

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR #42

Summary of the Continental Oil Company #1 Duemeland  
Burleigh County, North Dakota  
Permit No. 190, Well No. 174  
by Carole Smith  
March, 1954

Continental Oil Company - Duemeland #1, Burleigh County, North Dakota,  
Section 3, T. 140 N., R. 77 W. N. W. - N. W. (688' from north line, 659' from  
west line, Section 3) Elevation: 1970' G.L.

The Continental Oil Company #1 Duemeland was spudded September 30, 1952  
and 418' of 13 3/8" surface casing was set with 350 sacks of cement. The well  
was drilled to a total depth of 6864' and abandoned on December 8, 1952.

The well was plugged with 20 sacks from 6525-6575; 15 sack plugs were  
set at 5740-4777, 5343-5380, 4923-4960, 4100-4137, 2903-2940; a plug of 25  
sacks was set 393-434; the top of the casing was cemented with 10 sacks.

CORED INTERVALS

Core #1: 4115-4174	Core #6: 5344-5371
Core #2: 4281-4318	Core #7: 5372-5399
Core #3: 4954-4978	Core #8: 5400-5443
Core #4: 4978-5023	Core #9: 5850-5878
Core #5: 5301-5344	Core #10: 6570-6629
	Core #11: 6629-6653

TESTS

Dst. #1: 4816 - 4840  
Tool plugged

Dst. #2: 4814 - 4840  
Tool plugged

Dst. #3: 4816 - 4840  
Tool plugged

Dst. #4: 4812 - 4840  
Tool open 2 hours, shut in 30 minutes. Very weak blow, 1 hour 55  
minutes, died. Received 15 feet of drilling mud, 430 feet of muddy salt  
water (130,000 PPM) with slight sulfur odor. F. P. 100#; S.I.P. 1850#;  
H.P. 2600#.

Dst. #5: 6576 - 6629  
Tool open 1 hour, shut in 20 minutes. Very strong blow. Flowed in 26  
minutes. Received slightly salty (17,000 PPM) sulfur water with rainbow  
of oil, good fluorescence, and 5 units of methane. F.P. 3050#; S.I.P.  
3050#; H.P. 3700#.

FORMATION TOPS

Cretaceous System	
Pierre Formation	576
Niobrara Formation	1612
Greenhorn Formation	2215
Dakota Formation	2855
Jurassic System:	
Morrison Formation	2985
Sundance Formation	3065
Piper Formation	3395
Triassic System:	
Spearfish Formation	3385
Mississippian System:	
Amsden Formation	3605
Big Snowy Group	3650
Charles Formation	3845
Mission Canyon Formation	4140
Lodgepole Formation	4420
Englewood Formation	4834
Devonian System:	
"Nisku equivalent"	4960
Duperow Formation	5020
Souris River Formation	5202
Dawson Bay Formation	5290
Ashern Formation	5350
Silurian System:	
Interlake Group	5380
Ordovician System:	
Upper Stony Mountain	5610
Lower Stony Mountain	5680
Red River Formation	5773
Winnipeg Formation	6400
Winnipeg sand	6575
Pr-Cambrian	6860

Formation tops called from sample and electric logs. Colors from rock color chart.

<u>DEPTH</u>	<u>DESCRIPTION</u>
1500	1660 Shale--medium grey, moderately firm, partly lumpy, slightly bentonitic. Missing samples: 1580-1600.
1660	1760 Shale--dark grey to grey black, soft, flaky. Missing samples: 1680-1700.
1760	1780 Missing samples.
1780	1840 Shale--grey black to medium light grey, flaky, lumpy, slightly silty; traces of bentonite.
1840	1900 Shale--medium dark grey, slightly green, pyritic, slightly calcareous and bentonitic and silty.
1900	2020 Shale--medium dark grey, partly calcareous and lumpy, slightly silty and bentonitic.
2020	2100 Shale--medium grey to medium dark grey, soft, flaky, silty, somewhat calcareous.

<u>DEPTH</u>	<u>DESCRIPTION</u>
2100	2200 Shale--medium grey to medium dark grey, silty, firm to lumpy, pyritic, slightly bentonitic; traces of inoceramus fragments(2180-2200).
2200	2280 Shale--medium grey, slightly brown, silty, partly calcareous; some inoceramus fragments and inoceramus limestone.
2280	2360 Calcareous shale--medium dark grey to dark grey; some inoceramus fragments and inoceramus limestone.
2360	2660 Shale--grey black, flaky, lumpy, pyritic in part.
2660	2710 Shale--dark grey to grey black, firm, flaky, lumpy slightly calcareous in part.
2710	2830 Shale--medium grey to medium dark grey, lumpy, flaky, becoming slightly silty and calcareous in part beginning at 2740.
2830	2900 Shale--medium dark grey, firm, lumpy, flaky, becoming increasingly silty; a small amount of fine grained, limy shaly, sandstone (2890-2900).
2900	2910 Sandstone--fine grained, slightly limy, shaly, quartzose; trace pyrite.
2910	2950 Shale---dark grey, partly silty and sandy; traces of limestone, pyrite, sandstone; more sandy and silty beginning at 2930.
2950	2990 Sandy shale--medium grey to medium dark grey, flaky, silty, partly lumpy, slightly calcareous.
2990	3080 Shale--medium grey to medium dark grey, silty, calcareous slightly green in part; increasing amounts of shaly, calcareous siltstone which begins at 3040.
3080	3090 Shale--medium grey, silty, calcareous, slightly bentonitic.
3090	3100 Silty shale--medium grey to greenish grey, light brown to reddish orange, calcareous.
3100	3190 Silty shale--light brown, calcareous; much light grey to dark grey, firm to flaky, partly silty, slightly calcareous shale; scattered traces of inoceramus fragments and dense grey limestone.
3190	3240 Shale--grey green, calcareous; some shale as above; silty beginning at 3210; some limy, light grey siltstone (3210-3230).
3240	3270 Missing samples.
3270	3280 Shale--grey green, silty; partly calcareous; some grey shale as above.
3280	3300 Calcareous shale--grey green, somewhat silty; traces of inoceramus fragments and inoceramus limestone.
3300	3310 Calcareous shale--light olive grey, very silty; some reddish orange, calcareous, silty shale; traces of pyrite and dense limestone.
3310	3400 Shale--black, very flaky, soft, pyritic; scattered traces of limy green shale and reddish orange shales.
3400	3430 Shale--black, very flaky, soft, partly silty; some dense white limestone beginning at 3410.
3430	3460 Shale--as above; much dense, sublithographic; very light grey to white limestone with white crystals, partly very light yellow brown at 3440-3450.

