pulled test tool and ran Gulberson production packer with dry tubing. Fluid rose 1500 feet on breaking disc. Swabbed 2 hours and acidized with 500 gallons. Swabbed 10 hours and recovered acid and black salty sulfur water later. Fluid later became clear salt water with no gas show.

DST #16 5728'-5823'

Perforated 5763'-5823' with 200 shots. Tool open 2 hours, weak blow for 45 minutes. Swabbed 8 hours and recovered black and gas cut salty sulfur water. No show of oil.

DST #17 5265'-5330'

Perforated 5290'-5330' with 10 shots. Swabbed no fluid, but recovered 1550 feet of mud cut salty sulfur water when tool was pulled. Re-ran test tool and swabbed for 5 hours, recovered more salt water.

Formation tops determined from sample and electric logs, not all lithologic formation tops called in following list.

FORMATION TOPS

<u>Formation</u>	<u>Depth</u>
Cretaceous System	
Niobrara Formation	2410
Greenhorn Member	2900
Dakota	3510
Jurassic System	
Sundance Formation	3985
Piper Formation (Sawtooth)	4465
Piper Lime	4540
Triassic System	
Spearfish Formation	4705
Mississippian System	
Charles Formation	5130
Mission Canyon Formation	5755
Lodgepole Formation	6112
Englewood Formation	6740
Devonian System	
Lyleton Formation	6830
"Nisku equivalent"	6940
"Woodbend equivalent"	7060
"Beaverhill Lake equivalent"	7455
Manitoban Formation	7665
Winnipegogan Formation	8030
Elm Point Formation	8355
Ashern Formation	8415

<u>Formation</u>	<u>Depth</u>
Silurian System	
Stonewall Formation	8430
Ordovician System	
Stony Mountain Formation	9140
Stony Mountain Shale Member	9212
Red River Formation	9290
Winnipeg Formation	9860 (sample top)
	9937 (radioactivity and electric log)
Winnipeg sand	10,070 (radioactivity and electric log)
Total Depth	10,134

Since logging this well a study of sample and radioactivity logs suggests that the section called Ashern in the Price Kline well is the Winnipegosan and the well probably ended in the Elm Point or the top of the Ashern.

