

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 12

Summary of William Herbert Hunt Trust Estate Joe J. & Anna Wald No. 1

Ward County, North Dakota
By Sidney B. Anderson
February 23, 1953

Hunt Oil Company - Joe Wald No. 1, Ward County, North Dakota, Section 23, T. 155N., R. 81W., (660 feet N. of S. line, 1980 feet E. of W. line, Section 23.) Elevation 1586.5 G.L. and 1596 D.F.

The Hunt Oil Company Joe Wald No. 1 was spudded Dec. 17, 1951 and 10 3/4 inch casing was set at 258 feet. The drilling was completed April 19, 1952 and the well abandoned. Total Depth, 8652 feet.

TESTS

DST #1 3057' - 3066'

Tool open 1 hour. Recovered 880' of water. I.P. - 260, F.P. - 475, S.I.P. - 1200.

DST #2 4754' - 4764'

Tool open hour. Recovered 400' gas cut salt water. I.P. - 325, F.P. - 475, S.I.P. - 3200.

DST #3 5876' - 5906'

Tool open 1 hour, shut in 20 minutes. Recovered 595' slightly oil and gas cut salt water. I.P. - 0, F.P. - 300, S.I.P. - 2700.

DST #4 6340' - 6362'

Tool open 1 hour, shut in 20 minutes. Recovered 180' mud. I.P. - 0, F.F.P. - 0, S.I.P. - 2200.

DST #5 6993' - 7040'

Tool open 1 hour, shut in 20 minutes, good blow, recovered 6100' salt water. S - 200,000 P.P.M. Cl., I.F. - 3400, F.F.P. - 3500 B.H.P. - 3500, H.P. - 3900.

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	1793
Greenhorn Member	2250
Dakota	2837 (electric log)
Jurassic System	
Ellis Group	3140 (electric log) 3110 (sample log)
Piper Formation (Sawtooth)	3682

<u>Formation</u>	<u>Depth</u>
Triassic System	
Spearfish Formation	3895
Mississippian System	
Charles Formation	4180
Mission Canyon Formation	4765
Lodgepole Formation	5065
Englewood Formation	5730
Devonian System	
Lyleton Formation	5790
Ashern Formation	6920
Silurian System	
Stonewall Foimation	6952
Ordovician System	
Stony Mountain Formation	7408
Stony Mountain Shale Member	7537
Red River Formation	7570
Winnipeg Formation	8210
Winnipeg Sand	8417
Pre-Cambrian	8617
Total Depth	8652

Wm. H. Hunt Trust Estate J. Wald #1

<u>From</u>	<u>To</u>	<u>Formation</u>
400	450	Light gray shale, tan siltstone, and little light brown sandstone.
450	460	Shale, one piece of very light olive gray; and one piece of light gray, dense limestone.
460	570	Shale, light olive gray, salty.
570	1540	Green gray shale and some white calcareous siltstone.
1540	1550	Shale, medium gray N5.
1550	1590	Shale, green gray.
1590	1620	Shale, green gray to dark gray N3.
1620	1650	Shale, green gray and gray orange hard shale.
1650	1680	Shale, green gray, medium dark gray and gray orange.
1680	1710	Shale, mostly green gray, some medium dark gray.
1710	1750	Green gray shale.
Niobrara		
1793	1830	Shale, green gray, dark gray and some gray orange.
1830	1840	Shale, dark gray, gray orange and light gray, brown gray, and medium gray with white specks.
1840	1860	Shale, dark gray, white specks, same as above.
1860	1900	Shale, medium gray with white specks.
1900	2200	Shale, medium light gray to green gray.
Greenhorn 2250		
2200	2380	Shale, medium dark gray.
2380	2470	Shale, medium dark gray and pale red 10R6/2, slightly calcareous.
2470	2530	Shale, dark gray, medium dark gray and medium gray.

