

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 38

Summary of Lion Oil Company - G.A. Huss No. 1  
Bottineau County, North Dakota

By Carole Smith

Lion Oil Company - Gustav A. and Christa A. Huss #1, Bottineau County, North Dakota, Section 23, T. 163N., R.75W. (660' South of North line, 660' East of West line). Elevation: 2205' K.B.

The Lion Oil Company Huss #1 was spudded July 27, 1952 and was abandoned as a dry hole on September 8, 1952. 9 5/8" casing was set at 858', cemented to surface with 300 sacks. 15 sack cement plugs (approx 40' plugs) were set at 6330, 5660, 5000, 4050, 3430, 3280, 2480. A 25 sack plug was set at the top of the surface casing at 610'. A 10 sack plug was set at the top of the surface casing after casing top had been lowered below plow depth.

DST #1 3373-3414 1/2

Tool open 45 minutes. Shut in 15 minutes. Hydrostatic pressure 1900#, Shut In Pressure 1125#, Initial Flow Pressure 0#, Final Flow Pressure 0#. Received 80' mud of which 30' was gas cut and slightly oil cut mud. 50' gas cut and moderately oil cut mud. No free oil or water.

Core #1 3398-3414 1/2

Core #2 3474 1/2-3450

Core #3 4078-4095

Core #4 4097 1/2-4106 1/2

Traces of oil were found in the Spearfish and top of Madison.

Formation Tops

	<u>Depth</u>
Cretaceous System	
Niobrara	1698
Greenhorn	2090
Dakota	2510
Jurassic System	
Morrison	2765
Sundance	2790 ?
Piper	3075
Triassic System	
Spearfish	3300
Mississippian System	
Charles ?	3415
Lodgepole	3445
Englewood	3997
Devonian System	
Lyleton	4025
Nisku	4050
Duperow	4150
Souris River	4550
Dawson Bay	4815

Prarie Evaporites	4951
Winnipegosis	4999
Ashern	5142
Silurian System	
Interlake	5170
Ordovician System	
Stony Mountain	5482 ?
Stony Mountain Shale	5585
Red River	5660
Winnipeg Shale	6225 ?
Winnipeg Sand	6345
Pre-Cambrian	6422

Formation tops picked by Anderson of the North Dakota Geological Survey from sample and electric logs. Colors determined from rock color chart.

G. A. Huss #1

<u>From</u>	<u>To</u>	<u>Formation</u>
25	200	Sand and gravel -- subangular to subround; small amounts of grey shale, much shale beginning at 50'.
200	250	Shale -- dark greenish grey, calcareous, slightly silty; some sand and gravel as above.
250	325	Shale -- very light brown, olive grey, calcareous, partly silty; some sand and gravel as above, much sand and gravel beginning at 300.
325	475	Shale -- dark gray, soft, becoming more consolidated, silty starting at 375.
475	500	Shale -- dark greenish grey, silty, slightly bentonitic.
500	540	Coal and lignite -- brittle, black; increasing amounts of medium grey shale; much sandy light grey bentonite at 530-540.
540	570	Shale -- greyed red purple, soft, slightly silty, much sandy, moderate yellow green bentonitic shale, some coal, increasing amounts of sand.
570	600	Sand -- fine to medium; some shale as above and light grey soft shale, much coal and lignite (580-600).
600	668	Missing samples.
668	720	Shale -- light grey to light olive grey, lumpy, slightly silty and calcareous; traces of coal.
720	760	Shale -- very light brown to very light grey, bentonitic, slightly silty, fossiliferous.
760	830	Shale -- medium grey to medium light grey, silty, slightly calcareous, slightly green tinged beginning at 800.
830	840	Shale -- as above; much medium grey shale with white specks.
840	850	Missing samples.
850	880	Shale -- medium grey, partly lumpy, dense, some scattered white specks.
880	1130	Shale -- medium grey to medium dark grey, dense, few scattered white specks. Missing samples 910-960.
1130	1230	Shale -- medium grey, very dense; traces of softer, bentonitic shale beginning at 1220.
1230	1240	Shale -- as above, but much softer and less consolidated.

