

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 23

Summary of Evans Production Co. Johnson #1
Rolette County, North Dakota

By Morton Strassberg

Evans Production Corporation Johnson #1, Rolette County, North Dakota C NW SW, Section 23, T. 160N., R. 70W., (2090 feet S. of N. line, 540 feet W. of E. line, Section 23) Elevation K.B. 1691, G. L. 1680. Total Depth 4949.

The Evans Johnson #1 was spudded May 19, 1953 and 10 3/4 inch casing was set at 289 feet with 50 sacks of cement. The well was plugged and abandoned June 9, 1953.

Fifteen sack cement plugs were set at the top of surface pipe, 289', 1910', 1960', 4182', 4895', and 4948'.

Formation tops were determined from samples, electric logs, and radioactivity logs. Not all lithologic tops called in following list. Colors determined from rock color chart.

FORMATION TOPS

	<u>Depth</u>
Cretaceous System	
Niobrara Formation	1023
Greenhorn Formation	1422
Muddy Zone	1690
Dakota	1825
Jurassic System	
Morrison Formation	1961
Sundance Formation	2020
Piper Formation	2296
Triassic System	
Spearfish	2500
Mississippian	
Lodgepole Formation	2576
Englewood (Bakken) Formation	2755
Devonian System	
Lyleton (Three Forks)	2805
Nisku Formation	2828
Woodbend (Duperow)	2918
Beaverhill Lake (Souris)	3267
Dawson Bay Formation	3483
Elk Point Group	
Prairie Evaporite	3625
Winnipegosis Formation	3679
Ashern Formation	3742
Silurian System	
Interlake Formation	3762
Ordovician System	
Stony Mountain Formation	4004
Stony Mountain Shale	4109
Red River Formation	4188

	<u>Depth</u>
Winnipeg Formation	4770
Winnipeg Sand	4898
Pre-Cambrian	
Total Depth	4949

It is interesting to note that in this well the thickness of the Lodgepole Formation is only 179 feet and that the Mission Canyon Formation appears to be entirely absent. In the Lion Oil Sebelius #1, SE NW Section 23, T. 161N., R. 73W., 20 miles northwest of the Evans Johnson #1, the Lodgepole Formation has a thickness of 570 feet and the Mission Canyon 39 feet. The possible causes for the decrease in thickness of these formations are; lack of deposition, structure, erosion, or a combination of these.

In trying to determine what phase of the Lodgepole Formation is present in this well, it was found that the S.P. curve resembles the base of the Lodgepole, the resistivity curve was unlike any individual portion of the Lodgepole, and the drilling samples resemble the top portion to some extent. There is also the possibility of a facies change considering that the well is on the flanks of the basin. Further exploration and study may answer these questions.

From the above discussion the possibility of overlay of some part of the Lodgepole and Mission Canyon should be considered. This offers a stimulus for exploration in this area.

Johnson #1

<u>From</u>	<u>To</u>	<u>Formation</u>
315	325	Shale, very light gray to medium gray calcareous. Fine to medium quartz grains, subangular to subrounded, frosted.
325	335	Shale as above, quartz, very fine grained.
335	345	Shale, medium light gray, pyritic.
345	355	Shale as above, no pyrite.
355	365	Shale as above.
365	375	Shale as above, small amount anhydrite.
375	385	Shale as above, no anhydrite.
385	435	Shale, medium gray.
435	445	Shale as above, pyritic.
445	455	Shale as above, round black pellets.
455	645	Shale as above, no pellets.
645	655	Shale as above, calcite prisms, micaceous.
655	665	Shale as above, no calcite prisms.
665	675	Shale as above, black phosphate pellets.
675	685	Shale, medium gray.
685	705	Shale, medium gray, micaceous, calcite prisms.
705	775	Shale as above, no calcite.
785	875	Shale, medium light gray.
900	910	Shale, medium dark to dark gray.
910	920	Shale, medium gray.
920	925	Shale, medium to medium dark gray.
925	935	Shale, medium gray, calcareous.
930	940	Shale, as above, micaceous, pyritic.