WANETE OIL COMPANY - M. O. LEE #1

<u>From</u>	<u>To</u>	<u>Formation</u>
1210	1220	Siltstone, light gray, slightly calcareous; very little gray shale, little reddish calcareous, sandy shale.
1220	1300	Shale, gray to brown gray to green gray.
1300	2070	Shale, green gray to gray.
2070	2400	Shale, medium gray to green gray.
Niobrara		
2400	2410	Shale as above and some light tan silty limestone.
2410	2440	Same as above and white specks.
2440	2450	Shale, medium gray.
2450	2460	Shale, light gray and little medium gray.
2460	2470	Shale, medium gray.
2470	2490	Shale, medium gray to light gray.
2490	2510	Shale, as above, some light tan to light gray, silty limestone and little red shale.
2510	2550	Shale, medium gray.
2550	2570	Shale, medium gray and some light brown.
2570	2580	Shale, medium light gray and some light brown.
2580	2610	Shale, medium light gray.
2610	2620	Shale, medium light gray and some pale yellow gray to light gray, silty limestone.
2620	2710	Shale, medium light gray.
2710	2720	Shale, medium gray and some medium light gray.
2720	2870	Shale, medium gray.
Greenhorn Member 2900		
2870	2920	Shale, dark gray to medium gray.
2920	2980	Shale, dark gray N3, few white speck.
2980	3000	Shale, medium gray calcareous to dark gray, white specks.
3000	3010	Shale, dark gray to gray black carbonaceous shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3010	3080	Shale, dark gray to medium gray with white specks. Inoceramus prisms.
3080	3100	Shale as above and some tan silty limestone. Inoceramus prisms.
3100	3110	Shale and little limestone as above, some fine grain gray limey sandstone.
3110	3130	Shale, dark gray N3.
3130	3150	Shale, medium dark gray.
3150	3200	Shale, medium dark gray to dark gray.
3200	3400	Shale, dark gray.
3400	3440	Shale, dark gray to medium gray.
3440	3450	Shale, as above, mostly dark gray.
3450	3470	Shale, dark gray to medium gray.
Dakota 3510		
3470	3580	Shale, as above, very little fine grained light gray sandstone.
3580	3590	Shale as above and some brown concretionary sandstone pellets.
3590	3610	Shale and sandstone pellets as above, some fine grained white to light gray sandstone.
3610	3620	Shale as above, very little sandstone as above.
3620	3630	Shale as above and some fine grained whitish sandstone.
3630	3660	Shale as above, very little sandstone.
3660	3670	Shale as above, little red shale. Some concretionary sandstone pellets.
3670	3680	Shale as above, few pellets, very little fine grained gray sandstone.
3680	3700	Shale, gray and very little red; little fine to medium grained sandstone, colorless.
3700	3750	Gray shale and some sandstone as above.
3750	3780	Gray shale and very little sandstone as above.
3780	3790	Shale as above and few coarse quartz grains.
3790	3810	Shale as above and little medium grained colorless sand.
3810	3820	Shale as above.
3820	3840	Shale as above and some colorless to white coarse free quartz, some medium quartz.
3840	3860	Shale as above, much coarse colorless to free quartz.
3860	3870	Shale as above, much fine grained tan sandstone, calcareous cement.
3870	3900	As above, some coarse free quartz, colorless to pink.
3900	3910	Same as above and some brownish rounded sandstone concretions.
3910	3950	Shale, light gray to dark gray; very little sandstone.
3950	3970	Shale, medium to dark gray, little light gray shale; little fine grained tan sandstone.
3970	3980	Shale and sandstone as above and some green shale.
Sundance 3985		
3980	4010	Same as above and little tan fine grained glauconitic sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
4010	4020	Shale, medium light to dark gray, few pieces reddish shale; little tan fine grained sandstone.
4020	4050	Gray shale as above, few pieces of red and green shale; sandstone as above.
4050	4080	Gray shale as above, green shale and few pieces of red shale; fine grained light gray sandstone.
4080	4090	Green and gray shale as above; sandstone as above and some colorless to pink coarse free quartz.
4090	4130	Shale, mostly green and light gray; very little fine grained light gray sandstone, much coarse free quartz.
4130	4140	Shale, green to light gray, some silty; little fine grained light gray sandstone; free quartz as above.
4140	4150	Shale, green to light gray and tan; very little fine grained light gray sandstone. Free quartz as above.
4150	4160	Shale, green to dark gray; little sandstone as above.
4160	4260	Shale, green to dark gray.
4260	4290	Shale as above and medium light gray shale, calcareous.
4290	4300	Shale, as above, little red shale.
4300	4320	Varigated shale.
4320	4330	Shale as above and little very fine grained sandstone.
4330	4380	Shale as above.
4380	4390	Shale as Above and fine grained tan to light brown sandstone, calcareous.
4390	4400	Shale, as above; very little sandstone above.
4400	4410	Shale as above and some sandstone as above.
4410	4420	Sandstone and shale as above.
4420	4430	Shale as above; little sandstone as above and some tan to light brown fine grained, dense limestone.
4430	4450	Shale as above, very little sandstone as above, very little limestone as above.
Piper 4465		
4450	4480	Same as above, no limestone.
4480	4490	Shale as above, very little yellow gray dense limestone; very little whitish fine to medium grained sandstone.
4490	4500	Shale as above; very little yellow gray and little light brown fine grained dense limestone.
4500	4520	Shale as above arid some colorless medium grained sandstone, calcareous cement.
4520	4540	Shale as above, little light gray fine grained, dense limestone and little sandstone as above.
Piper Lime		
4540	4550	Shale as above and much whitish to light gray, fine grained, dense limestone.
4550	4560	Same as above and very little sandstone as above.
4560	4600	Shale as above, much limestone as above.
4600	4610	Shale as above, mostly dark gray and some limestone as above.
4610	4620	As above and little fine grained light gray sandstone.
4620	4630	Shale as above and some very pale yellow brown, fine grained dense limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
4630	4640	As above and little white anhydrite.
4640	4650	Shale as above and very pale yellow brown fine grained dense dolomitic limestone.
4650	4700	Shale, mostly dark gray and green, as above, little white anhydrite.
Spearfish 4705		
4700	4710	Shale, dark gray and green, very little white anhydrite; colorless to tan sandstone.
4710	4720	Varigated shale, mostly green and dark gray; little light brown sandstone and white anhydrite.
4720	4730	Varigated shale.
4730	4740	Varigated shale, much pale red brown silty shale.
4740	4750	Shale as above and some very fine grained pale red brown sandstone.
4750	4760	Shale, medium light gray, dark gray and green; some pale red brown sandstone, very fine grained.
4760	4780	Varigated shale, shale as above and some gray red 10R4/2 shale; pale red brown very fine grained sandstone.
4780	4790	Shale, dark gray, very little red and green shale; little sandstone as above.
4790	4820	Shale, medium light gray to dark gray, very little green and red shale; pale red brown very fine grained sandstone.
4820	4830	Varigated shale gray red, pale red brown, green, medium light gray and dark gray; little pale red brown sandstone.
4830	4840	Same as above; some medium grained rounded free quartz.
4640	4870	Varigated shale, reddish fine to medium grained cemented sandstone and free quartz as above.
4870	4880	Varigated shale, very little sandstone.
4880	4900	Varigated shale, some very fine grained pale red brown sandstone medium grained free quartz.
4900	4910	Same as above; little sandstone and some reddish silty shale.
4910	4920	Varigated shale and very fine grained pale red brown calcareous sandstone.
4920	4950	Varigated shale, mostly reddish; some sandstone as above; little medium grained free quartz.
4950	4957	Circulation 30 minutes. Sandstone, pale red brown, fine to medium grained; much medium grained free quartz.
	4957	Circulation 45 minutes. Sandstone as above and varigated shale.
4950	4960	Same as above.
4960	4970	Same as above, mostly sandstone
4970	4990	As above, mostly sandstone, fine grained, little free quartz.
4990	5010	Shale, dark gray to green; little pinkish calcareous, fine to medium grained sandstone.
5010	5020	Varigated shale and little pinkish sandstone as above.
5020	5030	Varigated shale, much gray red shale; little red to pink sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
5030	5040	Varigated shale, some pale red brown sandstone and siltstone.
5040	5050	Varigated shale, little medium to coarse round free quartz.
5050	5090	Varigated shale.
5090	5100	Shale, moderate red orange; little pink to red anhydrite.
5100	5110	Varigated shale and red to pink anhydrite.
5110	5120	Variated shale, mostly gray; little light gray, fine, calcareous sandstone.
Charles 5130		
5120	5140	Varigated shale, mostly gray; some very fine grained light brown to tan sandstone, calcareous.
5150	5160	Varigated shale.
5160	5170	Varigated shale, some tan limestone, dense.
5170	5190	Varigated shale, little white anhydrite.
5190	5200	Shale, red and little gray.
5200	5220	Shale, red and gray and reddish limey fine grained sandstone.
5220	5230	Gray shale, pale red 5R6/2 dolomite, slightly anhydrite; little white anhydrite.
5230	5250	White anhydrite and gray shale.
5250	5260	Shale, gray and red; little white anhydrite.
5260	5270	Shale and anhydrite as above, few pieces of gray dolomite.
5270	5280	Varigated shale and white to anhydrite.
5280	5290	As above and little tan soft, dense limestone.
5290	5320	As above and tan soft dense limestone.
5320	5330	Varigated shale, little white anhydrite; very little tan limestone.
5330	5340	Same as above with tan to gray sandstone, fine grained.
5340	5350	Shale, gray and little red; fine grained gray sandstone, calcareous.
5350	5360	Shale as above and very fine gained sandstone as above.
5360	5370	Shale as above and much white anhydrite.
5370	5390	Shale as above, medium light gray, very fine grained dense dolomite; little white anhydrite.
5390	5400	Missing.
5400	5410	Dolomite, much medium light gray, white to tan anhydrite and little shale.
5410	5420	Shale, gray and red, few pieces green shale, much white and little pink anhydrite; little dolomite.
5420	5440	Shale, gray and red; tan fragmental, soft limestone.
5440	5450	Tan fragmental limestone, little shale as above (cave?)
5450	5460	Shale as above and medium light gray anhydrite.
5460	5470	Shale as above, mostly gray; much white anhydrite, some soft.
5470	5480	Gray shale, medium gray very fine grained sandstone, slightly calcareous.
5480	5490	Very little shale, white to medium gray anhydrite.
5490	5500	Shale, medium dark gray, some brown; white anhydrite; little medium gray anhydrite; dolomite.



