

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 28

Summary of the Deep Rock-Stanolind-J. Brusich #1 Slope County, North Dakota

By Morton Strassberg

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The Deep Rock-Stanolind-J. Brusich. No. 1, Slope County, North Dakota, C SE 1/4 SE 1/4 Section 8, T. 135N. R. 98W. (660 feet from south line, 660 feet from east line). Elevation: K.B. 2503, G.L. 2792.

The Deep Rock-Stanolind-J. Brusich No. 1 was spudded August 20, 1952, and 13 3/8 inch casing was set at 721 feet.

The drilling was completed January 25, 1953 and the well abandoned. Total depth 11,521. Fifteen sack cement plugs were set at the following places:

11,045-75
10,361-91
9,735-65
5,925-55

Seven inch casing was run to 8,688 feet and cemented with 200 sacks of cement. The casing string was composed of 1385 feet 7 inch 26# N-80, 2421 feet 7 inch 23# N-80, 4938 feet 7 inch 23# J-55 casing. The following intervals were tested after setting casing, without obtaining commercial production and were squeezed off: 8592-8600; 8579½-87½'; 8552-75', 8420-48'. Casing was pulled from 3721 feet, a 15 sack cement plug set in top 7 inch stub at 3700 feet, a 15 sack cement plug set in bottom of 13 3/8 inch surface pipe at 712-724 feet, and a 15 sack cement plug placed in top 13 3/8 inch surface casing.

Cores

#1 8455-8505
#2 8522-8569
#3 8570-8619
#4 8620-8670
#5 8670-8720
#6 8720-8770
#7 8770-8788
#5 8788-8793
#9 8794-8842

Drill Stem Tests

DST #1 4974-5003'

Open 33 S.I. 20. Recovered 2985' fluid (100' mud, recovered fresh water salt 1400 PPM). BHpF 950-1475 S.I. 1855 Hydro S.2560.

DST #2 6168-6194'
 Open 1 hour 20 minutes. S.I. 20 recovered 40'. Drilling mud. No show.
 FPO 1900 Hydro S. 3450.

DST #3 7910-7932'
 Open 1 1/4 hours. S.I. 20 recovered 40'. Drilling mud. FPO S.I. 2750
 Hydro 4500.

DST #4 8420-8450'
 Open 3 hours. S.I. 40 1000' cushion recovered 517'. Slightly oil and gas
 cut mud. Oil (26-30 grav.) black. IPF 775 final 950 S.I. 3425 Hydro
 4500.

DST #5 8463-8505'
 1000' cushion. Open 3 hours. S.I. 30 recovered 60' slightly oil cut mud.
 I. flow 530, final 530 S.I. 1150 Hydro 4850.

DST #6 8566-8619'
 Open 1 hour. S.I. 30 recovered 3585 feet of fluid:
 275 feet, slightly gas cut mud.
 700 feet, heavily oil and gas cut mud.
 1164 feet, slightly oil and gas cut muddy water.
 1446 feet, gas cut water.
 BHP flow 600-1725. S.I. 3675 Hydro 4875.

DST #7 8579-8607'
 TD 8620 Straddle Packer and Btn Packer failed. Open 2 hours. S.I. 30
 recovered 8070 feet fluid.
 30 feet, slightly oil and heavily gas cut mud.
 2160 feet, slightly oil and heavily gas cut muddy water.
 3600 feet, heavily oil and gas cut water.
 1160 feet, slightly oil and gas cut water.
 1110 feet, slightly gas cut water.
 IFP 1100
 FFP 3500 S.I. 3700 Hydro 4875.

DST #5 9757-9802'
 Open 1/2 hour. S.I. 30 1500' water cushion recovered 620' slightly gas
 cut muddy salty water. 208,000 PPM, FP 800-975 S.I. O, HP 5400.

DST #9 9905-9936'
 Open 1 1/2 hours. Recovered 1500' water cushion. 945 feet slightly
 muddy, slightly salty gas cut water. FP 850-1175 S.I. 4175 Hydro S.
 5700.

DST #10 11096-11195'
 1/2 DCH. Open 1 1/2 hours. Recovered 3000 feet of water cushion, 2070 feet
 black sulfurous water, 630 feet mud cut sulfurous water, 540 feet mud.
 BHPF 2700 psig. No BHP, S.I. obtainable.

Tests After Setting 7" Oil String

With 7" casing set at 8688 feet, the following intervals were tested
 without obtaining commercial production.

- Zone 1 8592-8600' Swab 373 Barrels fluid 4% oil in 24 hours zone squeezed with 40 sacks cement.
- Zone 2 8579 ½-8587 ½' Swab 278 Barrels fluid, 15% oil in 24 hours zone squeezed with 28 sacks cement.
- Zone 3 8552-8587' Swab 35 Barrels fluid scum oil 18 hours zone squeezed with 28 sacks cement.
- Zone 4 8420-8448 ½' after acidizing with 2000 gallons, swab 50 barrels fluid with oil scum.

Formation tops were determined from drilling samples, core chips and electric, micro and radioactivity logs. Colors determined from rock color chart.