<u>From</u>	<u>To</u>	<u>Formation</u>
940	950	Shale, medium dark to dark gray, calcareous, pyritic, micaceous.
950	970	Shale, medium dark, micaceous.
970	980	Shale as above, shell fragments.
980	1000	Shale as above, no shells.
1000	1020	Shale, medium to medium dark gray, micaceous.
1020	1030	Medium dark shale, bentonitic.
1030	1040	Shale, medium to medium dark gray, shell fragments.
1040	1050	Shale, medium to medium dark gray, bentonitic, micaceous.
1050	1330	Shale, medium to medium dark gray.
1330	1350	Shale as above, shell fragments.
1350	1370	Shale as above, slightly bentonitic.
1370	1380	Shale, medium to medium dark gray, slightly bentonitic and silty.
1380	1410	Shale as above, not silty.
1410	1420	Shale as above, white spots.
1420	1450	Shale, medium dark gray.
1450	1460	Shale, medium dark gray, white specks. Small amount white silty limestone.
1460	1490	Shale, medium dark gray, white specks.
1490	1520	Shale, medium to medium dark gray. Calcite prisims and shell fragments. Micaceous, bentonite.
1520	1530	Shale, medium dark gray, calcareous. Much shell fragments.
1530	1540	Shale, medium to medium dark gray, lighter parts calcareous, shell fragments and white bentonite.
1540	1560	Shale, medium to medium dark gray, calcareous. Calcite prisims.
1560	1570	Shale, medium dark gray, slightly calcareous, calcite prisims.
1570	1580	Shale, medium dark gray, slightly calcareous, white micaceous bentonite.
1580	1590	Shale, medium dark gray, slightly calcareous.
1590	1600	Shale as above, calcite prisims.
1600	1610	Shale, medium dark gray, calcite prisims and shell fragments. Bentonitic fragments.
1610	1630	Shale, medium to medium dark gray, slightly calcarous, white specks, calcite prisims and shell fragments.
1630	1740	Shale, medium to medium gray, slightly calcareous. Shell fragments, calcite prisims, and bentonite fragments.
1740	1750	Shale, medium to medium dark gray. Calcite prisims.
1750	1760	Shale as above, pyritic, bentonite.
1760	1770	Shale, medium to medium dark.
1770	1780	Shale as above, slightly pyritic.
1780	1800	Shale, medium to medium dark gray, calcite prisims, shell fragments, and micaceous bentonite.
1800	1810	Shale as above, very pyritic.
1810	1900	Shale, medium to medium dark gray, pyritic, calcite prisims, considerable very fine grained calcareous sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
1900	1910	Shale, medium to medium dark gray and light brownish gray silty. Considerable white gypsum and a few fine to medium quartz grains.
1910	1920	Shale as above, calcite prisms.
1920	1930	Shale as above, much white fibrous gypsum.
1930	1960	Shale, medium to medium dark gray, light brownish gray, silty, small amount gypsum.
1960	1970	Shale, medium gray, silty.
1970	1990	Shale, median to medium dark gray, and light gray, silty. Calcite prisms, fine grained sandstone.
1990	2010	Shale, medium to medium dark gray, light gray, silty. Fine grained sandstone.
2010	2020	Shale as above, small amount arenaceous limestone.
2020	2050	Shale, medium to medium dark gray, light brownish gray to light gray silty. Fine grained calcareous sandstone.
2050	2070	Shale, medium to medium dark and pale red. Fragmental limestone and white gypsum.
2070	2080	Shale, medium gray and pale red, slightly calcareous.
2080	2090	Shale as above, small amount gypsum.
2090	2110	Shale, medium, medium dark and pale red, very light brown dolomite, shell fragments and gypsum.
2110	2150	Shale, medium light to medium dark gray and pale red. Fine grained calcareous sandstone and shell fragments.
2150	2160	Shale, medium gray and pale red, slightly calcareous. Fine grained, calcareous sandstone.
2160	2180	Shale, light to medium dark to pale red, and light brownish gray silty shale. Very fine grained, calcareous sandstone and shell fragments.
2180	2190	Shale as above, slightly pyritic.
2190	2200	Shale as above, no pyrite.
2200	2210	Shale, light to medium dark to pale red, very light gray silty shale.
2210	2220	Shale, light to medium dark gray, very light gray silty shale.
2220	2260	Shale, light, medium, medium dark and pale red. Very light gray silty shale. White limestone. No limestone 30-60.
2260	2280	Shale, medium to medium dark and pale red. Fine grained, white limestone.
2280	2300	Shale as above with very fine grained sandstone and white to pink gypsum.
2300	2310	Shale, light, medium, medium dark and pale red, very calcareous, very light gray silty shale.
2310	2330	Shale, medium, medium dark, pale red and yellow gray, slightly calcareous, white gypsum.
2330	2350	Shale as above, fine grained limestone and white silty shale.
2350	2360	Shale, medium to medium dark gray and pale red. White fine grained limestone.
2400	2420	Shale, medium to medium dark gray and pale red. White arenaceous limestone, shell fragments and white fibrous gypsum.

