

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 20

Summary of the Continental Oil Co. #1 John Lueth
Wells County, North Dakota

By Morton Strassberg

August, 1953

Continental Oil Company - John Lueth No. 1, Wells County, North Dakota;
C SE 1/4, SE 1/4, Section 27, T. 146N., R. 73W., (660 feet N. of S. line, 660
feet W. of E. line, Section 27) Elevation G.L. 1922 - R. B. M. 1933.

The Continental Oil - Lueth No. 1 was spudded November 11, 1952 and 13
3/8 inch casing was set at 455 feet R. B. M. with 350 sacks of cement.

The drilling was completed January 8, 1953. Total depth 6033 feet.
Cement plugs were set at the following places:

5810 - 5760 with 20 sacks	3458 - 3421 with 15 sacks
5022 - 4985 with 15 sacks	2500 - 2463 with 15 sacks
4663 - 4626 with 15 sacks	475 - 434 with 10 sacks. In
4204 - 4167 with 15 sacks	bottom of surface casing and top of
	surface pipe with 10 sacks.

The well was cored but no oil shows were found:

Core #1 3560-3603	Core #10 4552-4606
Core #2 4185-4244	Core #11 4607-4659
Core #3 4244-4288	Core #12 4660-4684
Core #4 4289-4339	Core #13 4684-4718
Core #5 4340-4374	Core #14 4719-4734
Core #6 4375-4377	Core #15 4734-4778
Core #7 4377-4437	Core #16 4779-4827
Core #8 4438-4498	Core #17 5750-5790
Core #9 4499-4551	Core #18 5792-5817

FORMATION TOPS

Formation tops determined from sample, electric, and radioactivity logs,
not all lithologic formation tops called in following list. Colors
determined from rock color chart.

	<u>Depth</u>
Cretaceous System	
Pierre Formation	745 Electric log
Niobrara Formation	1484 Electric log
Greenhorn Member	1955
"Muddy"	2250
Dakota	2502
Jurassic System	
Morrison Formation	2692
Sundance Formation	2760
Piper Formation (Sawtooth)	3030
Triassic System	
Spearfish Formation	3132

	<u>Depth</u>
Mississippian System	
Amsden Formation	3245
Big Snowy Group	3285
Charles Formation	3412
Mission Canyon Formation	3493
Lodgepole Formation	3580
Bakken (Englewood)	4194
Devonian System	
Nisku Formation	4204
Duperow Formation (Woodbend)	4237
Souris R. Formation (Beaverhill)	4393
Silurian System	
Interlake Formation	4663
Ordovician System	
Upper Stoney Mountain	4852
Lower Stoney Mountain	4924
Red River Formation	5022
Winnipeg Formation	5634
Winnipeg Sandstone	5810
Pre-Cambrian	
Granite	6020
Total Depth	6033

Continental Lueth #1

<u>From</u>	<u>To</u>	<u>Formation</u>
Niobrara		
1500	1520	Shale, medium to dark gray, calcareous white specks, slightly pyritic.
1520	1540	Shale, medium greenish gray, slightly calcareous, slightly pyritic.
1540	1560	Shale, medium to dark gray, calcareous.
1560	1580	Shale, light, medium, to dark gray, calcareous, some bentonite.
1600	1620	Shale, light to medium gray, silty, calcareous, some pyrite.
1620	1640	Shale, light to dark gray, silty, calcareous, some small calcite crystals and (iridescent aragonite) shell fragments.
1640	1660	Shale, light to medium gray, calcareous, slightly, silty, slightly pyritic.
1660	1680	Shale, medium to dark gray, slightly calcareous.
1700	1720	Shale, medium to dark gray, slightly silty.
1720	1740	Shale, medium gray, slightly pyritic and silty.
1740	1760	Shale, medium to dark gray, lighter pieces are silty and slightly pyritic.
1760	1780	Shale, medium to dark gray, slightly micaceous, some light silty fragments.
1780	1800	Shale, light to medium gray, slightly calcareous, some light silty fragments.
1800	1820	Shale, light to medium gray, calcareous.
1820	1840	Shale, light to medium gray, very calcareous.