Formation Tops

<u>Formation</u>	<u>Depth</u>
Cretaceous System	
Pierre Formation	1730
Niobrara Formation	3792
Greenhorn Member	4380
"Muddy"	4955
Dakota	5260
Jurassic System	
Morrison Formation	5472
Sundance Formation	5550
Piper Formation	6165
Triassic System	
Spearfish Formation	6430
Permian System	
Minnekahata Formation	6880
Opeche Formation	6920
Pennsylvanian System	
Minnelusa System	7060
Mississippian	
Amsden Formation	7208
Big Snowy Group	7395
Kibby Formation	7800
Charles Formation	8030
Mission Canyon Formation	8572
Lodgepole Formation	8965
Bakken Formation	9535
Devonian System	
Three Forks Formation	9585
Nisku Formation	9730
Duperow Formation	9800
Souris River Formation	10,050
Elk Point Group	10,200
Ashern Formation	10,360
Silurian System	
Interlake Group	10,372
Ordovician System	

	<u>Depth</u>
Upper Stony Mtn.	10,854
Lower Stony Mtn.	10,980
Red River Formation	11,054
Total Depth	11,521

<u>From</u>	<u>To</u>	<u>Formation</u>
70	80	Shale, medium gray. Medium grained, subangular iron stained quartz.
80	90	Shale, same as above. Coal.
90	100	Shale, same as above, little quartz.
100	110	Shale, medium light gray.
110	120	Shale, same as above, few medium quartz grains.
120	140	Shale, same as above, no quartz.
140	150	Shale, same as above, fine grained quartz.
150	170	Shale, light gray and coal.
170	180	Shale, medium light gray.
180	210	Shale, same as above, very fine grained sandstone.
210	230	Sandstone, very fine to fine grained, subangular, frosted.
270	280	Shale, medium light gray and pale red.
290	300	Shale, medium light gray.
300	330	Shale, medium light gray.
330	360	Shale, medium light gray.
360	370	Shale, dark gray.
370	410	Shale, medium light to dark gray.
410	430	Shale, dark gray.
430	470	Shale, light gray.
470	480	Shale, dark gray.
480	500	Coal, black.
500	510	Shale, medium to dark gray.
510	520	Shale, medium dark gray.
520	530	Shale, light to medium gray.
530	540	Shale, medium to medium dark gray.
540	610	Shale, light gray.
610	620	Shale, light to medium dark gray shale.
620	640	Shale, medium light gray. Very fine grained sandstone.
640	650	Shale, medium light gray. Very fine to medium grained sandstone.
650	690	Shale, medium gray.
690	700	Shale, medium gray to pale red.
700	710	Shale, same as above. Fine grained quartz.
710	730	Sandstone, very fine grained argillaceous.
730	770	Shale, medium light gray.
770	780	Shale, medium light gray. Very fine grained sandstone.
780	790	Sandstone, very fine to fine grained, argillaceous.
790	830	Shale, medium to medium dark gray, arenaceous.
830	840	Shale, medium gray.
840	850	Shale, medium gray.
850	870	Shale, medium gray, arenaceous.
870	890	Shale, dark gray.
890	900	Sandstone, very fine grained argillaceous.
900	910	Shale, medium light gray.
910	950	Shale, medium gray.