<u>From</u>	<u>To</u>	<u>Formation</u>
2420	2430	Limestone, white, fine grained, dolomitic. White fibrous and non fibrous gypsum. Medium to medium dark gray shale.
2430	2440	Shale, medium light to medium gray. White fine grained limestone and white gypsum.
2440	2450	Shale, light to medium dark gray, small amount gypsum.
2450	2460	Shale as above, more gypsum and anhydrite.
2460	2470	Anhydrite, white, medium to medium dark gray and pale red shale.
2470	2480	Shale, medium to medium dark gray, much pale red. Considerable white anhydrite.
2480	2490	Shale, pale red and medium gray. White anhydrite.
2490	2500	Shale as above, more anhydrite.
2500	2510	Shale, medium dark gray and small amount pale red. Small amount anhydrite and calcareous fine grained sandstone.
2510	2525	Shale as above, no sandstone.
2525	2530	Shale, medium dark gray and some pale red. Large amount white anhydrite. Small white fibrous gypsum.
2530	2540	Shale, as above, no gypsum.
2540	2550	Shale as above, small amount fine grained limestone.
2550	2560	Shale, medium dark and pale red. White fine grained limestone and white anhydrite.
2560	2570	Shale as above, some fine grained, calcareous sandstone.
2570	2575	Shale, medium dark gray and pale red. Much fine sand grains, subrounded, frosted. White anhydrite and white fine grained limestone.
2575	2610	Shale, medium dark gray and pale red. Much fine subrounded, frosted, iron stained sand grains. Very fine grained calcareous sandstone. Small anhydrite.
2610	2615	Shale, medium gray and pale red. White fine grained limestone and small amounts of white anhydrite, gypsum and a few fine sand grains.
2615	2620	Shale, medium gray and a little pale red. Great deal white very fine grained dolomitic limestone and white anhydrite.
2620	2630	Shale, medium to medium dark. Large amount white to pink chert. Small white limestone and anhydrite.
2630	2640	Shale, medium gray. Small amount pink chert and very light gray fine grained limestone.
2640	2645	Shale, medium to pale red. Pink chert, white arenaceous limestone and white anhydrite.
2645	2680	Limestone, white to pinkish gray, very fine grained. Much pinkish gray and white chert and some medium gray shale.
2680	2725	Limestone, white to pink sublithographic. Chert white to pink, medium to medium dark and pale red shale.
2725	2730	Same as above, increasing shale.
2730	2745	Shale, medium dark gray and pale red. White to pink very fine grained limestone. White to pink dolomite. White fibrous gypsum.
2745	2760	Shale, medium to medium dark gray and pale red. White to pinkish gray, fine to medium grained limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
2760	2775	Shale as above, white gypsum.
2780	2785	Shale, medium to medium dark gray and pale red.
2785	2790	Shale as above, white fibrous gypsum.
2810	2830	Shale, medium light to medium gray and pale red, calcareous. Fine to medium, subrounded to subangular frosted iron stained, sand grains.
2830	2835	Shale, pale red calcareous and medium gray, few sand grains.
2835	2845	Shale as above, slightly calcareous.
2845	2850	Dolomite, very light gray, medium gray and pale red shale.
2850	2855	Shale, medium gray, very light gray calcareous shale.
2855	2860	Shale, medium gray and pale red. Some white aragonite.
2860	2865	Shale as above with light pinkish gray limestone.
2865	2870	Shale as above, slight oil stain.
2870	2875	Shale as above, no stain.
2875	2885	Shale as above, small amount white limestone.
2885	2895	Shale, medium gray, small amount pale red. Small white limestone and very light gray siltstone.
2895	2905	Shale as above with light gray limestone.
2905	2910	Shale, medium gray and pale red. Considerable very light gray limestone and light gray calcareous siltstone. Slight oil stain.
2910	2915	Shale as above, no stain.
2915	2920	Shale as above, almost $\frac{1}{2}$ limestone.
2920	2940	Limestone, white to very light gray, fine grained to sublithographic, Medium gray shale, light gray calcareous siltstone.
2945	2950	Shale, medium to dark gray and pale red. Limestone, white to very light gray, fine grained. White fibrous gypsum. Calcareous siltstone.
2950	2955	Shale as above, no gypsum.
2955	2965	Shale as above, iridescent shell fragments.
2965	2975	Shale, as above, no shell fragments. Few well rounded quartz grains.
2975	2985	Shale, medium to medium dark gray and pale red. White to very light gray dolomitic, argillaceous limestone.
2985	2990	Limestone, white to light gray, fine grained slightly argillaceous. Light to medium gray and pale red shale. Slight oil stain, no cut.
3000	3010	Limestone, very light to light gray, fine grained. Medium to medium dark gray and pale red shale.
3010	3020	Limestone, white to very light gray, fine grained. Small medium gray shale, shell fragments.
3025	3035	Limestone, white to light gray, fine grained, some dolomitic medium gray shale. Slight oil stain.
3035	3040	Limestone, white to very light gray, fine grained. Medium gray and pale red shale.
3040	3045	Limestone, white to very light gray, fine grained, pinpoint porosity and slight oil stains. Medium gray shale.
3045	3050	Limestone as above, no oil stain.