<u>From</u>	<u>To</u>	<u>Formation</u>
2530	2540	Shale, medium dark gray to medium gray; little whitish to light gray rounded sandstone, calcareous.
2540	2560	Shale, medium dark gray.
2560	2620	Shale, medium gray to green gray.
2620	2750	Shale, medium dark gray N4. 30' to 50' few white specks.
2750	2780	Shale as above and piece of very fine grained, light gray, poorly cemented sandstone.
2780	2820	Shale, medium gray.
Dakota 2837		
2820	2840	Fine to coarse sandstone, light gray to white calcareous; shale as above.
2840	2850	Mostly shale as above, little sandstone, mostly fine grained glauconitic.
2850	2860	Much fine to coarse rounded sandstone as above and shale as above.
2860	2870	Much coarse sub-angular to rounded quartz, and shale as above.
2870	2900	Some coarse sub-angular to rounded quartz, and shale as above.
2900	2910	Some sandstone as above and dark gray N3 to medium gray N5 shale.
2910	2920	Little sandstone as above and shale as above.
2920	2940	Medium dark gray shale N4 and little medium to coarse grained, white sand calcareous cement.
2940	2960	Medium dark gray shale and very little sand.
2960	2970	Medium dark gray shale and little medium grained whitish to light gray sandstone, calcareous cement.
2970	2980	Medium dark gray shale to green gray shale, very little sand.
2980	2990	Medium dark gray shale, little medium grained sandstone, whitish.
2990	3010	Medium dark gray shale, little brownish medium grained sandstone, calcareous.
3010	3020	Medium dark gray and whitish medium grained sandstone calcareous cement.
3020	3030	Medium dark gray and little very fine to medium grained light gray, sandstone.
3030	3060	Medium dark gray and little very fine to medium light gray to whitish sandstone, little coarse as above and free quartz.
3060	3080	Medium dark gray, and little fine to medium grained, very light gray sandstone, some slightly glauconitic.
3080	3090	Shale as above and little medium grained sandstone, little green gray siltstone, glauconitic.
3090	3100	Shale as above and little medium grained sandstone.
3100	3110	Shale as above and little fine to very fine grained light gray calcareous sandstone.
3110	3130	Shale as above and much sand as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
Ellis (electric log)		
3130	3140	Sandstone as above, slight brown tinge, shale as above and little green gray shale.
3140	3170	Shale as above, light brown or tan sandstone, little pale pink anhydrite.
3170	3180	Shale as above, mostly light gray sandstone.
3180	3190	Sandstone as above, gray shale, little white to pink anhydrite.
3190	3210	Medium dark gray shale, little sandstone as above, white to pink anhydrite.
3210	3230	Shale and anhydrite as above; very little sandstone.
3230	3240	Shale, medium dark gray and green gray; very little sandstone, anhydrite as above.
3240	3250	Shale, medium dark gray and medium light gray; very little sandstone, anhydrite as above.
3250	3290	Shale, medium dark gray to green gray.
3290	3300	Shale, medium dark gray to medium light gray, with white specks & little green gray.
3300	3320	Shale, medium dark gray to green gray, little sandstone as above (cave?).
3320	3330	Shale as above and some red silty shale.
3330	3340	Varigated shale and little pink anhydrite.
3340	3350	Shale, mostly medium dark gray to green gray; little red shale and little light gray fragmental limestone.
3350	3360	Varigated shale, little sandstone as above (cave?).
3360	3400	Varigated shale, mostly medium dark gray and green gray. Little sandstone as above (cave?).
3400	3410	Varigated shale, mostly medium dark gray and green gray.
3410	3420	Varigated shale.
3420	3430	Shale, green gray and medium dark gray.
3430	3510	Shale as above, little red shale; piece of fine grained light gray sandstone; few pieces of pink anhydrite.
3510	3530	Shale, green gray and red.
3530	3540	Varigated shale and little pink anhydrite.
3540	3550	Varigated shale and light gray sandstone, fine grained; little light gray dense limestone.
3550	3560	Varigated shale and some fine grained white sandstone.
3560	3550	Varigated shale and fine grained white to light gray sandstone; pieces of white to pink anhydrite.
3550	3590	Varigated shale.
3590	3600	Varigated shale; mostly green gray and gray shale.
3600	3620	Varigated shale and little white fine grained, slightly calcareous sandstone.
3620	3630	Varigated shale.
3630	3640	Varigated shale and little fine grained tan sandstone and gray shale interbedded. little very light buff, dense limestone.