<u>From</u>	<u>To</u>	<u>Formation</u>
950	960	Shale, dark gray.
960	970	Shale, medium light gray.
970	980	Shale, same as above, arenaceous.
980	990	Shale, medium dark to dark gray.
990	1000	Shale, medium to medium dark gray arenaceous.
1000	1030	Shale, medium to medium dark gray.
1030	1040	Shale, same as above, very fine grained sandstone.
1040	1060	Shale, black, carbonaceous.
1060	1070	Limestone, medium light to medium gray, arenaceous argillaceous.
1070	1080	Shale, medium gray, arenaceous.
1080	1090	Bentonite, medium light gray, arenaceous.
1090	1100	Shale, medium to dark gray. Very fine grained quartz.
1100	1110	Bentonite, medium light gray, arenaceous.
1110	1120	Shale, medium gray.
1140	1150	Bentonite, medium light gray, arenaceous.
1150	1170	Sandstone, very fine to fine grained, bentonitic.
1170	1180	Shale, dark gray.
1180	1210	Shale, medium to medium dark gray. Very fine grained quartz.
1210	1230	Shale, medium gray.
1230	1250	Shale, medium to medium dark gray. Medium gray, medium grained, arenaceous limestone.
1250	1270	Shale, medium to medium dark gray.
1270	1280	Sandstone, very fine to fine grained, calcareous.
1280	1310	Limestone, medium gray, arenaceous, argillaceous.
1310	1320	Shale, medium to medium dark gray, calcareous.
1320	1330	Shale, medium to medium dark gray bentonitic.
1330	1350	Shale, same as above, slightly calcareous.
1350	1380	Shale, medium to brownish gray, bentonitic, arenaceous.
1380	1390	Shale, light olive gray, arenaceous.
1394	1445	Sandstone, very fine grained, argillaceous.
1445	1475	Shale, medium to medium dark gray. Very fine grained sandstone.
1470	1505	Sandstone, very fine to fine grained. Medium dark gray shale.
1505	1566	Shale, medium to medium dark gray. Very fine grained sandstone.
1566	1626	Shale, medium to medium dark gray shale, bentonitic. Very fine grained sandstone.
1626	1656	Shale, medium gray, bentonitic, arenaceous.
1656	1686	Sandstone, very fine. Medium to medium dark gray shale.
1686	1716	Shale, light to medium gray. Very fine grained sandstone.
1716	1747	Shale, medium light to medium gray, bentonitic.
1747	1776	Shale, same as above. Very fine grained calcareous sandstone.
1776	1806	Shale, olive gray to brownish gray.
1806	1835	Shale, olive gray. Very fine grained calcareous sandstone.
1835	1866	Shale, medium gray, arenaceous.
1866	1897	Shale, medium dark gray.
1897	1957	Shale, medium dark gray, bentonitic.
1957	1986	Shale, medium dark to dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
1986	2018	Shale, dark gray.
2018	2047	Shale, medium dark gray.
2047	2079	Shale, dark gray.
2079	2109	Shale, medium dark gray. Very light gray bentonite.
2109	2139	Shale, medium dark to dark gray.
2139	2169	Shale, medium to medium dark gray.
2169	2199	Shale, medium dark gray.
2199	2220	Shale, dark gray.
2220	2250	Shale, medium dark to dark gray.
2250	2280	Shale, medium gray.
2280	2319	Shale, dark gray.
2319	2349	Shale, medium gray, bentonitic.
2349	2470	Shale, medium to medium dark gray.
2470	2501	Shale, medium gray.
2501	2531	Shale, medium to medium dark gray.
2531	2560	Shale, medium gray.
2560	2620	Shale, medium dark gray, bentonitic.
2620	2630	Shale, medium to medium dark gray.
2630	2640	Shale, medium dark gray. White fine grained, argillaceous limestone.
2640	2650	Shale, same as above, more limestone.
2650	2710	Shale, medium to medium dark gray. White fine grained limestone.
2710	2720	Shale, medium gray.
2720	2750	Shale, same as above, very fine grained white limestone.
2750	2780	Shale, same as above, no limestone.
2780	2800	Shale, medium gray and light olive gray. White fine grained limestone.
2800	2810	Shale, medium to medium dark gray.
2810	2850	Shale, medium and light brownish gray.
2850	2870	Shale, medium gray.
2870	2910	Shale, medium to medium dark gray.
2910	2950	Shale, medium gray.
2950	2960	Shale, medium to medium dark gray.
2960	3000	Shale, medium gray.
3000	3030	Shale, medium light to medium gray.
3030	3070	Shale, medium to medium dark gray.
3070	3080	Shale, light olive to medium gray.
3080	3090	Shale, medium to medium dark gray.
3090	3160	Shale, medium to medium dark gray.
3160	3300	Shale, medium gray,
3300	3340	Shale, medium to medium dark gray.
3340	3390	Shale, medium dark gray. White bentonite.
3390	3430	Shale, medium to medium dark gray.
3430	3440	Shale, medium to medium dark gray, shell fragments.
3440	3470	Shale, medium to brownish gray.
3470	3500	Shale, medium gray.
3500	3510	Shale, medium to medium dark gray.
3510	3540	Shale, medium to medium dark gray and brownish gray. White bentonite.
3540	3600	Shale, medium to medium dark gray.
3600	3620	Shale, medium to medium dark and light olive gray.