<u>From</u>	<u>To</u>	<u>Formation</u>
1840	1860	Shale, light to medium gray, slightly pyritic, pearly shell fragments.
1860	1880	Shale, light to medium gray, inoceramus fragments.
1880	1900	Shale, medium gray, calcareous.
1900	1920	Shale, medium gray, shell fragments, calcareous, some pyrite.
1920	1940	Shale, medium gray, calcareous.
Greenhorn 1955		
1940	1960	Shale, medium gray, bentonitic, calcareous.
1960	1980	Shale, medium gray, calcareous, inoceramus fragments abundant.
1980	2000	Shale, medium gray, calcareous, iridescent shell fragments and inoceramus fragments. Lighter shale bentonitic.
2000	2030	Shale, medium gray, calcareous, inoceramus fragments.
2030	2040	Shale, light to medium gray, calcareous.
2040	2050	Shale, medium gray, calcareous, limestone and inoceramus fragments, slight amount light gray bentonite.
2050	2060	Shale, light to medium gray, white bentonite.
2060	2070	Shale, light gray, part is slightly calcareous, inoceramus fragments.
2070	2080	Shale, light to medium gray, slightly calcareous, inoceramus fragments.
2080	2100	Shale, light to medium gray, light gray bentonite, inoceramus fragments, slightly pyritic.
2100	2110	Shale, light to medium gray, abundant pyrite crystals, inoceramus fragments, white bentonite.
2110	2120	Shale, light to medium gray, partly calcareous, traces of pyrite, inoceramus fragments.
2130	2140	Shale, medium gray, slightly calcareous, shell fragments.
2140	2150	Shale, medium gray, shell fragments, inoceramus fragments.
2150	2160	Shale, medium gray, inoceramus fragments.
2160	2170	Shale, medium gray, abundant white micaceous bentonite.
2170	2180	Shale, medium gray with white micaceous bentonite.
2180	2190	Shale as above mixed with white micaceous bentonite and shell fragments.
2190	2200	Shale, medium gray, calcareous, white micaceous bentonite and a few inoceramus fragments.
Muddy 2250		
2270	2280	Shale, light to medium gray, micaceous, some siltstone.
2280	2290	Shale, light gray, micaceous, slight siltstone and limestone fragments.
2290	2300	Shale, light to medium gray, some siltstone, shell fragments.
2300	2320	Shale, light to medium gray, some siltstone.
2320	2330	Shale, light to medium gray, some siltstone, traces of pyrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
2330	2340	Shale, light to medium gray, trace of pyrite.
2340	2350	Shale, medium gray, pyritic. White calcite specks, some siltstone, inoceramus fragments.
2350	2360	Shale, medium to dark gray, siltstone, inoceramus fragments.
2360	2370	Shale, medium to dark gray, some siltstone and small amount of bentonite.
2370	2380	Shale, medium gray with some dark gray. Some white bentonite slightly micaceous, shell fragments.
2380	2390	Shale, medium gray, also dark gray fissile shale, some siltstone.
2390	2400	Shale, medium to medium dark gray, darker fragments fissile, some siltstone.
2400	2430	Shale, medium to medium dark gray and light gray siltstone.
2440	2450	Shale, medium dark gray, slightly bentonitic.
2450	2490	Shale, medium to medium dark gray, slightly bentonitic.
2490	2500	Shale, medium dark gray, some is bentonitic, some fibrous calcite.
Dakota	2502	
2500	2510	Shale, medium dark, gray, some siltstone and a few clear quartz grains.
2510	2520	Shale, medium to medium dark gray, bentonitic, some small iron stained quartz grains.
2520	2530	Shale, medium to medium dark gray, bentonitic, traces of pyrite and iron staining. Small fibrous calcite (inoceramus).
2530	2540	Shale, medium to medium dark gray, bentonitic, inoceramus fragments.
2540	2550	Shale, medium dark gray, bentonitic, trace of pyrite, inoceramus fragments.
2560	2570	Shale, medium gray, slightly bentonitic. Small round siltstone concretions (cemented with clay and small amount of calcite) inoceramus fragments.
2570	2580	Shale, medium gray, silty and bentonitic. Siltstone concretions, some are rusty.
2580	2589	Shale, medium gray, silty, bentonitic. Numerous fine frosted sand grain and rusty siltstone concretions.
2590	2600	Shale, medium gray, silty, iron stained. A few fine grains of quartz and many siltstone concretions.
2600	2610	Shale, medium gray, sandy, iron stained. Sand, very fine grained, clear, calcite cement. Siltstone concretions.
2610	2620	Shale, medium gray, abundant fine quartz grains mostly frosted and iron stained. Siltstone concretions.
2650	2660	Shale, medium gray, sandy. Small fragments of fine sandstone cemented with calcite. Abundant siltstone concretions, iron stained.
2660	2670	Shale, medium dark gray, slightly pyritic. Sand grains and sandstone fragments, all fine grained mostly frosted. Many iron stained siltstone concretions.