3640	3660	Varigated shale and very light buff dense limestone.
3660	3670	Same as above; much red shale.
3670	3680	Varigated shale and little white fine grained sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
Piper Formation 3682		
3680	3690	Varigated shale, some silty shale.
3690	3700	Varigated shale and some light gray, fine grained sandstone.
3700	3720	Varigated shale and some whitish, fine to medium grained sandstone, calcareous. little pink anhydrite 10' - 20'.
3720	3730	Varigated shale.
3730	3740	Varigated shale and white dense limestone.
3740	3750	Varigated shale; light yellow gray to light gray, dense limestone.
3750	3760	Varigated shale; light yellow gray dense limestone.
3760	3770	Varigated shale, little limestone as above, dense.
3770	3780	Varigated shale and light yellow gray limestone, dense; few pieces of sandstone as above.
3800	3810	Varigated shale and few pieces of limestone as above.
3810	3830	Varigated shale and few pieces of white anhydrite.
3830	3840	Varigated shale.
3840	3860	Varigated shale and white anhydrite.
3860	3870	Varigated shale and white anhydrite; little tan fine grained sandstone.
3870	3880	Varigated shale and white anhydrite.
Spearfish 3895		
3880	3900	Varigated shale.
3900	3910	Varigated shale, much red shale, pale red brown 10R5/4 and little reddish.
3910	3920	Varigated shale.
3920	3940	Varigated shale and pale red brown fine grained sandstone.
3940	3950	Sandstone as above and some light to medium gray shale.
3950	3960	Sandstone as above; varigated shale, little white anhydrite in sandstone.
3960	4060	Sandstone as above, fine to medium grained; varigated shale.
4060	4160	Sandstone as above, fine to coarse rounded; varigated shale.
Charles Formation 4180		
4160	4200	Varigated shale.
4200	4210	Varigated shale and little white anhydrite.
4210	4220	Varigated shale.
4220	4230	Varigated shale; pale red 10R6/2 fine grained sandstone, slightly calcareous.
4230	4240	Varigated shale.
4240	4250	Varigated shale and yellow gray oolitic to fragmental limestone, some pinpoint porosity.
4250	4260	Limestone as above and some shale as above.
4260	4290	Varigated shale and white anhydrite.
4290	4300	Shale as above, brownish to gray red limestone with anhydrite inclusions; little white anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
4300	4310	Varigated shale and medium light gray dolomite.
4310	4320	Varigated shale.
4320	4350	Varigated shale, very light olive gray fragmental limestone, little pinpoint porosity, little white anhydrite.
4350	4360	Varigated shale, light gray floury limestone.
4360	4370	Varigated shale, light gray slightly saccharoidal limestone.
4370	4380	Varigated shale, little light gray dense limestone, white anhydrite
4380	4390	Varigated shale, white anhydrite, pale yellow brown crystalline limestone.
4390	4400	Pale yellow brown fragment limestone.
4400	4420	Varigated shale, limestone as above and few rounded free quart grains.
4420	4430	Varigated shale.
4430	4450	Varigated shale mostly gray; little medium light gray dense dolomite and white anhydrite. Little limestone as above.
4450	4460	Varigated shale, some fragmental limestone as above.
4460	4470	Same as above and few pieces of medium gray oolitic limestone.
4470	4480	Shale as above, little pale brown limestone as above and gray dense limestone.
4480	4500	Varigated shale.
4500	4510	Varigated shale, and little medium gray dense dolomite.
4510	4530	Varigated shale, little dolomite as above, and yellow gray dense limestone; whitish to light gray anhydrite.
4530	4540	Varigated shale, little dolomite and white anhydrite; much yellow, gray oolitic fragmental limestone.
4540	4560	Limestone as above, oolitic fragmental, some pinpoint porosity; some shale as above.
4560	4580	Little limestone as above; medium light gray dense dolomite, anhydritic.
4580	4620	Dolomite as above, little white anhydrite, and some shale as above.
4620	4660	Some shale as above, much medium dark gray shale; white anhydrite and little dolomite as above.
4660	4680	Varigated shale, much red and gray; little white anhydrite.
4680	4690	Some shale as above; reddish dense anhydritic dolomite.
4690	4700	Dolomite as above, much white anhydrite, and little red brown and gray shale.
4700	4710	Anhydrite, white to light gray and reddish.
4710	4720	White to light gray anhydrite; red and gray shale.
4720	4730	White anhydrite, red and gray shale.
4730	4740	Varigated shale and little white anhydrite.