<u>From</u>	<u>To</u>	<u>Formation</u>
3620	3640	Shale, medium to medium dark gray and brownish gray.
3640	3650	Shale, medium dark gray,
3650	3660	Shale, medium to dark and light olive gray.
3660	3670	Shale, medium to dark gray.
3670	3710	Shale, medium to medium dark gray.
3710	3720	Shale, medium dark gray. White bentonite.
3720	3740	Shale, medium to medium dark gray.
3740	3770	Shale, medium to medium dark gray.
3770	3830	Shale, same as above, white bentonite.
3830	3850	Shale, medium gray.
3850	3880	Shale, medium to medium dark gray, white specks.
3880	3890	Shale, medium to medium dark gray.
3890	3920	Shale, medium to medium dark gray, white specks.
3920	3930	Shale, same as above, no specks.
3930	3950	Shale, medium to medium dark gray.
3950	3990	Shale, medium to medium dark gray, some slightly calcareous.
3990	4030	Shale, medium to medium dark gray and brownish gray.
4030	4040	Shale, medium to medium dark gray, white specks.
4040	4070	Shale, medium to medium dark gray.
4070	4080	Shale, medium gray.
4080	4090	Shale, medium gray.
4090	4100	Shale, medium to medium dark gray.
4100	4150	Shale, same as above, slightly calcareous.
4150	4180	Shale, medium to medium dark gray, bentonitic.
4180	4190	Shale, medium gray.
4190	4200	Shale, medium to medium dark gray.
4200	4210	Shale, medium gray.
4210	4230	Shale, medium to medium dark gray.
4240	4260	Shale, medium to medium dark gray.
4260	4270	Shale, medium gray.
4270	4280	Shale, medium to medium dark and light olive gray.
4280	4290	Shale, medium gray, bentonitic.
4290	4300	Shale, medium to medium dark gray.
4300	4320	Shale, medium gray bentonitic.
4320	4330	Shale, medium to medium dark gray.
4330	4340	Shale, medium to medium dark and light olive gray.
4340	4360	Shale, medium to medium dark gray.
4360	4370	Shale, same as above, bentonitic.
4370	4380	Shale, medium dark gray.
4380	4400	Shale, medium to medium dark gray, bentonitic.
4400	4410	Shale, medium gray, bentonitic.
4410	4430	Shale, medium dark gray. Medium gray fine grained limestone.
4430	4440	Shale, medium to medium dark gray. Medium gray, argillaceous, fine grained limestone.
4440	4450	Limestone, medium gray, fine grained, argillaceous. Medium to medium dark gray shale.
4450	4460	Shale, medium to medium dark gray, white specks. Medium to medium light gray argillaceous limestone.
4460	4470	Shale, medium dark gray. Medium light gray fine grained argillaceous limestone.
4470	4480	Shale, medium to medium dark gray. Medium to medium light gray fine grained argillaceous limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
4480	4520	Shale, medium dark gray. Medium gray, fine grained, argillaceous limestone.
4520	4530	Shale, medium to medium dark gray, calcareous.
4530	4540	Shale, medium gray, slightly calcareous. Medium light gray limestone.
4540	4550	Shale, medium to medium dark and light brownish gray.
4550	4560	Shale, medium gray.
4560	4580	Shale, medium gray, calcareous.
4580	4590	Shale, medium to medium dark gray, calcareous, bentonitic.
4590	4610	Shale, medium to medium dark gray, partially calcareous.
4610	4650	Shale, medium to dark gray. Medium gray, argillaceous limestone.
4650	4660	Shale, medium gray bentonitic.
4660	4700	Shale, medium to medium dark gray, bentonitic. Medium gray argillaceous limestone.
4700	4710	Shale, medium to medium dark gray, bentonitic.
4710	4740	Shale, same as above, Medium light gray fine grained limestone.
4740	4760	Shale, medium to medium dark gray.
4760	4770	Shale, medium dark gray, bentonitic.
4770	4780	Shale, medium light to medium dark gray, bentonitic.
4780	4790	Shale, medium dark gray.
4790	4800	Shale, medium to medium dark gray.
4800	4810	Shale, medium dark gray.
4810	4830	Shale, medium to medium dark gray.
4830	4850	Shale, medium to, medium dark gray, bentonitic.
4850	4870	Shale, medium dark gray.
4870	4910	Shale, same as above, bentonitic.
4910	4920	Shale, medium dark gray.
4920	4950	Shale, medium dark gray bentonitic.
4950	4970	Shale, medium to medium dark gray.
4970	4980	Shale, medium dark gray and pale yellow brown.
4980	5000	Shale, medium to medium dark gray. Very fine grained sandstone.
5000	5010	Shale, medium dark gray.
5010	5020	Shale, medium dark gray. Very fine grained sandstone.
5020	5030	Shale, same as above. Increase in sandstone.
5030		Circulation 90 minutes. Sandstone, white, very fine grained. Medium dark gray shale.
5030	5040	Shale, medium dark gray. Very fine grained sandstone.
5040	5050	Shale, medium dark gray. Very fine grained sandstone.
5050	5060	Sandstone, white, very fine grained. Medium dark gray shale.
5060	5070	Shale, medium gray. Very fine grained white sandstone.
5070	5100	Shale, medium dark gray. Very fine grained sandstone.
5100	5110	Shale, medium dark gray.
5110	5120	Shale, medium dark gray and medium light gray, bentonitic.
5120	5130	Shale, medium dark gray. Very fine grained sandstone.
5130	5140	Shale, medium dark gray.
5140	5150	Shale, medium dark gray. Small amount medium dark gray, very fine grained sandstone.
5150	5190	Shale, medium dark gray. Very fine to fine grained sandstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
5190	5240	Shale, medium dark gray. Fine grained argillaceous sandstone.
5240	5260	Shale, medium dark gray.
5260	5270	Shale, medium to medium dark gray.
5270	5280	Shale, medium dark gray. Very fine grained sandstone, pyrite.
5280	5290	Shale, same as above, no pyrite.
5290	5330	Shale, medium dark gray. Little very fine grained sandstone.
5330	5340	Shale, medium dark gray. Iron stained siltstone concretions and very fine grained sandstone.
5340	5350	Shale, medium dark and light brownish gray. Considerable iron stained siltstone concretions.
5350	5400	Shale, medium dark gray. Very fine grained sandstone and few siltstone concretions.
5400	5410	Shale, same as above, less sandstone and concretions.
5410	5450	Shale, medium dark to dark gray. Little very fine grained sandstone and iron stained siltstone concretions.
5450	5460	Shale, same as above. Very little sandstone and no concretions.
5460	5470	Shale, medium dark to dark gray. Little very fine grained sandstone.
5470	5480	Shale, medium to medium dark gray.
5480	5490	Shale, medium dark gray. Very fine to fine grained sandstone, few iron stained concretions.
5490	5510	Shale, medium to medium dark gray.
5510	5520	Shale, same as above, few free quartz grains.
5520	5540	Shale, medium to medium dark gray. Few free quartz grains and very fine grained sandstone.
5540	5560	Shale, medium dark gray. Very fine grained sandstone.
5560	5600	Shale, medium dark gray. Very fine grained sandstone and few medium sized quartz grains.
5600	5610	Shale, same as above, very little sandstone.
5610	5630	Shale, medium to medium dark gray. Little fine grained sandstone and few free quartz grains.
5630	5650	Shale, same as above, no free quartz.
5650	5680	Shale, medium dark gray and moderate brown, very fine grained calcareous sandstone.