<u>From</u>	<u>To</u>	<u>Formation</u>
2670	2680	Shale, medium dark gray, fine grained, mostly frosted calcite cemented sandstone fragments. Abundant iron stained silt. Concretions.
2680	2690	Sandstone, frosted to iron stained, subrounded, fine to medium grained. Medium gray shale. Few siltstone concretions.
Morrison 2692		
2690	2700	Sandstone, frosted, iron stained, fine to mostly medium grained. Medium gray shale fragments.
2700	2710	Sandstone, frosted, some iron stained fine to mostly medium grained, sub-rounded to sub-angular. Medium gray shale fragments.
2710	2730	Sandstone, frosted, some iron stained, fine to mostly medium grained, some medium gray shale.
2730	2750	Shale, medium gray sand as above.
Sundance 2760		
2750	2770	Shale, medium gray frosted, slightly iron stained, fine to mostly medium grained, subrounded to sub-angular sandstone.
2770	2790	Same as above, increase of shale.
2790	2830	Sandstone, frosted, slightly iron stained, mostly medium grained, a few large grains. Almost 1/2 medium gray shale fragments.
2830	2840	Limestone, white, very fine grained, contains fine quartz grains and some pyrite as inclusions. Abundant frosted, medium sized grains of quartz. Some medium gray shale.
2840	2850	Shale, medium dark gray. Small amount of white limestone, with fine quartz inclusions. Few medium sized quartz grains.
2850	2860	Limestone, white fine grained, with fine quartz inclusions. Abundant medium gray shale and frosted medium sized quartz.
2860	2870	Shale, medium dark gray. White, fine grained limestone fragments and a few medium sized quartz grains.
2870	2890	Shale, medium dark gray. Some fine grained, white limestone and shell fragments. Fine to medium grained quartz.
2890	2910	Shale, same as above, much, less quartz grains.
2910	2920	Shale, medium to dark gray, shell fragments, small amount of white limestone, and a few medium sized quartz grains.
2920	2930	Shale, medium to dark gray, many white shell fragments and a few fine grains of quartz.
2930	2950	Shale, same as above with additional fine grained limestone fragments.
2950	2960	Shale, medium to dark gray, much silty limestone and shell fragments. Small amount of fine to medium grained quartz.