<u>From</u>	<u>To</u>	<u>Formation</u>
5500	5510	Shale as above; white anhydrite and medium gray anhydrite dolomite.
5510	5550	Some gray shale; yellow gray fragmental limestone.
5550	5560	Shale as above and little green and red shale; some soft white anhydrite; limestone as above.
5560	5570	Shale as above, much white anhydrite and light gray anhydritic dolomite.
5570	5580	Varigated shale; much red shale, white anhydrite and medium light gray anhydritic dolomite.
5580	5600	Varigated shale; medium light gray anhydritic dolomite.
5600	5610	Gray shale and much white anhydrite.
5610	5620	Gray to brown shale; much medium light gray anhydritic dolomite; some white anhydrite.
5620	5640	Much white anhydrite; little anhydritic dolomite as above and little shale as above.
5640	5650	Shale, much dark gray and little red and green; some white anhydrite; few pieces of light gray anhydritic dolomite.
5650	5660	Much white anhydrite and medium gray shale; few pieces of red and green shale.
5660	5680	Much white anhydrite; little gray shale and few pieces of red shale.
5680	5690	Dolomite, sandy and silty medium light gray; little gray shale.
5690	5700	Little dolomite as above, mostly medium light gray, vitreous anhydritic dolomite and medium gray shale.
5700	5710	Anhydrite, medium light gray, some white to tan; medium gray shale; dolomite as above.
5710	5730	Much white anhydrite and medium gray shale; some dolomite as above.
5730	5740	Dolomite, light gray to pale brown, dense crystalline, some anhydrite as above.
5740	5750	Dolomite, medium light gray, hard, dense, finely crystalline; some gray shale.
Mission Canyon 5755		
5750	5760	Limestone, very light gray, very fine granular dense dolomitic; little dolomite and gray shale as above.
5760	5770	Limestone, pale tan, oolitic, dense.
5770	5790	Missing.
5790	5800	Limestone, pale tan, fine grained, dense; medium gray shale.
5800	5880	Limestone, light brown saccharoidal to fragmental.
5880	5910	Limestone, light brown, fine granular, fragmental.
5910	5920	Varigated shale, mostly medium dark gray.
5920	5930	Limestone as above, little shale as above.
5930	5940	Limestone as above, light tan fine granular limestone, some shale as above.
5940	5950	Limestone as above, and light tan soft dense limestone, some shale as above.
5950	5960	Limestone, light tan, very fine granular, dense.
5960	5980	Limestone, light tan, oolitic.