5680	5690	Shale, medium dark gray. Considerable very fine grained calcareous sandstone. Little medium light gray fine grained limestone.
5690	5710	Shale, same as above, no limestone.
5710	5730	Shale, medium to medium dark gray. Little calcareous siltstone.
5730	5740	Shale, medium dark gray. Very fine grained calcareous sandstone and calcareous siltstone. Few fine grains of quartz.
5740	5760	Shale, medium dark to dark gray. Considerable very fine calcareous sandstone and free fine, subangular, quartz grains.
5760	5810	Shale, same as above, no free quartz.
5810	5860	Sandstone, white very fine grained, calcareous. Medium dark to dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
5860	5870	Shale, medium to medium dark. Very fine grained calcareous sandstone.
5870	5880	Shale, same as above, few free quartz grains.
5880	5890	Sandstone, white, very fine grained. Medium to medium dark gray shale.
5890	5930	Sandstone, very fine grained, calcareous, sandstone. Medium dark gray shale.
5930	5940	Shale, medium dark to dark gray. Very fine grained, calcareous sandstone.
5940	5960	Sandstone, very fine grained, calcareous. Medium dark gray shale.
5960	5970	Sandstone, same as above. Dark gray shale.
5970	5980	Sandstone, white to slightly iron stained, very fine grained.
5980	6020	Shale, dark gray. Very fine grained calcareous sandstone.
6020	6060	Shale, medium to dark gray. Little light gray, silty fine grained limestone.
6060	6080	Shale, medium to dark gray. Light gray very fine grained limestone.
6084	6110	Circulation 1 hour. Limestone, medium light gray, silty, argillaceous, very fine grained. Shale, dark gray.
6110	6120	Limestone, pale red to pale yellowish brown, fine grained, silty, argillaceous. Dark gray shale.
6120	6150	Shale, pale red, calcareous, silty.
6150	6160	Shale, dark gray and pale red calcareous.
6160	6170	Shale, pale red to moderate red, calcareous. Little white anhydrite.
6170	6180	Shale, dark gray.
6189		Circulation 2 hours. Limestone, pale to moderate red, very fine grained. Dark gray shale.
6180	6190	Shale, medium dark to dark gray. Light gray to pale red limestone.
6194		Circulation 4 hours. Shale, pale red, calcareous and medium dark gray.
6200	6210	Shale, same as above.
6210	6220	Shale, same as above. White, fine grained, dense dolomite. White anhydrite.
6220	6230	Dolomite, white to very light gray, fine grained dense. Pale red calcareous and medium dark gray shale.
6230	6250	Dolomite, same as above. Few free medium sized quartz grains.
6250	6260	Shale, medium to medium dark gray. Little medium, light gray fine grained limestone.
6260	6270	Shale, medium dark gray. Medium light gray fine grained, limestone.
6270	6280	Shale, pale reddish brown calcareous and medium dark gray. White to very light gray fine grained dense limestone.
6280	6300	Shale, moderate red, slightly calcareous.
6300	6310	Dolomite, very light to light gray, fine grained.
6310	6320	Shale, medium dark gray and moderate red. Little very light gray limestone.
6320	6330	Shale, moderate red to medium dark gray. Little moderate red chert and white anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
6330	6350	Shale, moderate red.
6350	6360	Shale, moderate red, slightly calcareous.
6360	6370	Shale, medium dark gray and moderate red.
6370	6390	Shale, moderate red and medium dark gray.
6390	6400	Sandstone, moderate red, argillaceous, calcareous.
6400	6410	Shale, medium dark gray and moderate red.
6410	6430	Sandstone, moderate red, very fine grained, calcareous argillaceous. Medium dark gray and moderate red shale.
6430	6440	Shale, medium dark gray to moderate red. Moderate red, very fine grained, calcareous argillaceous sandstone.
6440	6450	Shale, same as above, fine, well rounded quartz.
6460	6480	Shale, same as above.
6480	6490	Shale, moderate red, slightly calcareous and medium dark gray.
6490	6500	Shale, moderate red and medium dark grey. Few free, fine, well rounded quartz grains.
6500	6510	Shale, medium dark to light olive gray and moderate red.
6507		Circulation 2 hours. Shale, pale red to medium dark gray, white anhydrite.
6510	6520	Shale, medium dark and light olive gray.
6520	6580	Shale, medium to medium dark gray and moderate red.
6580	6590	Shale, same as above, white anhydrite.
6590	6630	Shale, same as above, pale red fine to very fine sandstone.
6630	6650	Shale, moderate red and medium dark gray. Fine, free, subangular, iron stained, quartz.
6650	6690	Shale, medium dark gray and moderate red calcareous.
6690	6710	Shale, moderate reddish orange, calcareous.
6710	6720	Shale, same as above. Crystalline aragonite.
6720	6810	Shale, moderate reddish orange and medium dark gray. Very fine sandstone and fine free quartz.
6810	6850	Shale, moderate red and medium dark gray very fine grained sandstone.
6850	6880	Shale, pale reddish brown. Very fine grained sandstone.
6880	6890	Shale, same as above, white anhydrite.
6890	6900	Shale, moderate red and dark gray shale. White fine dolomite. White anhydrite.
6900	6930	Limestone, white to iron stained, fine grained dense. Medium dark gray and pale red shale.
6930	6950	Limestone, iron stained, fine grained. Moderate red shale.
6950	6990	Shale, moderate red. Iron stained fine grained limestone.
6990	7010	Dolomite, moderate reddish orange, fine grained, argillaceous.
7010	7020	Dolomite, pale reddish brown, argillaceous. Pale red shale.
7020	7040	Sandstone, pale reddish brown, very argillaceous, calcareous, very fine grained.
7040	7060	Sandstone, same as above, considerable free, fine rounded quartz.
7660	7070	Sandstone, same as above. Pale reddish brown dolomite.
7070	7080	Dolomite, light red, fine grained. Very fine grained sandstone.
7080	7090	Dolomite, light red, finely granular. Medium dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
7090	7100	Dolomite, same as above, no shale.
7100	7110	Shale, medium gray.
7110	7120	Shale, medium dark gray. Pale red dolomite.
7120	7170	Shale, medium to medium dark gray. Light red dolomite.
7170	7200	Sandstone, moderate pink, argillaceous, very fine grained. Medium dark gray shale.
7200	7210	Shale, medium to medium dark gray. Moderate pink, very fine grained sandstone. Moderate pink dolomite.
7210	7230	Dolomite, pale red, fine grained, dense. Medium dark gray shale.
7230	7240	Dolomite, same as above, fine to medium grained free quartz.
7240	7250	Sandstone, iron stained, very fine grained, argillaceous. Pale red dolomite. Medium dark gray shale.
7250	7260	Dolomite, white to very light gray to iron stained.
7260	7270	Shale, medium to medium dark gray.
7270	7280	Sandstone, very fine, iron stained, friable, considerable fine to medium free quartz. Medium dark and pale red shale.
7280	7290	Dolomite, white to very light gray, fine grained dense. Very fine grained sandstone.
7290	7300	Dolomite, very light gray to iron stained, fine grained dense. Medium dark gray shale.