<u>From</u>	<u>To</u>	<u>Formation</u>
3050	3060	Limestone, very light to light gray, fine grained pinpoint porosity. Small amount medium gray shale.
3060	3070	Limestone as above, medium light gray, argillaceous limestone.
3070	3075	Limestone, white to very light gray. Small amount medium gray shale.
3075	3080	Limestone as above. Slight oil stain was able to get cut.
3080	3085	Limestone as above, oil stain, no cut.
3085	3090	Limestone, very light gray, fine grained and medium light gray, silicious.
3090	3095	Limestone, white to light gray oolitic to fine grained. Small medium gray shale.
3095	3100	Dolomite, medium light gray, fine to medium grained, good intergranular porosity, some very light gray oolitic limestone. Small medium gray shale.
3100	3125	Dolomite as above, no oolites.
3125	3160	Dolomite, very light gray, fine grained, good intergranular porosity. Some fine grained very light gray to white limestone.
3160	3165	Dolomite as above. Small amount medium gray shale.
3165	3170	Limestone, white to very light gray. Some very light calcareous dolomite and medium dark gray shale.
3170	3185	Limestone as above with a little pale red shale.
3185	3220	Limestone, very light gray to light gray, fine grained. Small medium gray and pale red shale.
3220	3235	Limestone as above, pinpoint porosity.
3235	3240	Dolomite, light gray, finely granular, intergranular porosity, calcareous. Limestone very light gray, slightly vuggy.
3240	3250	Limestone, white to very light gray, fine grained, pinpoint porosity. Small amount dolomitic.
3250	3260	Limestone as above, considerable medium gray shale.
3260	3265	Dolomite, very light gray, calcareous fine grained. Limestone, white to very light gray. Medium gray shale.
3265	3270	Limestone, white to very light gray, sublithographic to fine grained. Small amount dolomite and medium gray shale.
3270	3275	Limestone, white to very light gray, sublithographic, some pinpoint porosity.
	3279	1/4 hour circulation. Limestone, white to very light gray, sublithographic, slightly dolomitic, medium gray shale.
	3279	1/2 hour circulation. Dolomite, very light gray, fine grained, slightly calcareous, pinpoint porosity. Small amount medium dark gray shale.
3280	3285	Dolomite as above.
3285	3295	Dolomite as above. Small amount very light gray, fine grained limestone.
3295	3305	Limestone, white to very light gray, fine grained to sublithographic, argillaceous. Very light gray dolomite and medium gray shale.
3305	3310	Limestone as above, pale red shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3310	3320	Limestone as above, less red shale.
3325	3330	Limestone, very light to light gray, argillaceous, fine grained. Light to medium gray shale.
3330	3335	Dolomite, very light to light gray, fine grained. Small amount light gray limestone. Much medium gray shale.
3335	3340	Dolomite, very light to medium gray. Considerable medium gray shale, small very light gray limestone.
3340	3345	Shale, medium to medium dark gray and small amount pale red. White to very light gray, fine grained dolomite, small amount very light gray limestone.
3345	3350	Dolomite, light to medium light gray, fine grained, medium gray shale.
3350	3355	Dolomite as above, small amount very light gray, fine grain limestone.
3355	3370	Dolomite, light medium gray, fine grained. Very light gray, fine grained limestone. Medium gray shale.
3370	3375	Dolomite, very light to light gray, fine grained. White to very light gray, fine grained limestone, light to medium dark gray shale.
3375	3380	Limestone, light gray fine grained. Medium light gray dolomite, medium to medium dark gray and pale red shale.
3380	3385	Dolomite, very light to light gray, fine grained. Light to medium gray shale.
3385	3395	Dolomite, light gray, fine grained, very light gray, argillaceous limestone, medium gray shale.
3395	3405	Dolomite, white to medium light gray, fine grained. Some very light gray limestone. Medium gray shale, few medium quartz grains.
3405	3410	Dolomite, white to light gray, fine grained. Some very light gray limestone. Medium light gray siltstone. Medium gray shale.
3410	3415	Dolomite as above, no siltstone.
3415	3425	Dolomite, very light gray, fine grained, medium gray shale.
3425	3450	Dolomite, very light gray, fine grained. Some very light gray, fine grained limestone.
3455	3460	Siltstone, medium light gray, porous, very light gray dolomite.
3465	3475	Dolomite, medium light gray, fine grained, pinpoint porosity, some very light gray, fine grained limestone.
3485	3500	Dolomite, light pinkish gray, fine grained, pinpoint porosity.
3500	3505	Dolomite as above, very light pink limestone.
3505	3515	Limestone, white to very light pink, fine grained, pinpoint porosity, light pink gray dolomite.
3515	3520	Limestone, white to light pink, fine grained, intergranular porosity. Dolomite, light gray fine grained, intergranular porosity.
3520	3525	Dolomite, light gray to light pink, fine grained, intergranular porosity.