<u>From</u>	<u>To</u>	<u>Formation</u>
5980	5990	Limestone, light brown granular, some finely oolitic.
5990	6000	Limestone, light brown granular to tan fragmental.
6000	6020	Limestone, light brown, fine granular.
6020	6030	Limestone as above and some fragmental to oolitic.
6030	6040	Limestone, light brown to tan, fine granular.
6040	6050	Limestone, medium gray, very shaley.
6050	6060	Limestone, tan to yellow gray, fragmental, dense.
6060	6070	As above to finely oolitic.
6670	6080	Limestone, tan to yellow gray fragmental.
6080	6090	Limestone as above to saccharoidal.
6090	6110	Limestone, light brown saccharoidal and fragmental to tan fragmental.
Lodgepole		
6110	6120	Limestone, light brown saccharoidal and fragmental.
6120	6140	As above and medium gray fragmental dense limestone.
6140	6150	Missing.
6150	6160	Limestone, light to medium gray fragmental, much variegated shale, mostly dark gray.
6160	6180	Limestone, light to medium gray, fine grained to fragmental dense; some shale as above.
6180	6190	Limestone, very light olive gray, fine grained, dense.
6190	6200	Limestone as above to fragmental.
6200	6240	Limestone, light gray fragmental.
6240	6340	Limestone, light gray to tan fragmental to granular.
6340	6360	Limestone, light gray fragmental.
6360	6400	Limestone, light gray fragmental to fine granular.
6400	6450	Limestone, light gray, fine granular.
6450	6460	As above, few oolites, and small amount of chert.
6460	6480	Limestone, light gray and little medium gray, fine granular to crystalline; some medium gray limey chert.
6480	6490	As above, much dark gray shale.
6490	6500	Limestone as above and, some chert.
6500	6540	Limestone as above and little chert.
6540	6560	Limestone, very light gray to light tan, fine grained fragmental.
6560	6580	Limestone, medium gray shaley, medium gray shale.
6580	6590	As above, fine granular limestone, little green material in limestone, (glauconitic?); chert as above.
6590	6600	Limestone as above and little shale.
6600	6610	Limestone as above and little shale as above.
6610	6640	Limestone as above; some medium gray chert and little gray shale
6640	6650	Limestone as above; medium dark gray shale.
6650	6660	Limestone, medium light gray, fine granular; some medium gray shale; pinkish to colorless angular to sub-rounded quartz.
6660	6680	As above; shale, medium light to dark gray; little light ray fine sandstone.
6680	6690	Shale, green gray to medium dark gray; little medium light gray limestone and quartz as above.
6690	6700	Shale, medium light to medium dark gray, little green and red, little medium light gray limestone, fine granular.