<u>From</u>	<u>To</u>	<u>Formation</u>
1240	1260	Shale -- olive grey to medium grey, dense, soft.
1266	1270	Shale -- medium grey, firm, partly lumpy.
1270	1400	Shale -- greenish grey to olive grey, dense, some with white specks. Missing samples - 1380-1390.
1400	1450	Shale -- medium grey, dense. Missing samples 1430-1440.
1450	1460	Shale -- light olive, grey to medium light grey, dense fossiliferous, partly soft and lumpy.
1460	1640	Shale -- medium light grey to medium grey, increasingly lumpy, slightly bentonitic starting at 1530, fossiliferous. Missing samples - 1600-1610.
1640	1670	Shale -- olive grey, dense, fossiliferous, partly lumpy and bentonitic.
1670	1760	Shale -- dark grey to greyish black, flaky, white specked, fossiliferous; much light grey, bentonitic shale 1680-1700, somewhat bentonitic 1700-1760.
1760	1810	Shale -- medium grey, lumpy, bentonitic and somewhat calcareous, becoming darker grey at 1780.
1810	1840	Shale -- medium light grey to medium dark grey, partly calcareous and lumpy; some bentonite - 1830-1840.
1840	1900	Shale -- medium light to medium grey shale, calcareous, white spotted, partly lumpy, slightly bentonitic.
1900	1950	Shale -- medium grey, slightly calcareous and bentonitic, mostly lumpy; traces of dense limestone; some rust brown stain (?)
1950	9160	Shale -- light olive grey, slightly calcareous and bentonitic, some grey, lumpy, calcareous shale.
1960	1980	Shale -- medium dark grey, mostly lumpy, slightly bentonitic, becoming somewhat lighter grey.
1980	2030	Shale - medium grey, lumpy, white spotted.
2030	2070	Shale -- dark grey, becoming greyish black, slightly white specked; small amounts of light grey shale that have moderate brown stains; much very light brownish grey, soft, bentonitic shale 2060-2070.
2070	2110	Shale -- dark grey to grey black; flaky, partly lumpy, partly white spotted, much medium grey to light grey, bentonitic shale 2100-2110.
2110	2130	Shale -- medium grey to dark grey, lumpy, calcareous, bentonitic, scattered white specks.
2130	2170	Shale -- dark grey to grey black, flaky to dense, white spotted, becoming lumpier and more calcareous; traces of inoceramus fragments, dense limestone, pyrite.
2170	2210	Calcareous shale -- dark grey, white spotted, lumpy, fossiliferous, traces of inoceramus prisms.
2210	2230	Shale -- as above, some sub-crystalline grey and white limestone, small amounts of fine sugary, limy sandstone.
2230	2270	Shale -- medium dark grey to greyish black, white spotted, partly lumpy and calcareous.
2270	2350	Shale -- black, shiny, some white spots, partly lumpy.
2350	2370	Shale -- dark grey, lumpy, trace pyrite.
2370	2480	Shale -- medium dark grey to dark grey, somewhat lumpy; traces of limestone, sandstone, pyrite.
2480	2510	Shale -- medium grey, lumpy, somewhat silty and bentonitic. Missing samples 2490-2500.