<u>From</u>	<u>To</u>	<u>Formation</u>
3525	3535	Limestone, very light to light gray, fine grained, pinpoint porosity, light gray dolomite, fine grained, intergranular porosity.
3535	3565	Dolomite, pale red, fine grained, pinpoint porosity. Small white limestone.
3565	3590	Dolomite, pale red, fine grained, pinpoint porosity, and intergranular porosity, small amount white fine grained limestone.
3590	3595	Dolomite as above, increase in white limestone.
3595	3605	Limestone, white to very light gray, fine grained. Pale red dolomite, medium gray shale.
3605	3610	Limestone as above, considerable medium gray shale, small amount clear, friable sandstone.
3610	3615	Limestone as above, no sand.
3615	3620	Limestone as above, more shale.
3620	3625	Limestone, very light gray to grayish pink. Light gray, fine grained dolomite, medium gray and pale red shale.
3625	3640	Limestone, pinkish gray, fine grained, subrounded, fine frosted sand grains.
3640	3645	Dolomite, light gray, fine grain, subangular to subrounded, fine to medium sand grains.
3645	3650	Dolomite, grayish pink, fine grained, calcareous, pale red argillaceous dolomite. Medium gray shale.
3650	3655	Dolomite as above. Considerable fine, subangular to subrounded, frosted to clear quartz grains.
3655	3660	Dolomite as above, no sand.
3660	3670	Dolomite as above.
3670	3695	Dolomite, pinkish gray, fine grained.
3695	3700	Dolomite as above, few fine to medium quartz grains.
3700	3705	Dolomite as above, little white, fine grained limestone.
3705	3725	Dolomite, very light to light gray, fine grained, intergranular porosity.
3725	3740	Dolomite as above, small amount very light gray limestone.
3740	3750	Dolomite, light gray, finely granular, pinpoint to intergranular porosity.
3750	3755	Dolomite, very light to light gray, finely granular. Almost $\frac{1}{2}$ gray shale.
3755	3770	Dolomite, very light gray, finely granular, pinpoint porosity.
3770	3775	Dolomite, white to very light gray, fine grain, dense and very light gray finely granular with pinpoint porosity.
3775	3790	Dolomite, white, fine grained, dense and small amount finely granular. White, sublithographic, limestone.
3790	3805	Dolomite as above, medium gray shale.
3805	3820	Dolomite, white to light gray, fine grained, dense.
3820	3825	Dolomite as above, small amount white fibrous gypsum.
3825	3840	Dolomite, white to very light gray, fine grained, dense.
3840	3845	Dolomite as above, small amount white fine grained limestone.
3545	3850	Dolomite as above, considerable medium gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