<u>From</u>	<u>To</u>	<u>Formation</u>
6700	6710	Shale, medium dark gray to medium light gray, little red and green shale.
6710	6720	As above and some medium light gray, fine grained dense limestone.
6720	6730	Gray shale as above and some medium right gray fragmental limestone.
Englewood 6740		
6730	6760	Limestone, medium gray to light gray, very fine grained dense; some fragmental.
6760	6770	Shale, dark gray N3 carbonaceous; some limestone as above.
6770	6780	Shale as above, some medium light gray, fine grained dense limestone; little light gray fine sandstone.
6780	6790	Dolomite, yellow gray, fine granular.
6790	6800	Dolomite as above, some fine grained light gray limestone; little gray and red shale.
6800	6830	Pale orange dolomite, fine granular (color due to shale staining?) whitish on fracture and red shale, little gray shale.
Lyleton Formation		
6830	6850	Dolomite, pale orange, fine granular.
6850	6880	Dolomite, whitish fine granular with red shale staining; red and dark gray shale.
6880	6890	As above and few pieces of white anhydrite.
6890	6900	Shale, red and very little gray shale; few pieces dolomite as above.
6900	6920	Shale, red and few pieces of gray.
Nisku Equivalent 6940		
6920	6950	Red and light gray shale, few pieces of white anhydrite.
6950	6960	Shale, red and medium gray; little light gray fine granular limestone.
6960	6970	Varigated shale and some white anhydrite.
6970	6980	As above and few pieces of tan dolomite.
6980	6990	Limestone, tan, fine grained to fragmental dense, some slightly dolomitic.
6990	7000	Limestone, tan fine grained dense; tan fine granular dolomite; varigated shale.
7000	7010	Limestone, tan fragmental to fine granular to saccharoidal; little pinpoint porosity.
7010	7020	Limestone, tan to light brown, fine granular.
7020	7030	Limestone, yellow gray, fine grained and fragmental to fine granular dense.
7030	7040	Limestone, yellow gray to light brown, fine grained, fragmental to fine granular.
Woodbend 7060		
7040	7070	Limestone, yellow gray, mostly fine grained fragmental, dense.
7070	7080	Limestone, light brown, fine grained, dense; medium light gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
7080	7090	Limestone, pale yellow brown vitreous, sub-lithographic dense to floury; white anhydrite.
7090	7130	Missing.
7130	7140	Limestone, pale yellow brown, fine grained dense and light gray fine grained dense dolomitic limestone; some gray shale.
7140	7150	Limestone, light brown fine grained, fragmental, dense; and same gray shale.
7150	7160	Limestone, light tan to buff fine grained to fragmental dense.
7160	7170	Limestone, buff fine crystalline to light brown fine granular; little light gray fine grained dolomite; dark gray shale.
7170	7190	Dolomite, light gray, fine crystalline, dense.
7190	7200	Limestone, light brown fragmental to granular.
7200	7220	Limestone, light brown fine granular and pale yellow brown fine grained fragmental.
7220	7230	Limestone, pale yellow brown as above, some fine granular dark brown dense crystalline; light gray fine grained dolomite.
7230	7240	Limestone, pale yellow brown fine granular to fragmental some dark gray shale.
7240	7250	Limestone, pale yellow brown fine grained; little pinpoint porosity; some dark gray shale.
7250	7260	Limestone, pale yellow brown fine grained to fragmental; variegated shale, mostly gray.
7260	7310	Limestone, light brown gray to tan, fine crystalline, dolomitic.
7310	7330	Dolomite, pale brown saccharoidal, some pinpoint porosity.
7330	7350	Limestone, pale yellow brown saccharoidal.
7350	7360	Limestone, light gray to medium light gray, fine grained, dense.
7360	7370	Limestone, light gray to very pale yellow brown, fine grained, dense.
7370	7390	Limestone, very pale yellow brown to yellow gray as above to fine fragmental.
7390	7410	Limestone, very pale yellow brown fragmental and brown gray, fine crystalline dense; light gray dense dolomite.
7410	7430	Limestone, very pale yellow brown fine grained, dolomitic.
7430	7440	Limestone, very pale yellow brown fine grained to fragmental and light to medium gray fine grained limestone.
7440	7450	Limestone, very pale yellow brown as above; mostly fine grained crystalline dense.
Beaverbill Lake 7455		
7450	7460	Limestone, very pale yellow brown, fine grained to fragmental, dense.
7460	7470	Limestone, light gray, fine grained dense; little pale yellow brown, fine grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
7470	7510	Limestone, very pale yellow brown, fine grained to fragmental, dense and some light gray as above.
7510	7530	Limestone, very pale yellow brown fine grained to fine granular.
7530	7550	Limestone, very pale yellow brown, very fine granular, dolomitic.
7550	7570	Limestone, very pale yellow brown, very fine granular.
7570	7580	Limestone, very pale yellow brown to light gray, very fine granular.
7580	7600	Limestone, very pale yellow brown to light olive gray, fine granular.
7600	7610	As above and some pale brown limestone.
7610	7640	As above, fine grained to fine granular limestone.
7640	7650	Limestone, pale yellow brown, fine granular, slightly dolomitic.
Manitoban 7665		
7650	7670	Limestone, pale yellow brown, fine granular to pale brown fine grained crystalline.
7670	7680	Limestone as above.
7680	7690	Limestone, medium light gray to brown gray, fine crystalline.
7690	7700	Limestone, pale yellow brown to light olive gray, fine granular as above.
7700	7710	Limestone, pale yellow brown to light olive gray, fine granular and brown gray fine crystalline; few medium to coarse free sand grains.
7730	7750	Limestone, buff, fine granular and brown gray, fine grained crystalline.
7750	7790	Limestone, brown gray, saccharoidal, slightly dolomitic; fair to good pinpoint porosity.
7790	7810	Limestone, pale yellow brown to light olive gray, saccharoidal, slightly dolomitic; fair to good pinpoint porosity.
7810	7820	Limestone, pale yellow brown, fine granular, slightly dolomitic.
7820	7840	Limestone, pale yellow brown, granular to slightly saccharoidal; little pinpoint porosity,
7840	7860	Limestone, pale brown, fine grained crystalline, dense; some limestone as above.
7860	7880	Limestone, pale brown, fine grained crystalline, dense.
7880	7890	Limestone as above; some fine granular limestone as above.
7890	7920	As above and some reddish orange silty shale.
7920	7930	Limestone, as above to pale yellow brown and pale brown, fine granular to fragmental; some red shale, little light to medium gray shale.
7930	7960	As above and much red shale.
7960	7990	Much red shale, some pale brown crystalline limestone, dense, little fine granular limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
Winnipegogan 8030		
7990	8060	Red shale, little gray shale and little limestone as above.
8060	8110	Limestone, little pale yellow brown, fine granular, dolomitic and little pale brown crystalline; red and little gray shale.
8110	8200	Limestone, as above red shale little light gray fine grained dense dolomite; few free angular to subrounded quartz grains. Mostly shale.
8200	8210	Shale as above and few pieces white anhydrite.
8210	8250	Shale, red, much gray shale; few pieces white anhydrite; brown gray crystalline limestone, little fine saccharoidal pale brown dolomite.
8250	8260	Much white anhydrite; some whitish dolomite, dense and red shale as above.
8260	8300	Limestone, tan, very fine granular dolomitic.
8300	8310	Limestone, very light gray, fine grained, dense; some red and gray shale.
8310	8320	Limestone as above, much medium gray shale and little red shale.
8320	8330	Limestone, pale brown fine crystalline dense; some as above; some red and little gray shale, little white anhydrite.
8330	3340	Limestone as above, little red shale.
Elm Point 8355		
8340	8370	Limestone, brown, gray, pale brown and light gray, fine crystalline, some red shale.
8370	8400	Limestone, pale brown fine crystalline dense and light gray fine grained dense.
Ashern 8415		
Stonewall 8430		
8400	8430	As above, but much red shale.
8430	8450	Shale, red, some medium gray.
8450	8460	Red shale, whitish dolomite and fine grained limestone.
8460	8470	Limestone, whitish fine grained dense and light tan fine crystalline; red shale as above, limestone slightly dolomitic.
8470	8480	Limestone, whitish fine crystalline, slightly dolomitic, red shale.
8480	8500	As above, some medium gray shale(cave?)
8500	8530	Limestone, whitish fragmental dense.
8530	8550	Limestone, whitish fragmental, slightly dolomitic, some vugular porosity.
8550	8570	Limestone, whitish fragmental to oolitic dense.
8570	8620	Limestone, whitish fine crystalline dense to fragmental.
8620	8640	As above and little vugular porosity.
8640	8690	Limestone, whitish fragmental to oolitic, few pinpoint vugs.
8690	8720	Limestone, whitish fine crystalline to fragmental and oolitic, little pinpoint porosity.