<u>DEPTH</u>	<u>DESCRIPTION</u>
3460	3490 Shale--as above; some limestone as above; traces of sandstone and red shale; some marly limestone (3480-3490).
3490	3505 Shale--medium grey to dark grey, calcareous, soft, partly flaky; becoming firmer; small amounts of dense limestone, red and green shale.
3505	3515 Shale--medium grey to dark grey, somewhat calcareous and fossiliferous, flaky to firm; a trace of very fine sugary, very pale yellow brown dolomite (3505-3510); small amount of light olive grey, shaly siltstone (3510-3515); traces of dense limestone beginning at 3510.
3515	3530 Shale--medium grey to dark grey, firm, partly flaky; a small amount of grey green shale, reddish orange and reddish brown shale.
3530	3555 Shale--light grey to black, pale green to red brown, partly calcareous; increasing amounts of dense, light grey limestone; some shell limestone (3545-3550); traces of white anhydrite.
3555	3585 Anhydrite--white; much shale as above, partly sandy; some dense limestone; slightly more limestone (3560-3565).
3585	3590 Shale--medium grey hard; small amounts of reddish brown, dark grey, greenish shale, limestone.
3390	3605 Shale--reddish brown, slightly silty; much medium grey shale, some very soft, somewhat limy shale (3600-3005).
3605	3620 Shale--reddish and grey as above; much white anhydrite and dense limestone; some dense, argillaceous, dolomitic limestone (3615-3620); a small amount of greyed orange pink, fine grained sandstone (3615-3620).
3620	3625 Shale--reddish and grey as above; some white anhydrite; some pale, dense, argillaceous, partly dolomitic limestone.
3625	3655 Shale--reddish brown, slightly silty; some grey shale; small amounts of anhydrite, green shale, limestone; scattered small amounts of pale to moderate red, micro-sugary, very hard dolomite, much green grey slightly calcareous shale to (3645-3560).
3655	3675 Shale--medium grey to dark grey, partly silty, partly flaky; much reddish shale as above; some very soft, flaky, calcareous, green grey shale and dense, very hard, argillaceous, pale, limy dolomite beginning at 3665.
3675	3700 Shale--greenish grey, calcareous, soft; some reddish brown shale as above; small amounts of hard, dense limestone; traces of dusky yellow shale appearing at 3685.
3700	3720 Shale--grey to black, dusky yellow, moderate red, pale green, green grey, partly calcareous; small amounts of dense, moderate red dolomite and white anhydrite.
3720	3725 Shale--mostly grey and greenish; traces of sublithographic, white limestone.
3725	3730 Shale--grey and greenish, much reddish shales, partly silty and sandy.
3730	3740 Shale--variegated, partly silty and calcareous and sandy; fossiliferous (shell fragments); small amounts of dense, white limestone.

<u>DEPTH</u>	<u>DESCRIPTION</u>
3740	3755 Shale--medium grey, some variegated shale as above; a small amount of calcareous, pale yellow brown siltstone (3745-3750); traces of white anhydrite.
3755	3770 Shale--grey, some reddish and yellowish shale; some dense, hard limestone; the shale is quite lumpy and partly silty beginning at 3765.
3770	3785 Shale--medium grey to dark grey, partly calcareous, flaky, soft, partly lumpy, partly silty; some reddish shale; small amounts of anhydrite, dense limestone, grey shell fragments; traces of pink shale, pyrite, and siltstone.
3785	3790 Missing sample.
3790	3795 Shale--medium grey to dark grey, partly calcareous; some hard, grey, oolitic limestone; a small amount of reddish shale.
3795	3815 Shale--medium grey to medium dark grey, firm, partly silty and lumpy; some reddish brown shale; a small amount of dusky yellow, soft shale (3810-3815).
3815	3820 Shale--variegated, sandy; some dense, very hard limestone.
3820	3840 Shale--medium grey to dark grey, firm, slightly calcareous; some hard, dense, partly chalky, white to pale yellow brown limestone, increasing greatly in quantity.
3842	Limestone--white, very pale orange, very pale yellow brown, crystalline and chalky; some shale. Circulation:45 minutes.
3840	3855 Limestone--as above, partly oolitic beginning at 3845; some shale.
3855	3865 Shale--grey, reddish brown, traces of dusky yellow, partly silty and calcareous; some dense limestone.
3865	3870 Shale--medium grey, slightly calcareous; some shale as above; some limestone as above; trace anhydrite.
3870	3890 Shale--grey, reddish, greenish, yellowish, partly calcareous, some soft, micro-sugary to chalky, white limestone.
3890	Limestone--white to very pale yellow brown, micro-sugary to chalky. Circulation: 75 minutes.
3890	3910 Limestone as above; some dense, pale dolomite and anhydrite.
3910	3920 Shale--medium grey, slightly calcareous; some variegated shale; decreasing amounts of dense, pale limestone.
3920	3940 Limestone--white to very pale yellow brown, micro-sugary to chalky, partly fossiliferous; increasing amounts of grey, reddish, and greenish shale; traces of anhydrite.
3940	3955 Shale--medium grey, slightly calcareous; some shale as above; traces of limestone and black shale.
3955	3960 Missing samples.
3960	3970 Limestone--very pale yellow brown to dark yellow brown, chalky and crystalline, becoming fine sugary; increasing amounts of grey and reddish shale.
3970	3985 Shale--medium grey, lumpy, silty; traces of limestone, anhydrite, shale as above.
3985	3990 Shale--grey, and reddish as above; much dense limestone and white anhydrite.
3990	4010 Dolomitic limestone--very light brown micro-sugary, hard, argillaceous; some white anhydrite; some grey and reddish shale, the grey increasing in quantity.