7300	7310	Dolomite, very light gray to iron stained, fine grained dense to finely granular.
7310	7320	Shale, medium dark to dark gray and pale red.
7320	7330	Shale, medium to medium dark gray.
7330	7340	Shale, medium dark gray and pale red. Very fine grained sandstone. Light gray fine grained dolomite.
7340	7350	Dolomite, pinkish gray, fine grained, dense.
7350	7360	Dolomite, light to pinkish gray, fine grained, dense.
7360	7370	Dolomite, very light to light gray and pale reddish brown argillaceous, fine grained.
7370	7390	Shale, medium to medium dark gray. Light gray to pale reddish brown dolomite.
7393		Circulation 1/2 hour. Dolomite, very light to light and pinkish gray, fine grained pinkish dolomite. Fine grained free quartz. Medium dark gray and pale red shale.
7390	7400	Dolomite, same as above.
7400	7410	Dolomite, medium light to light gray dolomite, fine grained. Medium dark gray shale.
7410	7420	Dolomite, light to medium light gray, very fine grained.
7420	7430	Shale, medium to medium dark and light olive gray. Medium light gray, fine grained dolomite.
7430	7450	Dolomite, light to very light gray dolomite, fine grained. Very fine grained sandstone. Medium to medium dark gray and pale red shale.
7450	7470	Dolomite, very light gray fine grained. Pale reddish brown shale.
7470	7500	Shale, medium to medium dark gray and pale red. Light to very light gray fine grained dolomite.
7500	7530	Dolomite, medium light to light gray, fine grained dense. Medium dark gray and pale red shale.
7530	7570	Dolomite, medium to medium light gray, fine grained, dense dolomite. Medium dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
7570	7580	Dolomite, same as above, pale red calcareous shale.
7580	7590	Limestone, medium gray fine grained dense.
7590	7610	Shale, pale red. Very light to medium gray, fine grained, dense limestone.
7610	7630	Shale, medium dark to brownish gray. Medium light gray, fine grained limestone.
7630	7660	Shale, medium dark to dark gray. Medium to medium light gray fine grained limestone.
7660	7680	Shale, medium to medium dark gray. Little medium gray fine grained limestone.
7680	7700	Shale, medium dark to dark gray and moderate red.
7700	7710	Shale, medium to dark gray and moderate red calcareous. Black pellets and ostracods.
7710	7720	Shale, medium dark to dark gray. Pale reddish brown, argillaceous dolomite. Black pellets.
7720	7730	Limestone, white, very fine grained, dense. Pale reddish brown dolomite. Black pellets.
7730	7760	Limestone, white, fine grained, dense. Pale reddish brown dolomite. Dark gray shale.
7760	7790	Limestone, medium light gray, fine grained. Medium gray fine grained dolomite.
7790	7800	Dolomite, medium light to medium gray, fine grained.
7800	7810	Sandstone, white to very light gray. Medium to medium dark gray dolomite.
7810	7830	Sandstone, same as above. Moderate red dolomite.
7830	7840	Sandstone, very fine grained, dolomitic. Pale red fine, grained dolomite.
7840	7860	Dolomite, pale reddish brown, argillaceous, fine grained. Very fine grained sandstone.
7580	7890	Dolomite, pale reddish brown, fine grained, argillaceous. Medium dark to dark gray shale.
7890	7900	Dolomite, pale reddish brown and pale red fine grained.
7900	7920	Sandstone, very fine to fine grained, calcite cement.
7927		Circulation 70 minutes. Limestone, very light to medium gray fine grained, dense.
7920	7930	Shale, medium dark and light olive gray. Medium light gray fine grained limestone.
7932		Circulation 2 hours. Limestone, very light to medium light gray.
7930	7950	Shale, medium dark gray. Light to medium gray limestone.
7950	7960	Limestone, medium light gray, fine grained.
7960	7970	Shale, medium to medium dark gray. Medium gray fine grained limestone.
7970	7980	Dolomite, pale reddish brown, fine grained argillaceous and pale red, fine grained.
7980	8030	Dolomite, pale reddish brown, fine grained argillaceous.
8030	8050	Dolomite, light gray and pale red, fine grained.
8050	8060	Dolomite, same as above, white anhydrite.
8060	8090	Dolomite, pale reddish brown, fine grained, argillaceous. Medium gray limestone. Considerable white anhydrite.
8090	8100	Limestone, medium gray, fine grained. Pale reddish brown dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
8100	8120	Limestone, light to medium gray, fine grained, dense. Pale reddish brown dolomite.
8120	8140	Limestone, white to very light gray and medium gray, fine grained, dense. Pale red, fine grained argillaceous dolomite.
8140	8160	Dolomite, medium gray, fine grained, dense and pale red, argillaceous.
8160	8170	Dolomite, moderate reddish brown, argillaceous, fine grained and medium gray fine grained. Medium gray limestone.
8170	8180	Dolomite, pale reddish brown, fine grained, argillaceous. Medium gray limestone. Medium dark to dark gray shale.
8180	8190	Dolomite, same as above. White anhydrite.
8190	8210	Limestone, light to medium gray, fine grained.
8210	8220	Limestone, light to medium light gray, fine grained, dense. Pale reddish brown argillaceous dolomite. White anhydrite.
8220	8240	Shale, medium dark to dark gray. Medium gray limestone and white dolomite.
8240	8250	Shale, same as above, white anhydrite.
8250	8280	Limestone, light to medium gray fine grained. Reddish brown dolomite. Medium dark gray shale and white anhydrite.
8280	8290	Limestone, pale reddish brown, finely granular, porous argillaceous. Medium light gray dolomite.
8290	8310	Limestone, same as above. Much medium dark gray shale.
8310	8330	Dolomite, very light to light gray fine grained. Very light gray fine grained limestone.
8330	8340	Shale, medium dark gray. Medium light gray dolomite. Light gray limestone.
8340	8350	Limestone, medium light to light gray, fine grained dense. Medium grained free quartz.
8360	8370	Dolomite, medium light gray, fine grained, dense oil stain, no cut. Medium dark gray shale.
8370	8380	Dolomite, same as above, oil stain, no cut.
8380	8390	Dolomite, very light to light gray, fine grained, dense. White, fine grained, chalky limestone. Oil stain, no cut.
8390	8400	Limestone, very light gray, fine grained, dense. Medium light gray dolomite.
8400	8410	Limestone, medium light to medium gray, fine grained, dense. Medium light gray dolomite.
8410	8420	Limestone, light to medium light gray, fine grained, dense.
8430	8440	Limestone, light to medium light gray, fine grained, dense.
8440	8450	Limestone, same as above. Oil stain, no cut.
8450	8460	Limestone, very light to medium light gray, fine grained.
8455	8458	Anhydrite, medium dark gray, argillaceous, dense.
8458	8463	Anhydrite, medium gray, dense.
8463	8467	Shale, medium dark gray, anhydritic. Laminae of anhydrite.
8467	8475	Limestone, medium dark gray, fine grained, slight pinpoint porosity.
8475	8479	Limestone, medium gray, fine grained. Dark brown shale stringers and pockets of anhydrite.
8479	8481	Dolomite, medium to medium dark gray, fine grained. Shale stringers. Oil show.