<u>From</u>	<u>To</u>	<u>Formation</u>
8720	8770	As above but with reddish shale staining and little red shale. Some purplish limey shale, little medium gray shale.
8770	8810	Limestone, whitish to vitreous very fine crystalline, dense; some shale as above.
8810	8830	As above, little red shale, few pieces medium gray shale.
8830	8840	As above and whitish to light tan fine granular dense limestone.
8840	8880	Limestone, whitish to light tan vitreous to fine granular dense dolomite.
8880	8900	As above, mostly light tan and much medium gray shale (cave?)
8900	8910	Limestone, light tan, very fine crystalline dense, little light tan very fine granular dolomitic limestone.
8910	8970	Dolomite, light tan, very fine crystalline to very fine granular, dense.
8970	9000	As above, dolomitic limestone.
9000	9010	Limestone, whitish to light tan, fine grained, dense dolomitic.
9010	9040	Limestone as above, some medium gray and little red shale. (cave?)
Core #4		
9053	9058	Dolomite, light tan, fine granular and medium light gray, fine grained dense; little pinpoint porosity.
9058	9065	Dolomite, light tan lithographic and medium light gray as above, with medium gray shale interbedded.
9065	9079	Dolomite, pale yellow brown fine crystalline dense.
9079	9081 1/2	Dolomite, pale yellow brown to tan fine crystalline dense, thin layer of fine rounded sandstone.
9081 1/2	9084	Dolomite, pale yellow brown to tan fine crystalline to fragmental.
End Core		
9040	9060	Limestone, pale brown, very fine granular, dense, slightly dolomitic.
9060	9070	Limestone as above, much medium gray shale and some red shale cave?
9070	9080	Missing.
9080	9100	Limestone, light tan fine crystalline dense dolomitic, some pale brown limestone as above; shale as above.
9100	9110	As above to medium light gray fine crystalline dense dolomite, much red and gray shale cave.
9110	9130	Dolomite, medium light gray to pale yellow brown, fine crystalline, dense.
Stony Mountain 9140		
9130	9140	Dolomite as above, mostly pale yellow brown, much gray, some red shale cave.
9140	9150	Dolomite, medium light gray, sandy and dolomite as above.
9150	9170	Shale, much red and medium dark gray cave? some pale yellow brown to pale brown dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
9170	9200	Dolomite, medium light gray sandy and pale yellow brown fine crystalline; much red shale.
9200	9210	Dolomite, pale yellow brown fine grained, little sandy dolomite.
Stony Mountain Shale Member 9212		
9210	9250	Dolomite, pale yellow brown, fine grained, slightly limey.
9250	9260	Dolomite as above and much medium dark gray shale, some green and red shale.
9260	9270	As above but mostly red shale.
9270	9280	Dolomite as above, some red shale.
Red River 9290		
9290	9300	Dolomite as above, much red shale, some gray shale.
9300	9310	Limestone, pale yellow brown fine grained dense, medium light gray fragmental.
9310	9320	Shale, much dark gray and red; little pale yellow brown and brown limestone, light gray limestone, dolomite.
Core #5		
9320	9323	Limestone, pale yellow brown, fine grained, dense.
9323	9329 1/2	Dolomite, pale yellow brown with anhydrite bandings; colorless anhydrite.
9329 1/2	9339	Dolomite, light gray fine grained, dense, containing some fractures.
End Core		
9339	9341	Limestone, pale brown to brown gray crystalline, dense.
Core #6		
9341	9343	Limestone, brown gray lithographic and very light tan fine grained dense.
9343	9348	Limestone, very pale yellow brown, fine crystalline, dense, and pale yellow brown fragmental; very pale yellow brown to light gray, fine grained dense dolomite.
9348	9355	Dolomite, tan anhydritic and medium gray argil. dolomite with colorless anhydrite inclusions.
9355	9357	Tan lithographic dolomite with brown crystalline dolomite inclusions; olive gray fine grained dense dolomite and medium gray argil. dolomite with colorless anhydrite inclusions.
9357	9360	Anhydrite, very light tan.
9360	9365	Dolomite, pale yellow brown to tan fine grained dense, with white anhydrite inclusions.
9365	9370	Dolomite, very pale yellow brown, fine grained to fine granular, dense.
9370	9375	Dolomite, very pale yellow brown, very fine grained, dense, and pale yellow brown limey dolomite, fine grained.
End Core #6		