<u>DEPTH</u>		<u>DESCRIPTION</u>
4010	4025	Limestone--very pale yellow brown to medium yellow brown, micro-sugary to chalky to crystalline; traces of pyrite, shale, anhydrite.
4025		Dolomitic limestone--very light brown, hard, dense, argillaceous; traces of shale, limestone, anhydrite. Circulation: 30 minutes.
4025	4030	Limestone as above, much grey and reddish shale.
4030	4045	Dolomite--light blue, grey, sub-crystalline; decreasing amounts of limestone as above; small amounts of bluish anhydrite; much grey and reddish shale. (4040-4045).
4045	4055	Dolomite as above; some reddish shale; some grey shale; some white anhydrite; some dense limestone.
4059		Limestone--very pale yellow brown, fine sugary and chalky; much grey and reddish shale; small amounts of dolomite and anhydrite. Circulation: 1 hour.
4060	4065	Missing samples.
4065	4075	Dolomite--blue grey, dense; some dense, blue grey anhydrite; some grey and reddish shale; small amounts of dense limestone as above; trace of shell fragments.
4075	4085	Missing samples.
4085	4100	Anhydrite--pale yellow brown to pale blue grey to white dense, hard; much grey and reddish shale, decreasing somewhat in quantity with depth; small amounts of dense limestone.
4100	4173	Missing samples.
4173	4240	Limestone--very pale orange, micro-sugary, partly oolitic; small amounts of shale and anhydrite.
4240	4250	Limestone--yellow brown, fine sugary and chalky, partly crystalline; much limestone as above; traces of shale and anhydrite.
4250	4265	Limestone--very pale orange to very pale yellow brown, mostly oolitic, partly very fine sugary to chalky; small amounts of white anhydrite.
4265	4280	Limestone--very pale orange to pale yellow brown to moderate yellow brown, fine sugary and chalky, hard, some white to crystalline yellow brown anhydrite; some dark grey shale.
4280	4320	Missing samples.
4320	4365	Limestone--yellow brown, crystalline, oolitic, hard, porous; some shale and blue grey anhydrite (4320-4340).
4365	4395	Limestone--pale orange, hard, coarse oolitic, porous, more sugary and less oolitic beginning at 4385; small amounts of shale and anhydrite.
4395	4430	Limestone--yellow brown, fine sugary and chalky, hard; some shale; the limestone is partly oolitic and fossiliferous (4420-4430); missing samples (4400-4405).
4430	4445	Limestone--light olive grey to very pale orange, fine sugary and chalky, hard; some shale.
4445	4450	Missing samples.
4450	4475	Limestone--very pale orange and light olive grey, hard, partly oolitic, partly fine sugary; traces of shale and anhydrite.

<u>DEPTH</u>		<u>DESCRIPTION</u>
4475	4495	Limestone--grey to white, partly light olive grey, crystalline to chalky, partly oolitic, traces of shale and anhydrite; the limestone is mostly orangish (4490-4495).
4495	4515	Limestone--grey, very pale orange, fine sugary and/or chalky and/or crystalline, partly oolitic; traces of shale and anhydrite.
4515	4530	Limestone--grey to light olive grey, partly pseudo oolitic, dense, hard, traces of shale.
4530	4550	Limestone--greyed, micro-sugary to crystalline and chalky, dense, traces of shale.
4550	4585	Limestone--grey, light olive, grey, orangish, very fine sugary and/or chalky, becoming partly crystalline at 4565; traces of shale.
4585	4595	Limestone--grey, dense, sub-crystalline to micro-crystalline much very fine sugary, hard limestone; much soft, chalky, grey, shaly limestone.
4595	4610	Limestone--grey, very fine sugary to crystalline and chalky, dense; some soft, shaly, lumpy, grey limestone; small amounts of shale.
4610	4620	Missing samples.
4620	4675	Limestone--greyish, very fine sugary and chalky, very hard, partly crystalline beginning at 4650; traces of shale; missing samples: 4660-4665; traces of shell fragments (4670-4675).
4675	4690	Limestone--orangish, chalky to crystalline; some limestone as above; shell fragments.
4690	4720	Limestone--greyish, partly brownish and very pale orange, very fine sugary and crystalline and/or chalky; fossiliferous; shell impressions; more chalky limestone beginning at 4705.
4720	4740	Limestone--pale yellow brown, very pale orange, grey, crystalline to very fine sugary to chalky, partly oolitic; some shale, traces of anhydrite.
4740	4755	Limestone--very pale orange to light grey, partly brown, very fine sugary, crystalline, chalky; traces of chert.
4755	4770	Limestone--grey, partly brownish grey, very fine sugary and/or chalky, partly crystalline; shell impressions and fragments; traces of shale and chert.
4770	4790	Limestone--greyed, slightly brownish and orange, micro-sugary to chalky, partly very dense; shell impressions, small amounts of shale; the limestone becomes very hard and dense at 4780.
4790	4805	Chert--grey brown to light grey, dull; some limestone as above.
4805	4815	Limestone--pale, micro-sugary, chalky; decreasing amounts of chert as above.
4815	4835	Limestone--light brownish grey, dense, very fine sugary to chalky; some variegated shale; small amounts of chert.
4835	4845	Limestone--dense as above; much shale, especially grey; some chert.
4845	4860	Limestone--medium grey, very fine sugary, dense; small amounts of shale and chert.