<u>From</u>	<u>To</u>	<u>Formation</u>
2960	2970	Shale, medium dark gray. Much white silty limestone. Abundant orange shaley limestone. Small amount of fine to medium grained red quartz.
2970	2980	Shale, medium dark gray. Large amount of white to light gray fine silty limestone and orange to rust shaley limestone. Few fine to medium quartz grains.
2980	2990	Shale, medium dark gray. White to light gray silty and orange rust shaley limestone.
2990	3000	Shale, same as above much less limestone.
3000	3020	Shale, medium to medium dark gray and small amount of red. Smaller amount of white silty limestone.
3020	3030	Shale, medium gray, very calcareous and white silty limestone.
Piper 3030		
3060	3070	Shale, medium to dark gray, the lighter shales are calcareous. Some silty, light gray limestone.
3070	3080	Shale, medium to medium dark gray, lighter colored slightly calcareous, also a small amount of red non-calcareous.
3080	3090	Shale, medium to medium dark gray, calcareous, also small amount of red shale and white anhydrite.
	3090	One hour. Shale, medium to medium dark gray, highly calcareous, small amount white fine grained limestone.
3090	3100	One-half hour. Shale, medium dark gray, light gray shaley and white pure limestone.
3100	3110	Shale, medium dark gray, light gray shaley limestone.
3110	3120	Shale, medium to medium dark gray, calcareous, white to light gray shaley limestone.
Spearfish 3132		
3120	3150	Shale, medium dark gray, slightly calcareous. Small amount of white limestone.
3150	3170	Shale, medium dark gray, calcareous. White silty limestone.
3170	3180	Shale, medium dark gray. White slightly shaley limestone and small amount of dolomite.
3180	3190	Shale, medium dark gray, calcareous, white fine grained limestone and some dolomite.
3190	3200	Shale, medium dark gray, white fine grained, limestone and dolomite.
3200	3205	Shale, medium dark gray, large amount of thin flakes of white anhydrite. Small amount white fine grained limestone and grayish red calcareous shale.
3205	3210	Shale, medium dark gray, large amount white anhydrite and white fine grained limestone.
3210	3220	Shale, medium dark gray and lesser amount of calcareous grayish red white anhydrite, limestone and small amount of light gray dolomite.
3220	3230	Shale, same as above, larger amount of grayish red shale.
3230	3240	Shale grayish red, calcareous and small amount of medium dark gray. Large amount white anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
Amsden 3245		
3240	3250	Shale same as above, more gray shale.
3250	3260	Shale, medium dark gray with small amount of grayish red. Light gray shaley limestone and small amount white anhydrite and dolomite.
3270	3280	Shale, medium dark gray and some dolomitic grayish red, large amount of white to light gray dolomite and smaller amount white limestone.
Big Snowy 3285		
3280	3290	Shale, medium dark gray, large amount of pale red and lesser amount white dolomite. Small amount white limestone.
3300	3310	Shale, medium dark gray and considerable light gray, calcareous shale. White, shaley limestone and pale red dolomite.
3310	3320	Shale, medium dark gray, with smaller amount light gray calcareous shale and white anhydrite.
3320	3330	Dolomite, pale red, with small amount medium gray shale.
3330	3350	Dolomite, pale red, with small amounts of medium gray and gray red shale and white flakey limestone.
3350	3360	Dolomite, pale red, small amount medium dark gray shale.
3360	3370	Dolomite, pale red, little more shale, small amount light gray limestone.
3370	3380	Dolomite, pale red, considerable white to light gray limestone, medium gray and gray and gray red shale, and small anhydrite.
3380	3390	Shale, medium gray, smaller amount gray red shale. Light gray limestone and smaller amount grayish pink dolomite.
3390	3400	Dolomite, grayish pink. Some medium gray shale and small amount white limestone.
3400	3410	Limestone, white fine grained, large amount grayish pink dolomite and some medium gray and gray red shale.
Charles 3412		
3410	3420	Anhydrite, white to iron stained very fine grained. Medium gray and gray red calcareous shale.
3420	3440	Shale, medium dark gray and small amount gray red. Considerable white fine grained anhydrite.
3440	3450	Anhydrite, large amount of white dolomite; medium gray and gray red shale.
3450	3460	Shale, medium dark gray and gray red. Large amount of white very fine grained dolomite and lesser anhydrite.
3460	3480	Shale, medium gray to gray red, slightly calcareous.
3480	3490	Shale, medium gray and gray yellow, both calcareous.
Mission Canyon 3493		
3490	3500	Shale, same as above with considerable anhydrite.
3500	3510	Dolomite, very light gray, very fine grained. Small amounts gray and gray red shale.
3510	3520	Dolomite, very light gray. Small amount medium gray and gray red shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3520	3525	Dolomite, very light gray, very fine grained, calcareous. Small amount medium dark gray shale.
3525	3535	Limestone, very light gray, dolomitic, fine grained, small medium dark gray and gray red shale.
3535	3540	Limestone, same as above, increasing shale.
3540	3545	Limestone, very light gray, fine grained. Dolomite light gray, fine grained. Abundant medium dark gray and small gray red shale.
3545	3560	Shale, medium light grays calcareous, small gray red shale.
3560	3587	Dolomite, white to yellowish gray, fine grained, very tight.
3587	3591	Limestone, light yellowish gray, fine grained, silty, tight.
3591	3601	Dolomite, white to pinkish gray, fine grained, pinpoint porosity.
3601	3607	Limestone, white to light gray, fine grained, silty.
3607	3610	Limestone, very light gray fine grained. Some medium gray and small gray red shale.
3610	3615	Limestone, very light gray, fine grained. Some very light gray dolomite and medium gray shale.
	3615	One-half hour. Limestone, very light gray, dolomitic, fine grained. Considerable medium gray calcareous and small red shale.
3620	3640	Limestone as above, little more shale.
3640	3645	Limestone, very light gray, fine to very fine grained. Considerable medium gray shale, little gray red calcareous shale.
3645	3650	Same as above, more shale.
3650	3655	Limestone, light gray, fine grained, slightly dolomitic. Medium to medium dark gray shale.
3655	3660	Dolomite, pinkish gray, fine grained, considerable light gray dolomitic limestone. Considerable medium dark gray shale.
3660	3685	Limestone, very light gray, very fine grained dolomitic. Medium gray shale.
3685	3690	Shale, medium to medium dark gray. Considerable very light gray dolomitic limestone.
3690	3695	Shale, medium dark gray, calcareous, considerable very light gray limestone.
3695	3700	Dolomite, very light gray, very fine grained calcareous, shale, medium to medium dark gray.
	3727	One hour. Limestone, light gray, very oolitic. Small amount light gray shale.
3727	3745	Limestone, light gray to pinkish gray, slightly oolitic. Small shale, medium to medium dark gray.
3745	3760	Limestone as above, no oolites.
3760	3765	Limestone, white to light gray, fine grained. Considerable medium gray shale.
3765	3775	Limestone, very light gray, very fine grained, and oolitic. Considerable medium dark and small gray red shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3775	3780	Limestone as above, more oolitic.
3780	3785	Limestone, pinkish gray, fine grained, and oolitic. Shale, medium dark gray and pale reddish brown.
3785	3790	Limestone, very light gray to pinkish gray, fine grained to oolitic. almost 1/2 shale, medium dark gray and small pale reddish brown.
3790	3795	Limestone as above, less shale.
3795	3805	Limestone, very light gray, fine grained. Considerable medium gray and small pale reddish brown shale.
3805	3810	Limestone, very light gray, fine grained. Medium light gray shale.
3810	3820	Limestone as above, more shale.
3820	3835	Limestone, very light gray, slightly silty, fine grained. Medium to medium dark gray shale.
3835	3845	Limestone, very light to light gray, fine grained silty. Some shale medium dark gray.
3845	3875	Limestone, light gray, fine grained, very silty.
3875	3890	Limestone, very light gray, very silty, many shell fragments. Shale, medium dark gray.
3890	3895	Limestone, very light gray, silty, some calcite prisms, Considerable light gray calcareous shale.
3895	3900	Limestone, medium light gray, very silty. Medium gray, very calcareous shale and some medium dark gray uncalcareous.
3900	3915	Limestone, very light gray, very silty, fine grained; small amount white, very fine grained. Considerable medium dark gray shale.
3915	3930	Limestone, very light gray, very silty, fine grained.
3930	3950	Limestone, medium light gray, very silty, fine grained, platy. Some medium dark gray shale.
3950	3955	Limestone as above, with addition of pale reddish brown calcareous shale.
3955	3960	Limestone, medium light gray, very silty, fine grained. Considerable medium gray and pale reddish brown shale. Small amount white fibrous gypsum.
3960	3970	Limestone as above, no gypsum.
3980	3985	Limestone as above, more shale.
3985	3990	Shale, medium dark gray, almost 1/2 limestone, very light gray silty, fine grained.
3990	3995	Limestone, very light gray, silty, crinoid stem segment. Shale medium dark gray and pale reddish brown.
3995	4000	Limestone, very light gray, silty, fine grained. Shale, medium dark gray and pale reddish brown.
	4000	Circulation. Limestone, same as above with small amount pale yellowish brown limestone.
4000	4005	Shale, medium gray and pale reddish brown. Large amount very light gray, silty limestone.
4005	4010	Limestone, very light gray, silty, fine grained. Shale, medium dark gray, smaller amount pale reddish brown.
4010	4025	Limestone, very light gray, silty, some pinkish gray silty. Some medium dark gray and pale reddish brown shale. Small anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
4025	4030	Limestone as above, some white gypsum.
4030	4035	Limestone as above, no gypsum.
4035	4040	Limestone, very light gray, silty to pale red, silty. Medium dark gray and pale reddish brown shale.
4040	4065	Limestone as above, more shale.
4065	4070	Dolomite, very light gray. Considerable very light gray limestone. Small white anhydrite. Medium dark and pale reddish brown shale.
4070	4075	Limestone, very light to light gray, very silty, fine grained. Considerable fine grained dolomite, medium dark gray shale.
4075	4080	Limestone, very light gray, silty, very fine grained.
4085	4105	Limestone, very light gray to light gray, silty, very fine grained.
4105	4115	Limestone, pale red 10R6/2, and light gray, both very fine grained.
4115	4120	Limestone, very light to light gray, silty and dolomitic.
4120	4135	Dolomite, very light gray, fine grained. Considerable fine grained limestone.
4135	4140	Dolomite, very light gray to white. Considerable pinkish gray, very fine grained limestone.
4140	4145	Limestone, white to very light gray, slightly salty, fine grained, some white, fine grained dolomite.
4145	4150	Limestone, as above, small amount white chert.
4150	4160	Limestone, same as above, no chert.
4160	4165	Limestone, white with pink specks. Dolomite, white to light gray.
4165	4175	Limestone, white to very light gray, fine grained, silty.
4175	4180	Limestone, as above. Considerable medium gray shale.
4180	4185	Limestone, white very fine grained to fine grained. Less medium gray shale.
	4185	One-half hour. Limestone, white fine grained, slightly silty. Small shale, medium gray.
	4185	One hour. Limestone, same as above.
Englewood 4194		
4185	4205	Shale, medium gray, slightly dolomitic.
4205	4231	Dolomite, white, fine grained, slightly sandy, vuggy.
Duperow 4237		
4231	4244	Dolomite, pinkish gray, fine grained, intergranular and vuggy porosity.
4244	4259	Dolomite, white, fine grained, vuggy porosity.
4259	4260	Dolomite, iron staining.
4260	4261	Limestone, white, fine grained, intergranular porosity.
4261	4270	Dolomite, white to light gray, very vuggy.
4270	4273	Dolomite, white, fine grained, pinpoint porosity.
4273	4274	Dolomite, white to iron stained, fine grained, tight.
4274	4276	Dolomite, light green to grayish pink, fine grained, a few sand grains, tight.