<u>From</u>	<u>To</u>	<u>Formation</u>
Core #7		
9389	9391	Dolomite, medium light gray, fine grained fragmental, dense, and brown gray fine grained dense dolomite.
9391	9404	Dolomite, very pale yellow brown, fine grained and pale yellow brown dolomitic limestone; colorless to brown anhydrite.
9404	9406	Dolomite, very pale yellow brown, very fine granular and pale yellow brown banded limestone.
9406	9408	Limestone, very pale yellow brown, fine grained, with white inclusions, dense dolomitic.
9408	9411 1/2	Limestone, very pale yellow brown fine grained dense with brown dolomite inclusions.
9411 1/2	9412	Limestone, very pale yellow brown fine grained dense with few dolomite inclusions and pale brown fine grained dense dolomite.
9412	9416	Dolomite, pale yellow brown fine grained, fair pinpoint porosity to light tan fine grained banded dense dolomite.
9416	9419	Pale brown anhydrite.
9419	9421	Dolomite, yellow brown fine crystalline.
9421	9427	Pale brown anhydrite.
9427	9434 1/2	Dolomite, very light tan, fine grained, dense.
9434 1/2	9438	Dolomite, very pale yellow brown, fine grained, dense.
9438	9444	Dolomite, very light tan to buff to fine grained, dense.
9444	9447	Dolomite, buff to pale yellow brown, fine grained, dense, some black shale banding.
End Core #7		
9440	9450	Dolomite as above, much cave-red shale, some gray.
Core #8		
9463	9472	Dolomite, pale yellow brown, some dolomite inclusions.
9472	9497	Dolomite, pale yellow brown, very fine granular to pale brown crystalline.
9497	9507	Limestone, pale yellow brown fine grained, dense.
9507	9512	Limestone, very pale yellow brown to brown, fine crystalline, dense.
9512	9517	Limestone, pale yellow brown and brown fine grained, dense and some very pale yellow brown fragmental fine grained dense limestone.
End Core #8		
Core #9		
9517	9523	Limestone, pale brown crystalline, dense and pale yellow brown, fragmental.
9523	9528	Limestone, pale yellow brown to pale brown, dense, crystalline fragmental.
9528	9532	Limestone, pale yellow brown, dense, crystalline.
9532	9537	Limestone, pale yellow brown lithographic to fine granular.
9537	9542	Limestone, pale yellow brown fragmental dense.
9542	9575	Limestone, pale yellow brown fragmental dense.
End Core #9		