4740	4750	Varigated shale, mostly gray; little white anhydrite.
4750	4760	Varigated shale, some light gray limestone, and white to pink anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
Mission Canyon	4765	
4760	4780	Limestone, yellow gray, fair pinpoint to vugular porosity, oolitic to dense.
4780	4800	Limestone, yellow gray oolitic, fair pinpoint to vugular porosity and medium dark gray shale.
4800	4820	Yellow gray oolitic to fragmental dense limestone.
4820	4890	Same as above, mostly fragmental; fair to good porosity.
4890	4920	Same as above and medium light gray dense limestone.
4920	4940	Yellow gray fragmental dense limestone.
4940	4970	Yellow gray oolitic limestone, some fair oolitic porosity.
4970	4980	Yellow gray oolitic to fragmental limestone.
Lodgepole	5065	
4980	5070	Yellow gray fine granular to oolitic and fragmental limestone.
5070	5090	Same as above and some light gray very fine grained limestone, dense.
5090	5100	Limestone as above, varigated shale and pink anhydrite.
5100	5130	Lime stone, light gray very fine grained dense to fragmental limestone.
5130	5170	Medium light gray fragmental limestone.
5170	5180	Limestone, yellow gray fragmental to fine granular, some medium light gray and varigated shale, mostly gray.
5180	5190	Limestone, medium light gray to light gray fragmental (some very argillaceous), little red and gray shale.
5190	5220	Limestone, medium light gray to light gray fragmental and little yellow gray fragmental to fine grained, dense.
5220	5330	Medium light gray fragmental, dense limestone.
5330	5360	Medium light gray finely fragmental, dense limestone.
5360	5380	Medium light gray fragmental, dense limestone.
5380	5460	Medium light gray to very light gray fragmental dense limestone, few pieces of slightly yellow gray fragmental limestone.
5460	5470	Limestone as above and much dark gray carbonaceous shale.
5470	5480	Limestone as above, little chert and crinoid button.
5480	5510	Limestone as above, fragmental, dense.
5510	5520	Limestone, medium light gray fragmental to very fine grained dense.
5520	5530	Limestone as above to slightly brownish dense, very fine grained.
5530	5550	Missing.
5550	5560	Limestone, light gray to medium light gray, fine grained, dense.
5560	5660	Limestone as above, very cherty.
5660	5670	Limestone as above much medium light to medium dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
5670	5680	Limestone as above, some chert and white to pink anhydrite.
5680	5690	Limestone, medium light gray, fine grained, dense.
5690	5700	Limestone as above and little white anhydrite.
5700	5720	Limestone as above and little white to pink anhydrite.
Englewood 5730		
5720	5750	Limestone, very light gray, dense, fine grained soft.
Lyleton 5790		
5750	5790	Limestone, very light gray, dense, fine grained; medium gray shale.
5790	5800	Limestone as above and some red shale.
5800	5820	Shale, dark gray and some reddish; light gray crystalline, dense limestone; siltstone.
5820	5830	Little limestone as above, dark gray N3 shale and reddish shale.
5830	5860	Dark gray N3 shale; some light gray fine granular limestone; some coarse rounded free quartz.
5860	5940	As above, very poor samples.
5940	5950	Shale as above, little fine granular yellow gray limestone and brown gray, fine grained, dense limestone.
5950	5980	Gray shale as above and fine granular to fine grained dense limestone, yellow gray.
5980	6000	Gray shale as above and yellow gray to light gray dense, fine grained limestone.
6000	6010	Limestone, yellow gray to light brown, fine grained dense.
6010	6100	Limestone as above, and yellow gray fragmental dense.
6100	6120	Limestone, yellow gray fragmental dense to fine granular.
6120	6160	Missing.
6160	6210	Dolomite, light olive gray, 5Y6/1 saccharoidal, some pinpoint porosity.
6210	6230	Dolomite as above and dark gray N3 carbonaceous shale.
6230	6250	Dolomite as above, yellow gray fragmental, dense limestone and shale as above.
6250	6300	Limestone, yellow gray, little pale yellow brown very fine grained limestone and light brown to light gray fine granular dolomitic limestone; few pieces of white anhydrite, medium dark gray carbonaceous shale.
6300	6310	Limestone, light gray finely granular, dense and very pale yellow brown, fine granular, and very pale yellow brown fragmental limestone.
6310	6320	Limestone, very pale yellow brown, fine granular to fragmental, to light gray fine granular, dense.