<u>From</u>	<u>To</u>	<u>Formation</u>
4276	4277	Dolomite, white, fine grained, pinpoint porosity and vuggy.
4277	4287	Dolomite, light gray, fine grained, very vuggy.
4287	4290	Dolomite, light gray to white, fine grained, vuggy.
4290	4295	Dolomite, white, fine grained, tight.
4295	4302	Dolomite, light gray, fine grained, very vuggy, anhydrite.
4302	4308	Dolomite, light gray to light brown, fine grained tight.
4308	4312	Dolomite, medium dark brown, fine grained, anhydrite inclusions, vuggy.
4312	4318	Dolomite, light to medium brown, iron stained, fine grained, vuggy.
4339	4340	Dolomite, very light green, fine grained, small iron stains, tight.
4340	4383	Dolomite, light brown to medium brown, fine grained, very vuggy.
4386	4389	Limestone, dark brown, sublithographic, very tight.
4389	4390	Limestone, light brown, fine grained, pinpoint porosity.
Beaverhill	4393	
4390	4398	Limestone, medium dark brown, fine grained, a few coarse crystals, tight.
4398	4400	Limestone, white to pink, fine grained, some medium crystals, some iron staining, vuggy.
4400	4404	Limestone, medium light gray, fine grained, small vugs. Brachiopods, many ostracods and micro gastropod.
4404	4407	Dolomite, grayish red, pale, fine grained, slight porosity.
4407	4411	Dolomite, pale red, iron stained, fine to medium grained, slightly vuggy.
4411	4427	Limestone, white to very light gray, micro-speckled, fine grained tight.
Souris River	4432	
4427	4433	Limestone, very light gray, sublithographic, to very fine grained, tight.
4438	4462	Dolomite, light gray to very light brown, fine grained, a few very thin shale partings, very tight.
4462	4467	Dolomite, white to light gray to light green, fine grained, thin black shaley lenses, tight. Slight oil stain under ultra violet. No cut.
4467	4470	Shale, gray to dark green, dolomitic.
4470	4480	Dolomite, light gray, fine grained, silty, shaley, tight.
4480	4487	Limestone, light, gray, fine grained, tight.
4487	4490	Limestone, medium light gray, fine to medium grained, tight.
4490	4494	Dolomite, light gray, fine grained, thin shale partings, tight.
4494	4496	Limestone, medium dark gray, sublithographic, argillaceous tight.