<u>From</u>	<u>To</u>	<u>Formation</u>
8481	8505	Anhydrite, white to medium dark gray sublithographic to lithographic. Shale stringers throughout. Becomes locally very shaley.
8522	8525	Anhydrite, brownish gray, dolomitic, sublithographic.
8525	8526	Anhydrite, light gray, fine grained, dense.
8526	8528	Shale, medium dark gray, vertical fracture.
8528	8530	Anhydrite, white to very light gray.
8532	8533	Anhydrite, light brownish gray dolomitic.
8533	8534	Shale, medium gray.
8534	8540	Anhydrite, white to light gray.
8540	8550	Anhydrite, white to medium dark gray.
8550	8552	Anhydrite, medium light to medium gray.
8552	8554	Anhydrite, white.
8554	8562	Anhydrite, brownish black, dolomitic and medium gray.
8562	8566	Limestone, light gray, finely granular, pinpoint porosity. Medium gray shale and anhydrite.
8566	8567	Anhydrite, medium gray and medium gray shale.
8567	8570	Anhydrite, medium dark to brownish black, calcareous. Lower 1 1/2 feet has vertical fracture, with odor and flow in fractures.
8570	8575	Limestone, medium to medium dark gray, micaceous, pyritic. Vertical fractures at top with slight odor and fluorescence.
8575	8579	Dolomite, medium gray, micro sucrocis, hand tight vertical fractures.
8579	8580	Limestone, medium light gray, micro sucrosic, dolomitic. Slight show along fracture.
8580	8586	Dolomite, pale yellowish brown, very finely grained, pinpoint porosity. Spotted fluorescence, fine odor, good cut.
8586	8590	Dolomite, pale yellowish brown, very fine grained, slight pinpoint porosity. Few calcite streaks. No odor, tight.
8590	8593	Dolomite, light olive gray, micro sucrosic, pinpoint porosity, good odor, even fluorescence throughout, good cut.
8593	8601	Dolomite, medium gray, micro sucrosic, tight, fetid, odor, very fossiliferous.
8601	8608	Dolomite, light olive gray, micro sucrosic, pinpoint porosity, good fluorescence and odor, good cut.
8608	8619	Limestone, light olive gray, micro sucrosic, slight pinpoint porosity, fetid odor. Top three feet fractured.
8620	8623	Limestone, pale yellowish brawn, fine to medium grained, no visible porosity, highly fractured, vertically, black organic matter, fetid odor.
8623	8629	Limestone, pale yellowish brown, micro sucrocis, coarse oolcite crystals, good intergranular porosity. Fetid odor.
8629	8633	Limestone, same as above, good to poor porosity.
8633	8635	Limestone, pale yellowish brown, micro sucrosic, coarse calcite crystals, tight vertical fracture, pyritic, good porosity, fetid odor.
8635	8637	Dolomite, pale yellowish brown, calcareous, good porosity.
8637	8638	Dolomite, medium light gray, micro sucrosic, no porosity visible.
8638	8640	Dolomite, same as above, good porosity.