6320	6330	Yellow gray to light gray fine granular limestone; some slightly dolomitic yellow gray limestone, and little gray shale.
6330	6350	Same as above to pale yellow brown fine granular limestone, little gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
6350	6360	Limestone, yellow gray, fine granular.
6360	6380	Limestone, yellow gray finely fragmental and some pale yellow brown fine granular; few pieces of white anhydrite; gray shale.
6380	6390	Limestone, yellow gray fine granular, pale yellow brown fine granular and light gray fine grained to fine granular; gray shale.
6390	6400	Limestone, very pale yellow brown, slightly dolomitic, fine granular and yellow gray fine grained limestone; much gray shale.
6400	6410	Limestone, yellow gray fine grained to, brown and pale brown, fine granular (some slightly dolomitic).
6410	6440	Limestone, yellow gray fine granular dolomitic to fine grained and light gray fine granular dolomitic.
6440	6450	Limestone, very pale yellow brown to yellow gray, fine granular dolomitic and pale yellow brown, fine grained, dense, limestone.
6450	6480	Limestone as above, very poor samples.
6480	6500	Limestone as above, some light to medium light gray, fine grained; little light brown fine grained limestone.
6500	6510	Limestone, yellow gray to whitish, fine grained, and some fine granular limestone as above.
6510	6530	Limestone, some fine granular as above; yellow gray to whitish fragmental, dense limestone.
6530	6540	Limestone as above, and some brown gray, coarsely crystalline to saccharoidal dolomite; some medium dark gray shale.
6540	6560	Limestone as above, brown gray dolomite as above.
6560	6580	Dolomite, light brown, finely crystalline to saccharoidal; much gypsum, some gray shale, fair pinpoint porosity.
6580	6620	Dolomite as above and little gypsum.
6620	6640	Dolomite as above and pale brown to light gray, fine grained dense limestone.
6640	6650	Dolomite as above, much medium dark gray shale, some limestone as above and little very light brown, fine granular limestone.
6650	6660	As above and little reddish calcareous shale.
6660	6700	Limestone, fine granular to fragmental tan; some dolomite, shale as above.
6700	6710	Limestone, tan, fine granular dolomitic.
6710	6720	Dolomite, tan to light brown, fine granular.
6720	6730	Dolomite as above and little medium gray, fine grained limestone.
6730	6740	Dolomite as above and little pink dolomite; light tan to white limestone, fine grained and little pale brown limestone; white anhydrite.
6740	6760	Limestone, medium gray, very fine grained and little tan, very fine grained; some dolomite as above.
6760	6790	Limestone, medium gray and brown mottled, very fine grained; little tan, very fine grained limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
6790	6800	Limestone as above and tan fine granular dolomite; some light to dark gray shale.
6800	6820	Limestone, pale brown and buff to light gray, very fine grained.
6820	6840	Limestone, pale brown hard and buff, very fine grained soft.
6840	6870	Limestone as above and few pieces of medium light gray, fine crystalline, slightly dolomitic.
6870	6900	Limestone, pale brown to buff, fine grained to very fine granular.
6900	6910	Limestone as above and some medium dark gray shale.
6910	6920	Limestone as above, some medium dark gray shale and pale red, fine crystalline dolomite to moderate orange pink fine crystalline dolomite.
Ashern 6920		
6920	6930	As above and some white, very fine grained limestone.
6930	6940	As above, and some white, very fine grained, slightly dolomitic limestone.
Stonewall 6952		
6940	6990	Limestone, whitish fine grained, some slightly dolomitic to very light gray, very fine granular.
6990	7000	Limestone as above and some whitish vitreous, very fine grained dolomite.
7000	7010	Dolomite, white, fine grained and some whitish vitreous, very fine grained; some tan fine grained limestone.
7010	7060	Dolomite, white vitreous, very fine grained and some coarse dolomite crystals, some pinpoint porosity.
7060	7070	Dolomite as above and some with slightly pinkish to brown tinge.
7070	7090	Dolomite as above, white vitreous; some pinkish fine grained limestone; white to chalky limestone.
7090	7100	Limestone, pinkish, very fine grained.
7100	7120	Limestone as above, whitish to pinkish; few pieces of whitish dolomite
7120	7150	Dolomite, whitish, very fine grained, and pinkish limestone as above.
7150	7160	Shale, medium dark gray.
7160	7210	Shale, medium dark gray and medium light gray to slightly green gray. Little dolomite and limestone as above.