<u>From</u>	<u>To</u>	<u>Formation</u>
4496	4522	Dolomite, white to medium light gray to light gray green, fine grained, tight.
4522	4527	Limestone, light gray to medium gray, very fine grained, thin argillaceous, dolomite partings.
4527	4540	Dolomite, white to greenish gray, fine grained, argillaceous, tight.
Dawson Bay 4545		
4540	4550	Limestone, white, fine grained, pinpoint porosity and light green lithographic, tight.
4550	4552	Shale, light green, calcareous nodules.
4552	4565	Limestone, white, light gray to medium gray, sublithographic to fine grained, tight.
4565	4567	Limestone, medium to medium dark gray, fine to coarse grained, crinoidal, tight.
4567	4571	Limestone, medium to medium dark gray, very fine grained, tight, oil stain.
4571	4573	Limestone, medium gray, fine to coarse grained brachiopods crinoidal, tight.
4573	4581	Limestone, light gray, fine grained, iron stains, crinoid segments.
4581	4582	Limestone, light to medium gray, fine to medium grained, brachiopods and crinoid segments.
4582	4586	Limestone, light to medium dark gray, fine grained, crinoidal, tight.
4586	4587	Limestone, same as above, very fossiliferous.
4587	4592	Limestone, medium gray, slight reddish tint, very fine grained, tight.
4592	4599	Limestone, light to medium gray, fine grained to sublithographic, brachiopods, tight.
4599	4607	Limestone, light gray brown, fine grained, brachiopods, tight.
4607	4611	Dolomite, light brown, fine to medium grained, anhydrite streaks, good porosity.
4611	4617	Dolomite, light gray to pinkish gray, fine grained. arenaceous, pinpoint porosity.
4617	4626	Shale, brownish red with variegated light green, calcareous.
4626	4644	Shale, pale red, fine grained, rounded sand grains, calcareous.
4644	4646	Shale, medium dark gray, calcareous.
4646	4650	Shale, light greenish gray to pale red, calcareous.
4650	4658	Shale, moderate reddish brown, arenaceous, calcareous.
4658	4659	Shale, light gray green with pale red streaks, calcareous, waxy luster.
4659	4661	Dolomite, white, fine grained, pinpoint porosity.
Interlake 4663		
4661	4665	Limestone, white, lithographic, tight.
4665	4680	Dolomite, white, light gray to pale red, fine grained, some pinpoint porosity.
4680	4684	Shale, grayish red purple with white mottlings.