3860	3870	Dolomite, white to very light gray, fine grained dense. White sublithographic limestone.
3870	3875	Dolomite as above, pale red shale.
3875	3880	Dolomite as above, more pale red shale.
3880	3885	Shale, pale red, white sublithographic limestone, white to very light gray dolomite.
3885	3895	Dolomite, white to very light gray, fine grained, dense, White sublithographic limestone, pale red shale.
3895	3900	Limestone, white, sublithographic, white to very light gray dolomite, pale red shale.
3900	3905	Dolomite, white, fine grained, dense, pale red shale.
3905	3910	Dolomite, white to very light gray, fine grained dense, limestone, white, sublithographic, medium gray and pale red shale.
3910	3920	Dolomite as above, few fine, subrounded, clear quartz grains.
3920	3930	Dolomite, white to very light gray, finely granular to dense. Limestone, white sublithographic. Medium gray shale.
3930	3955	Dolomite as above, pale red shale.
3955	3965	Dolomite, very light gray, fine grained, pinpoint porosity, white fine grained limestone, medium gray shale.
3965	3970	Dolomite as above, pale red shale.
3970	3975	Dolomite as above, few free quartz grains.
3975	3995	Dolomite, white, fine grained, dense to finely granular.
3995	4015	Dolomite as above, some medium gray shale.
4015	4030	Dolomite, white, fine grained, dense.
4030	4055	Dolomite as above, slightly iron stained, some medium gray and pale red shale.
4055	4060	Dolomite as above, few free fine subrounded quartz grains.
4060	4065	Dolomite, grayish pink, fine grained, some slightly arenaceous.
4065	4070	Dolomite as above, not arenaceous, light gray siltstone.
4070	4075	Dolomite, white to pinkish gray, fine grained, dense, medium gray shale.
4075	4090	Dolomite, as above, some very arenaceous.
4090	4100	Dolomite, white to pinkish gray, finely granular, some arenaceous.
4100	4105	Dolomite as above, showing pinpoint porosity.
4105	4125	Dolomite, white to very light gray, finely granular, pinpoint porosity.
4125	4140	Dolomite as above, considerable medium gray shale.
4140	4145	Dolomite, white to light gray, finely granular. White to very light gray, fine grained limestone. Fine grained, frosted, subrounded quartz. Medium gray shale.
4145	4150	Dolomite as above, no quartz.
4150	4155	Dolomite as above, some free quartz.
4155	4160	Dolomite as above, increase in shale.
4160	4165	Dolomite, white to light gray, finely granular to dense. Very light gray, fine grained limestone, fine subangular quartz.