<u>From</u>	<u>To</u>	<u>Formation</u>
Core #10		
9575	9590	Limestone, pale yellow brown fragmental dense.
9590	9595	Limestone as above and fossiliferous (shell fragments.)
9595	9600	Limestone, pale yellow brown fragmental and fossiliferous to fine granular dense.
9600	9620	Limestone, pale yellow brown fragmental, dense.
End Core	#10	
9620	9633	Limestone, pale yellow brown fragmental and fossiliferous, dense.
Core #11		
9633	9663	Limestone, pale yellow brown, fragmental, dense.
9663	9673	Limestone, pale yellow browns fragmental, dense and white fine grained dolomite.
9673	9691	Limestone as above.
End Core #11		
Core #12		
9691	9721	Limestone, pale yellow brown, fine grained fragmental.
9721	9731	Limestone, pale yellow brown, fragmental dense, contains crinoid stems.
9731	9741	Limestone, pale yellow brown fragmental dense crystalline.
9741	9749	Limestone, pale yellow brown and gray brown, fine grained fragmental, dense.
End Core	#12	
Core #13		
9749	9759	Limestone, pale yellow brown fragmental, dense, fine grained.
9759	9779	Limestone, pale yellow brown fine grained fragmental dense.
9779	9789	Limestone; pale brown fine grained to crystalline, fragmental, dense.
9789	9799	Limestone, pale brown crystalline dense and pale yellow brown fine grained fragmental.
End Core	#13	
9799	9840	Limestone, pale yellow brown fine grained fragmental, dense.
9840	9850	Limestone, pale yellow brown to light gray, fine grained fragmental dense.
Red River		
9850	9860	Limestone as above, much medium, dark gray shale cave? few pieces of green gray shale.
9860	9870	Shale, much green and green gray fissile, waxey.
9870	9880	Shale as above, few pieces of free coarse quartz angular.
9880	10,040	Shale as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
Winnipeg sand	10,070	
10,040	10,113	Missing.
10,113	10,120	Shale as above and little medium grained sandstone.
10,120	10,130	Shale as above and some fine to medium, white to colorless sandstone, slightly calcareous.
	10,134	TOTAL DEPTH