<u>From</u>	<u>To</u>	<u>Formation</u>
2510	2530	Shale -- medium dark grey, slightly calcareous in part, lumpy, silty, some coarse, sub-angular to sub-round quartz sand, traces of pyrite.
2530	2550	Shale -- as above, some firm, grey shale, much sand as above.
2550	2660	Sand -- coarse, sub-angular to sub-round, pitted; mostly flaky, dark grey shale beginning at 2660, traces of pyrite.
2660	2670	Shale -- medium dark grey to grey black, traces of sand, sandstone, inoceramus fragments.
2670	2710	Shale -- olive grey to light brownish grey, slightly bentonitic and calcareous, increasingly silty and sandy.
2710	2730	Calcareous shale -- medium light grey, lumpy; some firm, non-calcareous grey shale; some fine sugary, dirty white, limy sandstone.
2730	2760	Limestone -- white, very light grey, very pale yellow brown, fine oolitic, porous, becoming somewhat chalky and sandy, 2750-2760; small amounts of grey shale.
2760	2770	Shale -- pale green, somewhat calcareous, lumpy, much grey shale; some limestone as above; traces of pyrite and coal.
2770	2780	Calcareous shale -- moderate reddish brown, lumpy; some limestone and shale as above.
2780	2790	Calcareous shale -- medium light grey, pale green, moderate reddish brown, lumpy; small amounts of sugary grey limestone, sand and firm grey shale.
2790	2810	Shale -- pale green, lumpy, somewhat calcareous; small amounts of sand, limestone, reddish brown shale; increasing amounts of grey shale.
2810	2820	Shale -- pale green, medium grey, reddish brown, splintery, traces of sand, pyrite.
2820	2830	Shale -- dark grey (flaky), pale green, moderate reddish brown (partly lumpy), light brownish grey (lumpy, silty, calcareous); some limestone as above.
2830	2840	Shale -- light brownish grey; silty, calcareous, lumpy, much shale as above.
2840	2880	Shale -- dark grey (slightly brown) flaky, some very light grey, fine sugary, limy sandstone; traces of dense, fossiliferous limestone; much rounded sand 2870-2880 - cave?
2880	2900	Shale -- medium grey to medium dark grey, increasingly lumpy and calcareous; much dense, pale limestone 2880-2890, fossiliferous.
2900	2920	Calcareous shale -- light olive, grey to very light brown, lumpy; increasing amounts of firm, grey shale; traces of calcareous fragments.
2920	2930	Calcareous shale -- pale yellow brown, lumpy, silty; much medium grey to dark grey flaky shale; traces of calcareous fragments.
2930	2940	Shale -- medium grey to medium dark grey, flaky; some calcareous shale as above; some sand, fragmental limestone.
2940	2950	Calcareous shale -- moderate reddish brown, firm to lumpy; some sand, small amounts of pale green to grey shale, partly silty.
2950	2960	Calcareous shale -- very pale brown, lumpy, silty; some red and green shale as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
2960	2980	Limestone -- very light grey, lumpy, chalky, argillaceous, limestone; increasing amounts of reddish brown shale; traces of black flaky shale, sand.
2980	3000	Shale -- reddish brown to orange brown; some grey shale; small amounts of limestone as above.
3000	3070	Limestone -- white, medium crystalline, increasing amounts of dark grey, orange brown, light brown (silty and calcareous) pale green shale; traces of fossils, sand, inoceramus fragments.
3070	3120	Calcareous shale -- dark grey, reddish orange, pale green, grey green, dusky yellow; increasing amounts of very fine sugary to chalky white limestone; small amounts of sand, white anhydrite.
3120	3140	Calcareous shale -- as above.
3140	3170	Shale -- mostly medium dark grey, partly calcareous, some variegated; increasing amounts of brittle, dense, hard, white limestone.
3170	3200	Limestone -- white, dense, brittle, argillaceous, becoming greyed; decreasing amounts of grey shale.
3200	3220	Limestone -- very light brown to white, partly argillaceous; much grey (flaky) to light olive grey to light olive brown to grey black shale.
3220	3320	Shale -- medium dark grey to grey black, flaky; much white anhydrite 3220-3250, 3260-3310; small amounts of variegated shale.
3320	3350	Shale -- moderate reddish brown; medium grey to dark grey flaky shale; some white anhydrite (ending at 3340) some slightly yellow and green tinged shale 3340-3350.
3350	3360	Sandstone -- moderate reddish brown, fine grained; much shale as above,
3360	3400	Shale -- medium grey to dark grey, soft and flaky, white specked; much lumpy, silty, slightly calcareous, reddish brown shale; some variegated shale; small amounts of white anhydrite, argillaceous fine grained sandstone 3370-3380; argillaceous fine sugary limestone 3380-3390; fine sand 3390-3400.
3398	3450	Core chips
3398	3401	Sandstone -- moderate reddish brown, fine grained, some pale red brown sandstone.
3401	3404	Sandstone -- pale pink orangish brown, fine grained, a few medium sized sand (quartz) grains.
3404	3410	Sandstone -- yellow brown to moderate reddish brown, fine grained, with much included medium quartz sand (3404-3407).
3410	3413	Sandstone -- pale yellow brown to moderate reddish brown, fine grained, with included round medium quartz sand.
3413	3414 1/2	Sandstone -- medium greenish gray and moderate reddish brown mottled, fine grained.
3416	3420	Anhydrite -- orange brown, yellow grey, brownish pink, glassy to sub-crystalline resinous; trace of dolomite, sandstone as above.
3420	3432 1/3	Anhydrite -- yellow grey, pale orange brown, glassy and greasy sub-crystalline; some white anhydrite; trace of dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