<u>DEPTH</u>		<u>DESCRIPTION</u>
4860	4890	Limestone--grey, slightly brown in part, dense, micro-sugary; traces of shale and chert; much chert as above (4885-90); missing samples: 4880-4885.
4890	4955	Limestone--medium grey, micro-sugary, very hard, partly chalky and orangish; some chert as above; the limestone is slightly lighter, oranger, and harder beginning at 4915; less chert starting at 4945.
4954	4978	Core.
4954	4958	Dolomite--dark grey, to light brown, banded, micro-sugary, hard.
4958	4968	Dolomitic limestone--very pale orange to very pale yellow brown, very fine sugary to micro-sugary, dense, hard, slightly vuggy.
4968	4978	Dolomite--light grey to medium light grey, micro-sugary, very hard, slightly vuggy, pyritic.
4978	5020	Missing samples.
5020	5030	Dolomitic limestone--light brown to yellow brown, sugary, crystalline, becoming partly chalky; some very fine sugary, dense, grey limestone; small amounts of dark grey shale.
5030	5040	Dolomitic limestone--light brown to white, micro-sugary to sugary, partly chalky, becoming lighter and more dolomitic.
5040	5055	Limestone--very pale orange to dull light brown, sub-crystalline to sugary to chalky, becoming shaly at 5045.
5055	5065	Dolomite--very pale orange to very pale brown, micro-sugary to sugary, hard, partly chalky limestone; some shale increasing amounts of limestone.
5065	5080	Dolomite--as above; much chalky limestone, some dense limestone beginning at 5070; some shale.
5080	5090	Dolomite--pale yellow brown, very dense to sugary; small amounts of chalky limestone; fossiliferous; traces of shale and chert.
5090	5095	Dolomite--micro-sugary and/or chalky, grading into limestone.
5095	5100	Dolomite--very pale yellow brown sugary to moderate yellow brown fine sugary, partly limy, partly green tinged; some chalky limestone.
5100	5105	Limestone--yellow brown; sugary, somewhat dolomitic; small amounts of dense and chalky limestone.
5105	5115	Limy dolomite--light brown, sugary, becoming somewhat less limy; small amounts of chalky limestone, traces of shale.
5115	5145	Dolomite--light brown, yellow brown, light olive grey, sugary, crystalline, becoming dolomitic limestone at 5120.
5145	5150	Limestone--very light brown to very pale orange, very fine sugary and/or chalky; some dolomitic limestone as above; traces of shale and anhydrite.
5150	5170	Limestone--light brown, partly grey, very fine sugary and/or chalky, increasingly chalky; traces of chert and shale.
5170	5180	Limestone--very pale orange to very light grey, micro-sugary to chalky, becoming chalkier and paler; small amounts of shale.

<u>DEPTH</u>		<u>DESCRIPTION</u>
5180	5195	Limestone--very pale orange to very light grey fine sugary to chalky, partly dolomitic (5180-5185) much sub-lithographic, very pale orange limestone (5190-5195). 5195
5200		Limestone--grey to very pale orange, soft to hard chalky, partly very fine sugary.
5200	5205	Dolomitic limestone--very pale orange and very light grey, very fine sugary.
5205	5210	Limestone--grey and brownish, micro-sugary, very hard; much very pale orange, sub-lithographic limestone.
5210	5215	Limestone--very pale orange, very fine sugary to chalky.
5215	5225	Dolomitic limestone---very pale orange, very fine sugary; some chalky limestone; becoming much less dolomitic.
5225	5260	Limestone--very pale orange, very fine sugary, somewhat dolomitic, becoming more dolomitic at 5235; some dense limestone(5250-5255); small amounts of chalky limestone and shale.
5260	5260	5265 Dolomitic limestone--very pale orange, very fine sugary, partly chalky.
5265	5270	Limestone--very pale orange, very fine sugary partly chalky.
5270	5280	Dolomitic limestone--very pale orange, fine sugary, dense, becoming less dolomitic; much chalky limestone.
5280	5300	Limestone--very pale orange to grey, very fine sugary and/or chalky, partly dolomitic, becoming very light brown at 5290; small amounts of shale.
5300	5450	Missing samples.
5450	5455	Limestone--sublithographic, pink and white; some very pale pinkish orange, very dense, partly dolomitic limestone.
5455	5460	Dolomite--white, very pale pink very pale orange micro-sugary, very hard and dense.
5460	5480	Dolomitic limestone--white very pale pink, very pale orange, micro-sugary, very hard and dense, becoming very dolomitic at 5475.
5480	5510	Dolomite--white, very pale orange, very pale yellowbrown, hard, micro-sugary, partly chalky, some anhydrite (5480-5485); traces of anhydrite crystals.
5510	5535	Dolomite--white, micro-sugary; much dolomite as above, becoming more dense and pale orange at (5520), becoming somewhat limy at 5530.
5535	5540	Limy dolomite--white, very fine sugary to chalky.
5540	5545	Missing samples.
5545	5550	Dolomite--as above; much chalky white limestone.
5550	5555	Missing samples.
5555	5565	Dolomitic limestone--white, dense; much chalky limestone; the limestone becomes slightly brown at 5560; mostly reddish, grey, and greenish shale from 5560-5565 (Cave?).
5565	5570	Dolomitic limestone--very pale yellow brown, partly pink tinged, chalky to micro-sugary.
5570	5575	Dolomite--very pale yellow brown, partly pink tinged dense, partly chalky.
5575	5595	Dolomite--very pale orange, partly pink tinged, micro-sugary, hard, becoming limy at 5590; some chalky limestone (5590-5595).