7210	7230	As above and little red shale.
7230	7240	Shale as above, whitish to pinkish, very fine crystalline dolomite.
7240	7250	Shale as above, mostly gray; whitish, very fine crystalline dolomite.
7250	7260	Dolomite as above.
7260	7280	Some gray shale as above, whitish to buff, very fine crystalline dolomite.
7280	7290	Dolomite and shale as above; piece of brown, fine grained sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
7290	7300	Same as above with only a few pieces of sandstone.
Stony Mountain	7408	
7300	7430	Dolomite and shale as above.
7430	7460	Dolomite and shale as above, little medium light gray, fine crystalline dolomite, some very sandy.
7460	7480	Same as above, no sand.
7480	7490	Dolomite, buff to tan, fine crystalline; few pieces of white sandy dolomite.
Stony Mountain shale	7537	
7490	7540	Dolomite, buff to tan and little medium light gray, fine crystalline.
7540	7560	Dolomite as above and much dark gray shale, little gray fragmental limestone.
Red River	7570	
7560	7590	Dolomite as above, some gray fragmental limestone, few bryozoa fragments and some shale as above.
7590	7600	Limestone, whitish to buff, very fine grained, and little light gray, fragmental limestone.
7600	7610	Shale, dark gray N3, carbonaceous.
7610	7630	Shale as above, little limestone and dolomite as above.
7630	7640	Shale as above and tan, fine crystalline dolomite.
7640	7670	Shale and dolomite as above; some very pale yellow brown fragmental? limestone. Mostly limestone.
7670	7680	Limestone, buff to very pale yellow brown, fragmental; buff very fine grained dolomite. Some shale as above.
7680	7690	Limestone, some buff to pale yellow brown, fragmental; buff, very fine grained limestone and dolomite.
7690	7730	Dolomite, buff to yellow gray, very fine grained. Little shale.
7730	7770	Dolomite, yellow gray to buff, very fine grained to very fine granular. Bryozoa fragments. 50' - 60'.
7770	7780	Dolomite as above, little yellow gray, fine grained limestone.
7780	7790	Dolomite as above and dark gray shale.
7790	7800	Dolomite as above and yellow gray, fragmental, dense limestone.
7800	7810	Limestone, buff, fine grained, some fragmental, little fine saccharoidal light brown limestone, little pinpoint porosity.
7810	7880	Limestone, buff fine grained, some fragmental and fine saccharoidal.
7880	7910	Limestone, very light brown, fine saccharoidal, some buff to yellow gray, fragmental limestone.
7910	7920	As above, mostly light brown to buff fragmental limestone.
7920	7960	Limestone as above, mostly fine saccharoidal, dolomitic?; some fine saccharoidal dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
7960	8080	Limestone, mostly light brown fine saccharoidal; some buff to pale yellow brown, fine grained to fragmental limestone.
8080	8100	Limestone as above, mostly fine grained fragmental. Dark gray shale. Poor sample, lost circulation.
8100	8150	Limestone, fine grained fragmental as above? Very poor samples, lost circulation.
8150	8160	Limestone, fine grained to fine granular, fragmental? some medium dark gray shale.
8160	8170	Limestone, buff to light brown; medium to dark gray shale.
8170	8190	Limestone, buff as above.
8190	8210	Poor sample, lost circulation.
Winnipeg Shale	8210	
8210	8220	Limestone, buff to yellow gray, fine grained, fragmental. Medium to dark gray shale.
8220	8230	Limestone as above to very pale brown, fine granular and shale as above.
8230	8260	Limestone as above; dark gray to gray shale.
8260	8300	Limestone, some buff fragmental as above; mostly gray shale.
8300	8350	Some limestone as above; green and dark gray shale.
8350	8360	Mostly gray shale, some medium to coarse rounded quartz grains, little limestone as above. Phosphate Pellet?
8360	8400	As above, little quartz.
8400	8410	Shale, green, dark gray and brown; few rounded quartz grains as above. little limestone as above.
Winnipeg Sand	8417	
8410	8430	Shale as above, mostly green; much quartz, little limestone.
8430	8440	Same as above, some medium grained cemented sandstone.
8440	8450	Same as above, much medium grained cemented sandstone. Little limestone.
8450	8480	Shale as above, some sandstone & limestone as above.
8480	8510	Shale as above, much medium grained, cemented sandstone, slightly calcareous.
8510	8590	Same as above, sandstone, slightly glauconitic.
8590	8652	Sandstone, whitish to pale tan, calcareous cement, medium grained. Green and dark gray shale.
	8652	Total Depth.