3432 1/3	3436 1/2	Limestone -- yellow brown to very pale yellow brown, fragmental and fossiliferous; some pink and pale grey green mottled, dense, fossiliferous limestone; some white, very hard, very dense anhydrite.
3436 1/2	3450	Limestone -- very pale pinkish brown to very pale orangish brown, fine sugary, fossiliferous; some pink to white, micro-sugary limestone with dark red spots and streaks.
3450	3470	Shale -- medium gray to dark grey, flaky, slightly calcareous, increasing in quantity; much dense limestone as above; small amounts of chalky white limestone; some grey green, soft, calcareous shale 3460-3470; traces of anhydrite.
3470	3510	Limestone -- very pale yellow brown, pink, chalky; much medium dark grey to grey, flaky shale, decreasing in quantity.
3510	3520	Limestone yellow brown, sugary; partly chalky, partly pink, partly micro-sugary and chalky; some dark grey, flaky shale.
3520	3540	Limestone -- very pale yellow brown, pink, chalky; some limestone as above; some dark grey shale as above; small amounts of moderate reddish brown and pale green shale.
3540	3640	Limestone -- pink, very pale yellow brown, fine sugary to chalky, partly crystalline; much dark grey flaky shale; some grey green, pink, moderate red brown, dusky yellow shale in variable amounts small amounts of chalky white limestone beginning at 3600, much chalky white limestone 3630-3640.
3640	3660	Limestone -- white, chalky, brittle; much dark grey shale.
3660	3670	Limestone -- pale, sugary to sub-lithographic, slightly pink in part; some grey shale, some variegated shale.
3670	3680	Limestone -- pink to dark pink, dense, fossiliferous, much light olive grey, grey, greenish grey shale.
3680	3690	Limestone -- very light grey, dense; much shale as above.
3690	3730	Limestone -- white, pale yellow brown, pale yellow grey, sub-crystalline to chalky, becoming lighter in color; some dark grey shale.
3730	3770	Limestone -- very light grey, pale yellow grey, white, fine sugary, chalky, some dark grey, flaky shale; some crystalline, dense, grey, fossiliferous limestone 3750-3770.
3770	3780	Limestone -- pale, sugary to chalky, dense, much dark olive grey, flaky shale with white specks. Crinoid fossil?
3780	3810	Limestone -- light grey, very fine sugary; much grey; dense, sub-crystalline limestone; traces of shale. Crinoid fossil? some medium grey chert 3800-3810.
3810	3830	Limestone -- as above, much dark olive grey, flaky shale 3810-3830; traces of variegated shale some pale blue chert.
3830	3860	Limestone -- very light grey to very light brown, chalky to fine sugary; much pale blue chert.
3860	3900	Limestone -- light grey, micro-sugary, partly chalky; much dark grey, flaky shale.
3900	3920	Limestone -- chalky white, sub-crystalline light grey; slightly dolomitic; much dark grey to brownish grey flaky shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3920	3940	Shale -- dark grey, brownish grey, moderate reddish brown; some chalky white to limestone; some medium light grey to medium grey, dense, limy dolomite to dolomitic limestone.
3940	3950	Shale -- as above; much dense, medium grey, dolomitic limestone:
3950	3970	Limestone -- chalky white and very light brown, micro-sugary, very light brown, small amounts of shale and pale blue chert.
3970	3980	Dolomite - very light grey to very pale brown, hard, chalky; some white chert.
3980	4000	Limestone -- white, light grey, very pale brown, chalky to dense to fine sugary; small amounts of dark grey shale, white chert.
4000	4010	Shale -- dark grey, flaky; some chalky white limestone; some sub-crystalline grey limestone.
4010	4030	Calcareous shale -- very pale brown, lumpy, partly grey; some dark grey, flaky shale, increasing in quantity.
4030	4040	Shale -- dark grey; flaky; much very light grey, soft, calcareous shale.
4040	4050	Shale -- as above; much orange brown, lumpy, calcareous.
4050	4060	Shale -- dark grey shale as above; some reddish brown shale; much yellow grey, dense dolomite; some chalky white limestone.
4060	4080	Limestone -- very pale orange, dense; some chalky white limestone; much dark grey, flaky shale, small amounts of anhydrite and dolomite.
4079	4106	Cored interval.
4079	4093 1/3	Limestone -- orange brown to grey; crystalline; much yellow grey, micro-sugary dolomite with veinlets of anhydrite.
4090	4093	Limestone -- very light grey, micro-sugary, dolomitic; some pale yellow brown, micro-sugary limestone; much moderate orange brown, resinous, sub-crystalline anhydrite.
4093	4095	Limestone -- pale yellow grey, fine sugary.
4095	4097	Limestone -- pale orange brown, sugary; some medium brown, fine sugary limestone; traces of shale, anhydrite, and chalky limestone.
4097	4106	Limestone -- moderate yellow brown, fine sugary, slightly argillaceous, somewhat vuggy (4100-4103).
4110	4170	Limestone -- very pale yellow brown, chalky and/or fine sugary, small amounts of dark grey, flaky shale.
4170	4180	Limestone -- as above; much white anhydrite, much dark grey flaky shale.
4180	4250	Limestone -- pale yellow grey to pale yellow brown, chalky and/or fine sugary; some flaky dark grey shale, partly dark olive grey; variable amounts of white anhydrite, mostly (4190-4200, 4210-4230).
4250	4260	Dolomite -- very pale orange brown, dense, sub-crystalline, partly pale blue; some limestone as above; some flaky, dark grey shale.
4260	4280	Limestone -- white to very pale yellow brown, chalky to fine sugary; small amounts of dark grey shale, pale green shale, pale blue anhydrite (4270-4280).