<u>From</u>	<u>To</u>	<u>Formation</u>
4684	4685	Shale, grayish red purple with white mottlings, dolomitic.
4685	4700	Dolomite, white to pink, fine grained, tight.
4700	4706	Dolomite, pale purple red with pale red mottlings, fine to medium grained, calcareous, silty, vuggy porosity.
4706	4806	Dolomite, white to light gray, fine grained to lithographic, tight to slightly vuggy porosity. Thin gray and purple shale partings.
4806	4811	Dolomite, pale red to light gray, pale red and white mottlings, very tight.
4811	4827	Dolomite, white, very fine grained, chalky, tight.
Upper Stony Mountain 4852		
4850	4860	Dolomite, pinkish gray, very fine grained.
4860	4870	Dolomite, same as above.
4870	4880	Dolomite, pinkish gray very fine grained. Some limestone very light gray, slightly silty. Some medium gray shale.
4880	4890	Dolomite, pinkish gray, very fine grained. Very small amount well rounded, frosted, very fine grained quartz.
4890	4900	Dolomite, pinkish gray, very fine grained.
4900	4910	Dolomite, same as above.
4910	4920	Dolomite, same as above. Shale, medium gray, micaceous.
Lower Stony Mountain 4924		
4920	4930	Dolomite, grayish orange pink and pinkish gray. Very fine grained. Small micaceous, medium gray shale.
4930	4935	Dolomite, pale red to grayish orange pink, fine grained. Shale medium gray, very micaceous. Small amount black carbonaceous material.
4935	4940	Dolomite, grayish pink 5YR8/2 to very light gray. Some light gray calcareous shale.
4940	4945	Dolomite, grayish pink to pinkish gray, fine grained. Light gray, calcareous shale. Small black carbonaceous matter.
4945	4950	Dolomite, same as above, coral fragment.
4950	4960	Limestone, light to medium light gray, coralline, very fine grained.
4960	4965	Limestone, pale red, very fine grained shaley to light gray, coralline.
4965	4970	Limestone, light gray.
4970	4975	Limestone, light gray, coralline, bryozoans, white to pinkish gray dolomite.
4975	4980	Limestone, same as above, some medium gray shale.
4980	4985	Limestone, light to medium light gray, many bryozoans. Considerable white to pinkish gray dolomite.
4985	4995	Limestone, same as above. Considerable medium gray shale.
4995	5000	Limestone, very light gray, very fine grained, very shaley.
5005	5010	Limestone, very light gray, very fine grained, very shaley. Dolomite, pinkish gray, very fine grained. Brachiopod shell fragments.

<u>From</u>	<u>To</u>	<u>Formation</u>
5010	5015	Limestone, same as above, no shell fragments. Considerable medium light gray shale.
5015	5020	Limestone, very light gray to pinkish gray, very fine grained, very shaley. Few bryozoans and brachiopods. Medium dark gray shale.
Red River 5022		
5020	5025	Limestone, same as above. Slight increase in shale.
5025	5030	Dolomite, white to very light gray, sublithographic, some very light gray limestone.
5030	5035	Limestone, white to very light gray, sublithographic, bryozoans.
5035	5040	Limestone, same as above, no bryozoans.
5050	5055	Limestone, same as above, some pinpoint porosity, bryozoa.
5055	5065	Limestone, white to light gray, sublithographic.
5065	5070	Limestone, same as above - poor sample.
5070	5075	Limestone, very light to light gray, very fine grained, shaley. Some shale medium dark gray.
5075	5080	Limestone, same as above, increase in shale
5080	5085	Dolomite, very light to light gray. Considerable very light gray limestone and shell fragments. Some medium dark gray shale.
5085	5090	Limestone, white to very light gray, slightly silty, sublithographic. Some pinkish gray dolomite, few bryozoa.
5090	5095	Limestone, light gray to light brownish gray. Some pinkish gray dolomite. Some medium dark gray shale.
5095	5100	Dolomite, white very fine grained, shows some pinpoint porosity. Calcite prisms.
5100	5105	Dolomite, white, very fine grained, shows pinpoint porosity. Some very light gray limestone. Small medium light gray slightly pyritic shale.
5105	5110	Dolomite, white, very fine grained, some pinpoint porosity. Considerable very light gray, shaley limestone.
5110	5120	Limestone, white very fine grained, dolomitic, some pinpoint porosity.
5120	5125	Limestone, same as above, no shale, brachiopod shell.
5125	5130	Limestone, white dolomitic, fine grained, some pinpoint porosity. Pinkish gray dolomite.
5130	5135	Limestone, white dolomitic, fine grained, some good porosity.
5135	5140	Limestone, same as above, pinpoint porosity.
5140	5145	Limestone, white to very light gray, dolomite. Some light gray dolomite.
5145	5150	Limestone, white to very light gray, dolomitic, shaley, some pinpoint porosity. Few brachiopod fragments.
5150	5155	Dolomite, white to medium light gray, very calcareous, slightly shaley.
5155	5175	Limestone, white, fine grained, the light gray to medium light gray fragments are porous, and silty.