<u>From</u>	<u>To</u>	<u>Formation</u>
4165	4175	Shale, medium dark gray, very light to light gray finely granular dolomite, some free quartz.
4175	4180	Dolomite, white to light gray, fine grained dense to finely granular. Medium to medium dark gray shale, some free quartz.
4180	4190	Shale, medium to medium dark gray, very light to light gray, fine grained dolomite.
4195	4200	Limestone, white to very light gray, sublithographic, small amount very light gray dolomite and medium dark gray shale.
4200	4220	Limestone, white to very light gray, sublithographic.
	4220	1/4 hour circulation. Dolomite, white to very light gray, finely granular, pinpoint porosity. Limestone, white, sublithographic.
	4220	1/2 hour circulation. Dolomite, white, finely granular, pinpoint porosity.
	4220	3/4 hour circulation. Dolomite as above.
	4220	50 minutes circulation. Dolomite as above.
4220	4225	Dolomite as above.
4225	4230	Dolomite as above, small amount white fine grained limestone.
4230	4235	Dolomite, white to light gray, finely granular to dense, pinpoint porosity, some slightly calcareous. White fine grained limestone.
4235	4240	Limestone, white to very light gray, fine grained dolomitic, pinpoint porosity.
4240	4250	Limestone, white to very light gray, fine grained, pinpoint porosity, slightly dolomitic.
4250	4255	Limestone as above, no pinpoint porosity.
4255	4280	Dolomite, white, fine grained, dense.
4280	4295	Dolomite as above, pinpoint porosity.
4295	4305	Dolomite as above, white, fine grained limestone.
4305	4335	Dolomite as above, no porosity.
4335	4340	Dolomite as above, some pinpoint porosity.
4340	4350	Limestone, white, fine grained. Some white fine grained dolomite.
4350	4360	Limestone, white, fine grained, pinpoint porosity. White fine grained dolomite.
4365	4375	Limestone, same as above.
4375	4425	Limestone as above, no dolomite.
4425	4430	Limestone as above, brachiopods and bryozoans.
4430	4460	Limestone as above, no fossils.
4460	4465	Limestone, white, fine grained.
4465	4470	Limestone as above, some finely granular, very light gray dolomite.
4470	4485	Limestone, white to very light gray, finely granular dolomitic,
4500	4540	Dolomite, very light gray, finely granular, pinpoint porosity, some white fine grained limestone.
4540	4545	Dolomite as above. Considerable white fine grained limestone.
4545	4560	Limestone, white, fine grained. Considerable white to light gray, finely granular dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
4560	4565	Shale, light bluish gray (cave?), white, fine grained limestone and white, fine grained dolomite.
4565	4570	Limestone, white, fine grained. Very light gray, finely granular dolomite. Light bluish gray shale.
4570	4585	Dolomite, very light gray, fine grained. Some white fine grained limestone. Light bluish gray shale.
4585	4605	Limestone, white, fine grained, very light, fine grained dolomite. Bluish gray shale.
4605	4625	Limestone as above, no dolomite.
4625	4640	Limestone as above, considerable medium gray shale.
4650	4655	Limestone as above, some white, fine grained dolomite.
4655	4710	Limestone, white, fine grained.
4710	4720	Limestone, white to very light gray, fine grained.
4730	4735	Limestone as above, medium gray shale.
4735	4740	Limestone as above, brachiopod, bryozoans, and coral fragments, medium gray and pale red shale.
4740	4750	Limestone, white to light gray, fine grained. Bryozoans and crinoid stem segments. Medium gray shale. Few fine subrounded quartz grains.
4750	4755	Limestone as above, increasing amount of medium gray shale and small amount pale red shale.
4760	4765	Limestone, white to light gray, fine grained. Fine grained subrounded to subangular, frosted to clear quartz. Crinoidal. Medium gray shale.
	4768	Circulation. Same as above.
4765	4775	Shale, medium gray to greenish gray. White fine grained limestone. Pinkish gray finely granular dolomite, pyritic, crinoid stem segments.
4775	4800	Shale as above, more shale.
4800	4810	Shale, medium light to medium gray. Small amount fine grained limestone.
4810	4815	Shale, greenish gray. Some fine, subangular to subrounded, frosted quartz grains. Small amount white limestone.
4815	4830	Shale as above, no quartz.
	4832	Circulation. Shale, medium light to greenish gray. Fine to medium, subangular, frosted quartz grains. White to light gray limestone.
4830	4832	Same as circulation.
4832	4835	Shale, greenish gray, medium light gray and pale red.
4835	4845	Shale as above, more pale red.
4860	4865	Shale, greenish gray and pale red.
4865	4870	Shale, greenish gray.
4875	4885	Shale as above, small amount white limestone and pale red dolomite.
4885	4890	Shale as above, fine to medium subangular to subrounded, frosted to clear, quartz grains.
4910	4915	Sandstone, fine to medium, subrounded, frosted grains. Greenish gray shale.
4930	4935	Shale, medium light gray to grayish green. Sandstone as above.
4935	4940	3/4 hour circulation. Sandstone, fine, subrounded, slightly frosted grains. Medium light gray and greenish gray shale.
	4949	Total Depth.