<u>From</u>	<u>To</u>	<u>Formation</u>
4280	4300	Limestone -- very pale yellow brown to grey, chalky to dense sugary.
4300	4350	Limestone -- white to very light grey, chalky; much very pale orange brown, fine sugary limestone, increasing in quantity; some pale orange to white anhydrite (4300-4310), small amounts of flaky grey shale.
4350	4400	Limestone -- white, pale (yellow grey to yellow brown), fine sugary and/or chalky; traces of grey shale, anhydrite.
4400	4480	Limestone -- white to very pale orange to very light grey, chalky, brittle; partly sugary; chalky, pale yellow brown limestone (4460-4480); small amounts of dark grey, flaky shale.
4480	4540	Limestone -- as above; much fine sugary and/or chalky, very pale yellow brown to very pale yellow grey; some flaky, dark grey shale; some pale blue and grey, dense, limy dolomite (4480-4490).
4540	4550	Limestone -- grey to very pale orange to pale yellow grey, fine sugary and/or chalky, small amounts of dark grey, flaky shale.
4550	4580	Limestone -- light grey, chalky, partly fine sugary; small amounts of dark grey shale, reddish brown shale, anhydrite.
4580	4600	Limestone -- very light grey to very light brown, chalky; increasing amounts of pale, fine sugary limestone; small amount of pale blue, dense dolomite (4590-4600).
4600	4630	Dolomitic limestone to limy dolomite -- pale yellow grey, fine sugary, small amounts of shale. Missing samples: 4610-4620; some white anhydrite (4620-4630).
4630	4640	Dolomite -- pale, sugary, limy; some orange grey, dense dolomite; small amounts of limestone and shale.
4640	4660	Limestone -- white to grey, chalky, fossiliferous; small amounts of dark grey shale, dolomite as above.
4660	4690	Limestone -- grey, very pale yellow brown, chalky to fine sugary; much dense, very pale orange to grey limestone; small amounts of grey, green grey, reddish brown shale; traces of sugary dolomite, white anhydrite.
4690	4710	Limestone -- pale, chalky, much pale orange to white anhydrite; much fine sugary, pale yellow brown dolomite.
4710	4750	Dolomite -- pale orange, grey, dense, fine sugary, limy; small amounts of chalky limestone, white anhydrite.
4750	4760	Dolomite -- light olive grey, fine sugary, slightly limy; some dolomite and limestone and anhydrite as above.
4760	4810	Dolomitic limestone to limy dolomite -- orange brown, sugary, porous; traces of shale, pyrite, dolomite.
4810	4820	Dolomite -- very pale orange to pale yellow grey, micro-sugary, slightly limy; some dark grey shale.
4820	4830	Dolomite -- pale orange, dense, greasy to resinous; some white anhydrite; some dense, orangish, dolomitic limestone.
4830	4840	Dolomitic limestone -- orange brown, sugary, porous, some fine sugary, dolomitic limestone.
4840	4870	Limy dolomite -- orange brown, sugary, porous; traces of white anhydrite.
4870	4880	Dolomitic limestone -- orange brown, sugary, porous.