<u>DEPTH</u>	<u>DESCRIPTION</u>
5595	5605 Dolomite--white to very pale orange, micro-sugary, hard, dense; a small amount of chalky limestone.
5605	5615 Dolomite and limy dolomite--pale, dense; much grey, reddish, greenish shale--cave?
5615	5630 Dolomite--grey to very pale orange, micro-sugary, very hard, partly limy.
5630	5640 Dolomite to dolomitic limestone--grey to very pale orange, somewhat pink tinged, micro-sugary to fine sugary, hard, partly chalky, becoming sandy at 5635.
5640	5660 Dolomite--white to very pale orange, micro-sugary, partly limy, sandy.
5660	5665 Limy dolomite--white to very pale yellow brown, very dense and hard.
5665	5675 Dolomitic limestone--white to very pale yellow brown, very dense and hard; some chalky limestone (5670-5675).
5675	5680 Limy dolomite--very pale yellow brown, very dense, partly chalky and sandy.
5680	5695 Dolomitic limestone--very pale yellow brown, very dense, small amounts of chalky, pale pink limestone.
5695	5700 Limestone--dark grey, dense; some dolomitic limestone and limy dolomite as above; some shale.
5700	5710 Limestone--grey to black, chalky to crystalline; some very pale orange, dense, limy dolomite; a small amount of shale.
5710	5720 Limestone--medium greenish grey, micro-sugary, included black fossils; much very pale orange, dense dolomite; small amounts of shale.
5720	5725 Limestone--grey, dense, chalky, fossiliferous; some very pale orange, dense, dolomitic limestone to limy dolomite; some shale.
5725	5740 Limestone--grey and black, fossiliferous, chalky to crystalline; some limestone as above; some shale.
5740	5775 Limestone--medium grey, rather greenish, soft, very argillaceous; some fossils; some grey limestone as above (5755-5765) all becoming slightly sandy at 5760.
5775	5800 Dolomitic limestone--very pale brown to very pale yellow brown, micro-sugary, brittle; mostly flaky, black shale: 5790-5795 (Cave?), much black shale: 5795-5800 (Cave?).
5800	5805 Limestone--light olive grey to very light grey, dense to chalky, somewhat fossiliferous.
5805	5810 Dolomitic limestone--very light olive grey, dense to chalky; bryozoa.
5810	5825 Limestone--very pale brown to very light grey, very fine sugary to micro-sugary; fossils; small amounts of shale and chalky limestone.
5825	5830 Limestone--very light grey, partly very pale orange, sub-lithographic, fossils (bryozoa); some dense and chalky limestone.
5830	5840 Limestone--pale yellow grey, fine sugary to chalky; some grey shale; trace pyrite.
5840	5880 Limestone--light grey to very pale yellow grey, very fine sugary and/or chalky; missing samples (5850-5875).
5880	5890 Limestone--pale, dense micro-sugary to hard sub-lithographic; much grey shale (Cave?) Poor samples.

<u>DEPTH</u>	<u>DESCRIPTION</u>
5890	5925 Limestone--very pale orange to very light grey, very fine sugary and/or chalky, becoming partly dolomitic at 5810.
5925	5960 Limestone--very pale orange, micro-sugary and/or chalky; some sugary, yellow brown limestone; the chalky limestone becomes slightly pink at 5950.
5960	5995 Limestone--white to very light grey to pale yellow brown, very fine sugary and/or chalky, becoming more chalky and slightly pink at 5975.
5995	6025 Limestone--very pale yellow brown to yellow brown, slightly pink in part, very fine sugary and/or chalky, becoming somewhat more sugary at 6015; small amounts shale.
6025	6045 Limestone--very pale yellow brown, micro-sugary to fine sugary, partly chalky, becoming chalkier and slightly pink.
6045	6080 Limestone--white to yellow brown, fine sugary and/or chalky; much chalky limestone 6075-6080.
6080	6120 Limestone--sugary yellow brown to chalky pinkish white; small amounts of shale.
6120	6160 Limestone--pale yellow brown to pinkish, fine sugary and chalky.
6160	6195 Limestone--very, pale orange, mostly chalky and very fine sugary; partly fine sugary, yellow brown limestone; mostly chalky (6180-6185).
6195	6205 Limestone--very light grey, very pale orange, very pale yellow brown slightly pink, very fine sugary and/or chalky, becoming denser; some chert (6200-6205).
6205	6220 Limestone--very light grey, very fine sugary to micro-sugary, some chalky limestone as above; some chert.
6220	6235 Limestone--very light grey, becoming slightly pink, micro-sugary and/or chalky; decreasing amounts of chert.
6235	6245 Limestone--pale, very fine sugary and/or chalky.
6245	6260 Limestone--light grey, slightly pink in part, very fine sugary and/or chalky; traces of chert.
6260	6280 Missing samples.
6280	6295 Limestone--pale yellow brown, light grey, slightly pink, dense, very fine sugary and/or chalky; becoming chalkier; some shale (Cave?).
4060	4065 Missing samples.
4065	4075 Dolomite--blue grey, dense; some dense, blue grey anhydrite; some grey and reddish shale; small amounts of dense limestone as above; trace of shell fragments.
4075	4085 Missing samples.
4085	4100 Anhydrite--pale yellow brown to pale blue grey to white dense, hard; much grey and reddish shale, decreasing somewhat, in quantity with depth; small amounts, of dense limestone.
4100	4173 Missing samples.
4173	4240 Limestone--very pale orange, micro-sugary, partly oolitic; small amounts of shale and anhydrite.
4240	4250 Limestone--yellow brown, firm sugary and chalky, partly crystalline; much limestone as above; traces of shale and anhydrite.