<u>From</u>	<u>To</u>	<u>Formation</u>
5175	5180	Dolomite, white to light brownish gray, fine grained, porous calcitic. Considerable white fine grained limestone.
5180	5185	Dolomite, pinkish gray to light gray, finely granular. Some very light gray, fine grained limestone.
5185	5195	Limestone, white to very light gray fine grained. Considerable dolomite, light gray finely granular.
5195	5220	Limestone, white, fine grained, pure, to light gray finely granular, shaley and dolomitic.
5220	5225	Limestone, white to very light gray, fine grained.
5225	5275	Limestone, same as above with light gray dolomitic, finely granular limestone.
5275	5280	Limestone, white to very light gray, fine grained, very light gray to light gray, finely granular, dolomitic.
5325	5330	Limestone, white to light gray, fine grained, pure.
5330	5350	Limestone, light gray, finely grained, dolomitic, to white sublithographic, pure.
5350	5360	Limestone, white, sublithographic, pure, to very light to light gray, finely granular, slightly dolomitic.
5360	5370	Limestone, white, sublithographic.
5370	5375	Limestone, same as above, with very light gray, finely granular limestone, showing pinpoint porosity.
5375	5380	Limestone, same as above with white chert.
5380	5390	Limestone, white sublithographic to very light gray, finely granular. Some light gray finely granular dolomite.
5390	5400	Limestone, white sublithographic, large amount white chert.
5400	5405	Limestone, white sublithographic, to very light gray dolomitic. White to very light gray chert.
5405	5420	Limestone, white sublithographic to yellowish gray, finely grained, white chert.
5420	5440	Limestone, white sublithographic to light gray finely granular dolomitic. White chert.
5440	5445	Limestone, same as above, shell fragments.
5445	5450	Limestone, white sublithographic to light gray shaley. White chert.
5480	5490	Limestone, white to light gray, fine grained, white chert.
5490	5500	Limestone, very light gray to light gray slightly shaley limestone. White chert.
5500	5520	Limestone as above, no chert.
5520	5545	Limestone, very light gray, pure to light gray, silty and dolomitic.
5545	5570	Limestone, white sublithographic, to very light gray, finely granular.
5570	5575	Limestone, white to very light gray, sublithographic.
5575	5585	Limestone, same as above, small amount light gray shale.
5605	5635	Limestone, white, sublithographic to light gray, finely granular, shaley, pyritic.

<u>From</u>	<u>To</u>	<u>Formation</u>
Winnipeg Formation 5634		
5635	5640	Shale, gray green, splintery with limestone as above.
5640	5650	Shale, gray green with limestone as above.
5675	5685	Shale, greenish gray, splintery. Bryozoa. Small white limestone.
5685	5690	Shale, same as above, slightly pyritic.
5690	5710	Shale, greenish gray, splintery, slightly pyritic.
5710	5730	Shale, greenish gray to dark greenish gray, splintery.
5730	5735	Shale as above, bryozoa.
5735	5740	Shale as above.
5740	5745	Shale as above, some olive gray shale.
5750	5810	Shale, greenish gray, very fine pyrite crystals, sand grains at base.
Winnipeg Sandstone 5810		
5810	5817	Sandstone, white, medium gray to iron stained, fine to medium grained, friable, subrounded, to sub-angular, argillaceous, good permeability and porosity.
5825	5830	Shale as above, very light gray siltstone.
5830	5835	Siltstone, very light gray, greenish gray shale.
5835	5850	Shale, gray green, splintery, siltstone very light gray.
5850	5855	Shale as above, few fine grained frosted quartz grains.
5855	5865	Sandstone, fine grained, subrounded to rounded, frosted. Shale greenish gray.
5865	5870	Sandstone, very fine grained, subrounded, to fine grained, subrounded to rounded. Shale greenish gray.
5870	5875	Shale, gray green. Sandstone, very fine grained to fine grained, subrounded to rounded, frosted, calcite cement.
5875	5880	Shale as above with very light gray siltstone.
5880	5885	Shale same as above, sandstone iron stained.
5885	5900	Shale, same as above with light gray shale.
5900	5915	Sandstone, very fine to fine grained, subrounded to rounded, frosted, iron stained. Some greenish gray shale.
5915	5925	Shale, greenish gray, sandstone, very fine to fine grained, subrounded to rounded, frosted.
5925	5930	Shale as above. Abundant brachiopods.
5930	5955	Shale as above, no brachiopods -30-35.
5955	5960	Shale as above, sandstone glauconitic. Small amount white fine grained limestone.
5960	5965	Shale, greenish gray, slightly pyritic. Sandstone very fine to fine grained, frosted, subrounded to rounded, glauconitic.
5991	5995	Shale, greenish gray to medium dark gray. Sandstone as above. Some white finely granular limestone.
5995	6005	Shale as above, sandstone has red iron stains.
6005	6010	Shale, greenish gray. Sandstone very fine to fine grained, frosted, subrounded to rounded, iron stained and glauconitic. A few medium to coarse quartz grains, angular to subangular, frosted to clear.

<u>From</u>	<u>To</u>	<u>Formation</u>
6010	6015	Granite. Pink, fine to medium grained with quartz, pink feldspar, muscovite and biotite.
	6033	Total Depth.