<u>From</u>	<u>To</u>	<u>Formation</u>
4880	4900	Dolomitic limestone to limy dolomite -- orange brown, sugary, porous, becoming much denser.
4900	4910	Dolomitic limestone -- very pale yellow brown, very fine sugary; some pale yellow grey to pale yellow brown, chalky limestone.
4910	4950	Limestone -- white to very light grey, chalky; increasing amounts of very fine sugary, pale limestone; small amounts of dark grey shale; traces of pyrite.
4950	4960	Limestone -- very pale yellow brown, fine sugary; some fine sugary dolomite.
4960	4970	Limestone -- pale, chalky; some very pale orange, dense, dolomitic limestone; some dark grey shale.
4970	4980	Dolomite -- reddish brown, dense, argillaceous; much pale yellow grey, fine sugary, limy dolomite, some fine sugary limestone; much dark grey shale.
4980	4990	Dolomite -- reddish brown to orange brown, dense, argillaceous; small amounts of dark grey shale, white anhydrite, limestone, sugary dolomite.
4990	5000	Limestone -- pale blue grey, dense; some chalky, very light grey limestone; some dark grey shale.
5000	5010	Anhydrite, greasy, white, dense; some pale orange, micro-sugary dolomite; some dark grey shale.
5010	5020	Dolomitic limestone -- pale yellow brown, fine sugary; some white anhydrite; small amounts of chalky and dense limestone.
5020	5030	Limestone -- very pale orange, pale yellow brown, sugary, crystalline; some dark grey shale.
5030	5060	Limestone -- very pale orange, pale yellow brown, fine sugary to chalky, becoming dark yellow brown and dolomitic in part.
5060	5080	Limestone -- pale yellow brown, fine sugary, partly dolomite; some chalky limestone; much light olive grey to light yellow grey micro-sugary limestone (5070-5080).
5080	5140	Limestone -- very pale orange to pale yellow grey to pale yellow brown, chalky and fine sugary.
5140	5170	Limestone -- as above, much light grey blue, dense, argillaceous, dolomitic limestone; small amounts of dark grey shale.
5170	5180	Limestone -- light olive grey, fine sugary; some pale orange, sub-crystalline limestone; some chalky limestone; some orange brown, very fine sugary, limy sandstone; some dark grey shale.
5180	5190	Dolomite limestone -- white, very fine sugary; much pale orange, micro-sugary to sub-crystalline, limy dolomite; some chalky white limestone.
5190	5200	Dolomite to limestone -- pale orange to white, crystalline to fine sugary; small amount of shale.
5200	5210	Dolomite -- very pale orange, very fine sugary to sub-crystalline; much pale orange to white, chalky limestone.
5210	5230	Limestone -- pale orange to white, very fine sugary to chalky much pale orange to white very fine sugary (5220-5230).