<u>DEPTH</u>	<u>DESCRIPTION</u>
4250	4265 Limestone--very pale orange to very pale yellow brown, mostly oolitic, partly very fine sugary to chalky; small amounts of white anhydrite.
4265	4280 Limestone--very pale orange to pale yellow brown to moderate yellow brown, fine sugary and chalky, hard, some white to crystalline yellow brown anhydrite; some dark grey shale.
4280	4320 Missing samples.
4320	4365 Limestone--yellow brown, crystalline, oolitic, hard, porous; some shale and blue grey anhydrite (4320-4340).
4365	4395 Limestone--pale orange, hard, coarse oolitic, porous, more sugary and less oolitic beginning at 4385; small amounts of shale and anhydrite.
4395	4430 Limestone--yellow brown, fine sugary and chalky, hard; some shale; the limestone is partly oolitic and fossiliferous (4420-4430); missing samples (4400-4405).
4430	4445 Limestone--light olive grey to very pale orange, fine sugary and chalky, hard; some shale.
4445	4450 Missing samples.
4450	4475 Limestone--very pale orange and light olive grey, hard, partly oolitic, partly fine sugary; traces of shale and anhydrite.
4475	4495 Limestone--grey to white, partly light olive grey, to chalky, partly oolitic, traces of shale and anhydrite; the limestone is mostly orangish (4490-4495).
4495	4575 Limestone--grey, very pale orange, fine sugary and/or chalky and/or crystalline, partly oolitic; traces of shale and anhydrite.
4515	4530 Limestone--grey to light olive grey, partly pseudo oolitic, dense, hard, traces of shale.
4530	4550 Limestone--greyed, micro-sugary to crystalline and chalky, dense, traces of shale.
4550	4585 Limestone--grey, light olive, grey, orangish, very fine sugary and/or chalky, becoming partly crystalline at 4565; traces of shale.
4585	4595 Limestone--grey, dense, sub-crystalline to micro-crystalline much very fine sugary, hard limestone; much soft, chalky, grey, shaly limestone.
4595	4610 Limestone--grey, very fine sugary to crystalline and chalky, dense; some soft, shaly, lumpy, grey limestone; small amounts of shale.
4610	4620 Missing samples.
4620	4675 Limestone--greyish, very fine sugary and chalky, very hard partly crystalline beginning at 4650; traces of shale; missing samples: 4660-4665; traces of shell fragments (4670-4675).
4675	4690 Limestone--orangish, chalky to crystalline; some limestone as above; shell fragments.
4690	4720 Limestone--greyish, partly brownish and very pale orange very fine sugary and crystalline and/or chalky; fossiliferous; shell impressions; more chalky limestone beginning at 4705.

<u>DEPTH</u>		<u>DESCRIPTION</u>
4720	4740	Limestone--pale yellow brown, very pale orange, grey, crystalline to very fine sugary to chalky, partly oolitic; some shale, traces of anhydrite.
4740	4755	Limestone--very pale orange to light grey, partly brown, very fine sugary, crystalline chalky; traces of chert.
4755	4770	Limestone--grey; partly brownish grey very fine sugary and/or chalky, partly crystalline; shell impressions and fragments; traces of shale and chert.
4770	4790	Limestone--greyed, slightly brownish and orange, micro-sugary to chalky, partly very dense; shell impressions, small amounts of shale; the limestone becomes very hard and dense at 4780.
4790	4805	Chert--grey brown, to light grey, dull; some limestone as above.
4805	4815	Limestone--pale, micro-sugary, chalky; decreasing amounts of chert as above.
4815	4835	Limestone-light brownish grey, dense, very fine sugary to chalky; some variegated shale; small amounts of chert.
4835	4845	Limestone--dense as above; much shale, especially grey; some chert.
4845	4860	Limestone--medium grey, very fine sugary, dense, small amounts of shale and chert.
4860	4890	Limestone--grey, slightly brown in part, dense, micro-sugary traces of shale and chert; much chert as above (4885-4890); missing samples: 4880-4885.
4890	4955	Limestone--medium grey, micro-sugary, very hard, partly chalky and orangish; some chert as above; the limestone is slightly lighter, oranger, and harder beginning at 4915; less chert starting at 4945.
4954	4978	Core.
4954	4958	Dolomite--dark grey, to light brown, banded, micro-sugary, hard.
4958	4968	Dolomitic limestone--very pale orange to very pale yellow brown, very fine sugary to micro-sugary, dense, hard, slightly vuggy.
4968	4978	Dolomite--light grey to medium light grey, micro-sugary, very hard, slightly vuggy, pyritic.
4978	5020	Missing samples.
5020	5030	Dolomitic limestone--light brown to yellow brown, sugary, crystalline, becoming partly chalky; some very fine sugary, dense, grey limestone; small amounts of dark grey shale.
5030	5040	Dolomitic limestone--light brown to white, micro-sugary to sugary, partly chalky, becoming lighter and more dolomitic.
5040	5055	Limestone--very pale orange to dull light, brown, sub-crystalline to sugary to chalky, becoming shaly at 5045.
5055	5065	Dolomite--very pale orange to very pale brown, micro-sugary to sugary, hard, partly chalky limestone; some shale increasing amounts of limestone.
5065	5080	Dolomite--as above; much chalky limestone, some dense limestone beginning at 5070; some shale.
5080	5090	Dolomite--pale yellow brown, very dense to sugary; small amounts of chalky limestone; fossiliferous; traces of shale and chert.