<u>From</u>	<u>To</u>	<u>Formation</u>
5230	5240	Limy dolomite -- white to pale orange, chalky to very fine sugary; some white to pale orange limestone.
5240	5250	Dolomite limestone -- white to pale orange.
5250	5260	Limestone -- chalky white; some orangish, sub-crystalline limestone; much dolomitic limestone as above; small amounts of dark grey shale.
5260	5280	Limestone to dolomite -- white to very pale orange, fine sugary to sub-crystalline.
5280	5290	Limestone -- chalky, pale dense, fine sugary pale yellow brown; some white, fine sugary, limy dolomite.
5290	5320	Limestone -- white, chalky; some sugary, white, limy dolomite (5290-5300); some olive black shale.
5320	5350	Dolomite limestone -- very pale orange, fine to micro-sugary brittle, dense; small amounts of dark shale and chalky limestone; some dense, pale orange dolomite (5340-5350).
5350	5370	Limestone -- some dolomitic limestone as above; some chalky white limestone; some pale orange, dense dolomite; some very pale orange, lumpy, oolitic, porous limestone (5360-5370).
5370	5390	Limy dolomite -- very pale orange, dense, chalky hard; some very pale orange, dense, dolomitic limestone; small amount of dark grey shale.
5390	5410	Limy dolomite -- very pale orange, dense, hard, chalky; some dense limestone and dolomitic limestone.
5410	5460	Dolomitic limestone -- very pale orange, dense, hard, brittle; small amounts of dark shale.
5460	5470	Limestone -- white to very pale orange, partly dolomitic, dense; much light red, dense, argillaceous limestone.
5470	5480	Limy dolomite -- pale, dense; a small amount of dark grey shale.
5480	5500	Dolomitic limestone -- very pale, hard, dense; some light red to moderate red, argillaceous limestone; some dark grey flaky shale.
5500	5510	Dolomitic limestone -- light red, argillaceous; much very pale orange, micro-sugary to sub-crystalline dolomitic limestone; traces of chalky limestone.
5510	5540	Dolomitic limestone -- white to very pale orange, micro-sugary to sub-crystalline; some moderate reddish brown, calcareous shale; some dark grey shale.
5540	5550	Dolomitic limestone -- very light grey to very pale orange, micro-sugary to sub-lithographic.
5550	5560	Limy dolomite -- pale yellow brown, fine sugary to sub-crystalline.
5560	5590	Dolomitic limestone -- pale yellow brown to pale orange brown, sub-crystalline, to fine crystalline; small amounts of shale.
5590	5600	Limestone -- pale orange, very fine sugary to sub-crystalline, some dark grey, dense limestone; some grey shale.
5600	5610	Limestone -- medium light grey, soft, spongy, argillaceous; some dense limestone as above; some dark grey shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
5610	5620	Limestone -- chalky limestone as above; much chalky, white limestone; some pale orange, sub-crystalline limestone.
5620	5650	Limestone -- light grey, soft, lumpy, argillaceous; small amount of coarse crystalline, black and white limestone.
5650	5660	Limestone -- white to grey, chalky; a small amount of dense limestone.
5660	5680	Limestone -- light olive grey to very pale orange, fine, sugary to sub-crystalline; much chalky limestone.
5680	5690	Limy dolomite -- pale orange brown, very fine sugary; some dolomitic limestone.
5690	5730	Dolomitic limestone -- pale yellow brown to grey, fine sugary to sub-lithographic; traces of shale, limestone. Missing samples: 5700-5710; traces of bryozoa.
5730	5740	Limestone -- very light brown to grey, sub-lithographic to chalky, partly dolomitic; trace chert.
5740	5860	Dolomitic limestone -- very light grey to very light brown, very fine sugary and brittle, becoming increasingly chalky and white, partly light olive grey; much sugary, yellow brown, limy dolomite (5850-5860).
5860	5880	Limestone -- white, chalky; much pale, fine sugary, slightly dolomitic limestone.
5880	5920	Limestone -- white to grey, chalky; much fine sugary, light olive grey brown to yellow brown, limy dolomite to dolomite limestone; shell (brachiopod) impressions.
5920	5950	Limestone -- chalky, partly lithographic, very pale yellow brown to pale orange brown; some yellow brown, dense, dolomitic limestone (5930-5950).
5950	5980	Limestone -- yellow brown, fine sugary; increasing amounts of chalky white limestone, fossiliferous.
5990	6000	Limestone -- white, chalky; pale orange, dense, brittle limestone some orange brown, fine sugary, dolomitic limestone; much dark grey shale; trace of anhydrite, bryozoa.
6000	6010	Limestone -- white, chalky; some pale orange, sub-crystalline limestone.
6010	6030	Limestone -- white, chalky; some dense limestone; small amounts of orange brown, fine sugary, dolomitic limestone; fossiliferous.
6030	6050	Limestone -- pale orange brown, chalky, hard; much chalky limestone; some fine sugary, yellow brown dolomitic limestone.
6050	6070	Limestone -- as above; more fine sugary and dense limestone.
6070	6080	Limestone -- very pale yellow brown, chalky; much dense, sub-lithographic to fine sugary limestone; bryozoa fragments.
6080	6120	Limestone -- as above; some yellow grey, chalky, brittle limestone.
6120	6130	Limestone -- grey, yellow grey, sub-crystalline to micro-sugary; some chalky limestone.
6130	6150	Limestone -- pale orange brown, dense; much chalky limestone, some limestone as above.

<u>From</u>	<u>To</u>	<u>Formation</u>
6150	6190	Limestone -- chalky; much yellow grey, very fine sugary; some dense, pale yellow brown limestone.
6190	6220	Limestone -- pale, dense to micro-sugary to chalky, small amounts of olive black shale, limy green shale, dense dolomite (6190-6200).
6220	6230	Argillaceous limestone -- grey green to green grey, lumpy, some dense limestone as above.
6230	6310	Shale -- grey green, splintery, waxey; much grey green, lumpy calcareous shale; some yellow green, lumpy, calcareous shale; much moderate brown to grey brown, calcareous, lumpy shale (6300-6310); slightly silty in part.
6310	6320	Shale -- grey green, lumpy, calcareous; much splintery green shale as above.
6320	6330	Shale -- grey green, grey olive, splintery; some dark yellow brown to moderate brown, splintery shale; some lumpy shale as above.
6330	6390	Shale -- grey green, grey olive, splintery shale; much light olive grey and brown, lumpy, calcareous shale (6330-6350); small amounts of medium quartz sand appearing at 6350 and increasing in quantity and size and roundness; small amounts of dense to chalky limestone.
6390	6400	Missing samples.
6400	6430	Shale -- olive grey to grey olive, splintery; some sugary, green and white, limy sandstone (6400-6420), much medium to coarse, round quartz sand (6410-6430).
6430	6440	Shale -- greenish, splintery; some quartz sand as above.
6435		Pre-Cambrian granite.