<u>DEPTH</u>	<u>DESCRIPTION</u>
5090	5095 Dolomite--micro-sugary and/or chalky, grading into limestone.
5095	5100 Dolomite--very pale yellow brown sugary to moderate yellow brown fine sugary, partly limy, partly green tinged; some chalky limestone.
5100	5105 Limestone--yellow brown; sugary, somewhat dolomitic; small, amounts of dense and chalky limestone.
5105	5115 Limy dolomite--light brown, sugary, becoming somewhat less limy; small amounts of chalky limestone, traces of shale.
5115	5145 Dolomite--light brown, yellow brown, light olive grey, sugary, crystalline, becoming dolomitic limestone at 5120.
5145	5150 Limestone--very light brown to very pale orange, very fine sugary and/or chalky; some dolomitic limestone as above; traces of shale and anhydrite.
5150	5170 Limestone--light brown, partly grey, very fine sugary and/or chalky, increasingly chalky; traces of chert and shale.
5170	5180 Limestone--very pale orange to very light grey, micro-sugary to chalky becoming chalkier and paler; small amounts of shale.
5180	5195 Limestone--very pale orange to very light grey fine sugary to chalky, partly dolomitic (5180-5185) much sub-lithographic, very pale orange limestone (5190-5195). 5195
	5200 Limestone--grey to very pale orange, soft to hard chalky partly very fine sugary.
5200	5205 Dolomitic limestone--very pale orange and very light grey, very fine sugary.
5205	5210 Limestone--grey and brownish, micro-sugary, very hard; much very pale orange, sub-lithographic limestone.
5210	5215 Limestone--very-pale orange, very fine sugary to chalky.
5215	5225 Dolomitic limestone---very pale orange, very fine sugary; some chalky limestone; becoming much less dolomitic.
5225	5260 Limestone--very pale orange, very fine sugary, somewhat dolomitic, becoming more dolomitic at 5235; some dense limestone(5250-5255); small amounts of chalky limestone and shale.
5260	5260 5265 Dolomitic limestone--very pale orange, very fine sugary, partly chalky.
5265	5270 Limestone--very pale orange, very fine sugary partly chalky.
5270	5280 Dolomitic limestone--very pale orange, fine sugary, dense, becoming less dolomitic; much chalky limestone.
5280	5300 Limestone--very pale orange to grey, very fine sugary and/or chalky, partly dolomitic, becoming very light brown at 5290; small amounts of shale.
5300	5450 Missing samples.
5450	5455 Limestone--sublithographic, pink and white; some very pale pinkish orange, very dense, partly dolomitic limestone.
5455	5460 Dolomite--white, very pale pink very pale orange micro-sugary, very hard and dense.
5460	5480 Dolomitic limestone--white very pale pink, very pale orange, micro-sugary, very hard and dense, becoming very dolomitic at 5475.

<u>DEPTH</u>		<u>DESCRIPTION</u>
5480	5510	Dolomite--white very pale orange very pale yellow brown, hard, micro-sugary, partly chalky, some anhydrite (5480-5485); traces of anhydrite crystals.
5510	5535	Dolomite--white, micro-sugary; much dolomite as above, becoming more dense and pale orange at (5520)becoming somewhat limy at 5530.
5535	5540	Limy dolomite--white, very fine sugary to chalky.
5540	5545	Missing samples.
5545	5550	Dolomite--as above; much chalky white limestone.
5550	5555	Missings samples.
5555	5565	Dolomitic limestone--white, dense; much chalky limestone; the limestone becomes slightly brown at 5560; mostly reddish grey, and greenish shale from 5560-5565 (Cave?).
5565	5570	Dolomitic limestone--very pale yellow brown, partly pink tinged, chalky to micro-sugary.
5570	5575	Dolomite--very pale yellow brown, partly pink tinged dense, partly chalky.
5575	5595	Dolomite--very pale orange, partly pink tinged, micro-sugary, hard, becoming limy at 5590; some chalky limestone (5590-5595).
5595	5605	Dolomite--white to very pale orange, micro-sugary, hard dense; a small amount of chalky limestone.
5605	5615	Dolomite and limy dolomite--pale, dense; much grey, reddish, greenish shale--cave?
5615	5630	Dolomite--grey to very pale orange, micro-sugary, very hard, partly limy.
5630	5640	Dolomite to dolomitic limestone--grey to very pale orange, somewhat pink tinged, micro-sugary to fine sugary, hard, partly chalky, becoming sandy at 5635.
5640	5660	Dolomite--white to very pale orange, micro-sugary, partly limy, sandy.
5660	5665	Limy dolomite--white to very pale yellow brown, very dense and hard.
5665	5675	Dolomitic limestone--white to very pale yellow brown, very dense and hard; some chalky limestone (5670-5675).
5675	5680	Limy dolomite--very pale yellow brown, very dense, partly chalky and sandy.
5680	5695	Dolomitic limestone--very pale yellow brown, very dense, small amounts of chalky, pale pink limestone.
5695	5700	Limestone--dark grey, dense; some dolomitic limestone and limy dolomite as above; some shale.
5700	5710	Limestone--grey to black, chalky to crystalline; some very pale orange, dense, limy dolomite; a small amount of shale.
5710	5720	Limestone--medium greenish grey, micro-sugary, included black fossils; much very pale orange, dense dolomite; small amounts of shale.
5720	5725	Limestone--grey, dense, chalky, fossiliferous; some very pale orange, dense, dolomitic limestone to limy dolomite; some shale.
5725	5740	Limestone--grey and black, fossiliferous, chalky to crystalline; some limestone as above; some shale.

<u>DEPTH</u>		<u>DESCRIPTION</u>
5740	5775	Limestone--medium grey, rather greenish, soft, very argillaceous; some fossils; some grey limestone as above (5755-5765) all becoming slightly sandy at 5760.
5775	5800	Dolomitic limestone--very pale brown to very pale yellow brown, micro-sugary, brittle; mostly flaky, black shale; 5790-5795 (Cave?), much black shale; 5795-5800 (Cave?).
5800	5805	Limestone--light olive grey to very light grey, dense to chalky, somewhat fossiliferous.
5805	5810	Dolomitic limestone--very light olive grey, dense to chalky; bryozoa.
5810	5825	Limestone--very pale brown to very light grey, very fine sugary to micro-sugary; fossils; small amounts of shale and chalky limestone.
5825	5830	Limestone--very light grey, partly very pale orange, sub-lithographic fossils (bryozoa); some dense and chalky limestone.
5830	5840	Limestone--pale yellow grey, fine sugary to chalky; some grey shale; trace pyrite.
5840	5880	Limestone--light grey to very pale yellow grey, very fine sugary and/or chalky; missing samples (5850-5875).
5880	5890	Limestone--pale, dense micro-sugary to hard sub-lithographic; much grey shale (Cave?) Poor samples.
5890	5925	Limestone--very pale orange to very light grey, very fine sugary and/or chalky, becoming partly dolomitic at 5810.
5925	5960	Limestone--very pale orange, micro-sugary and/or chalky; some sugary, yellow brown limestone; the chalky limestone becomes slightly pink at 5950.
5960	5995	Limestone--white to very light grey to pale yellow brown, very fine sugary and/or chalky, becoming more chalky and slightly pink at 5975.
5995	6025	Limestone--very pale yellow brown to yellow brown, slightly pink in part, very fine sugary and/or chalky, becoming somewhat more sugary at 6015; small amounts shale.
6025	6045	Limestone--very pale yellow brown, micro-sugary to fine sugary, partly chalky, becoming chalkier and slightly pink.
6045	6080	Limestone--white to yellow brown, fine sugary and/or chalky; much chalky limestone 6075-6080.
6080	6120	Limestone--sugary yellow brown to chalky pinkish white; small amounts of shale.
6120	6160	Limestone--pale yellow brown to pinkish, fine sugary and chalky.
6160	6195	Limestone--very, pale orange, mostly chalky and very fine sugary; partly fine sugary, yellow brown limestone; mostly chalky (6180-6185).
6195	6205	Limestone--very light grey, very pale orange, very pale yellow brown slightly pink very fine sugary and/or chalky, becoming denser; some chert (6200-6205).
6205	6228	Limestone--very light grey, very fine sugary to micro-sugary, some chalky limestone as above; some chert.
6220	6235	Limestone--very light grey, becoming slightly pink, micro-sugary and/or chalky; decreasing amounts of chert.
6235	6245	Limestone--pale, very fine sugary and/or chalky.

<u>DEPTH</u>	<u>DESCRIPTION</u>
6245	6260 Limestone--light grey, slightly pink in part, very fine sugary and/or chalky; traces of chert.
6260	6280 Missing samples.
6280	6295 Limestone--pale yellow brown, light grey, slightly pink, dense, very fine sugary and/or chalky; becoming chalkier; some shale (Cave?).
6295	6320 Limestone--very light grey to very pale yellow grey, very fine sugary and/or chalky, becoming more yellow brown at 6310.
6320	6370 Limestone--very pale orange to light grey, becoming pinkish, micro-sugary and/or chalky, becoming chalkier; some grey shale (Cave?). Poor sample.
6370	6380 Limestone--very light grey, dense, mostly chalky; some shale. Poor samples.
6380	6395 Limestone--light grey to medium grey, somewhat brownish; some shale.
6395	6400 Limestone--somewhat brownish grey, dense and chalky, silty.
6400	6410 Limestone--brownish grey, dense, partly chalky, shaly, small amounts of shale.
6410	6415 Limestone--very light brown, lumpy, silty, dense; some limestone as above; much shale.
6415	6445 Limestone--green grey, lumpy, silty, very shaly, partly brownish; becoming more a limy green shale, poor samples.
6445	6450 Shale--brownish, greenish, greyish, silty, limy; small amount of chalky white limestone, poor samples.
6450	6475 Shale--mostly green, some grey; some dense, very pale orange limestone, poor samples.
6475	6500 Shale--greenish, splintery; much limy, brownish, lumpy, silty shale; the green shale becomes lumpy at 6490.
6500	6505 Shale--greenish, partly brownish, mostly splintery, partly lumpy; small amount of fine grained sandstone.
6505	6520 Shale--mostly splintery, greenish, becoming more olive green at 6510, mostly lumpy and silty beginning at 6515.
6520	6545 Shale--greenish, partly brownish, limy, lumpy, partly silty, becoming splintery and green mostly.
6545	6550 Shale--brownish, limy, lumpy.
6550	6555 Shale--greenish, splintery.
6555	6570 Shale--mostly brownish, lumpy, and silty; some greenish shale as above.
6570	6650 Missing samples.
6650	6690 Shale--greenish, splintery; traces of sugary to dense, white limestone, small amounts of medium, quartzose sandstone beginning at 6660.
6690	6755 Shale--greyish green, splintery; much medium grained, quartzose sandstone; some coarse, round quartz sand begins at 6720; much lumpy, silty, brownish shale (6750-6755).
6755	6760 Shale--grey, green, olive, firm to lumpy, partly silty, small amounts of sandstone.
6760	6765 Shale--greenish black, flaky, splintery; traces of limy sandstone and chalky limestone.
6765	6775 Shale--grey green, splintery; some fine, limy sandstone; small amounts of chalky limestone.

<u>DEPTH</u>		<u>DESCRIPTION</u>
6775	6805	Shale--grey green, splintery; much medium grained, quartzose sandstone, which contains green pellets and specks beginning at 6785 much silt (6795-6800).
6805	6820	Shale--grey green, green grey, grey, brownish, splintery; small amounts of sandstone and dense limestone.
6820	6830	Shale-grey green, splintery and lumpy silty; some sandstone.
6830	6840	Siltstone and fine grained sandstone--shaly, limy.
6840	6860	Shale--grey green, splintery; some sandstone and siltstone as above; beginning at 6850, there is some fine to coarse, quartzose sandstone with green particles.
6860		Granite.