<u>From</u>	<u>To</u>	<u>Formation</u>
8640	8670	Limestone, medium to dark brownish gray, fine to medium grained, locally shaley, sucrosic, dense, fetid odor 10 feet, highly vertical fracture 7 feet from top.
8670	8720	Limestone, pale brownish yellow, fine grained, dense, fossiliferous, fetid odor.
8720	8745	Limestone, medium brown, fine grained dense, sucrosic, and dense fossiliferous with calcite in fillings. Tight fracture, no show.
8745	8761	Limestone, medium brown to light brown, with calcite in fillings, no show.
8761	8768	Dolomite, medium brown sucrosic to finely grained, streaks of anhydrite, no show.
8770	8788	Limestone and dolomite, medium brown very fine grained, scattered oolites near base, scattered to fair porosity, no show.
8788	8793	Dolomite, very light brown, micro sucrosic, good porosity, no shows.
8799	8820	Dolomite, very light to light brown, sucrosic to fine grained, porosity variable from poor to good vuggy to intergranular, Yields H ₂ O when sucked. Fracture porosity from 8800-8808, 8810-8812.
8820	8842	Limestone, very light to light brown, medium to coarsely oolitic, poor to fair porosity. Some fracture porosity 8821-25, 8827-30.
8860	8870	Limestone, light to medium light gray, fine to medium grained.
8873		Circulation 2 hours. Limestone, light to medium gray, fine to medium grained. White fine grained dolomite. Free medium grained, clear subangular quartz.
8870	8880	Limestone, light to medium gray, fine to medium grained. White fine grained dolomite. Free, medium grained, clear, subangular quartz.
8880	8900	Limestone, medium to medium light gray, fine grained. Fine to coarse, clear, angular quartz.
8900	8910	Limestone, medium gray, fine grained, pinpoint porosity. Free, fine to medium grained, free angular quartz.
8910	8920	Limestone, light to medium light gray, fine to medium grained, pinpoint porosity. Free, fine to medium grained quartz.
8920	8940	Limestone, very light to medium light gray, fine to medium grained, some pinpoint porosity. Free medium to coarse grained, angular quartz.
8940	8950	Limestone, light to medium gray, fine grained, dense.
8950	8960	Limestone, same as above, fine, free, iron stained quartz.
8960	8990	Limestone, medium light to light gray, fine grained, some pinpoint porosity.
8992		Circulation 2 1/2 hours. Limestone, medium light to light gray, fine grained, dense, some pinpoint porosity.
8990	9020	Limestone, medium light to light gray, fine grained, dense some pinpoint porosity.
9020	9040	Limestone, light gray, fine to medium grained, tight.
9040	9070	Limestone, light to medium gray, fine grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
9070	9090	Limestone, light to medium gray, fine to medium grained, nonporous.
9090	9110	Limestone, light to medium light gray, fine grained, nonporous.
9120	9150	Limestone, light to medium gray, fine to medium grained.
9150	9180	Limestone, light to medium dark gray, fine to medium grained.
9180	9210	Limestone, light to medium gray, fine to medium grained. Free, medium, subangular, clear to iron stained, quartz.
9210	9280	Limestone, light to medium gray, fine to coarse grained, tight, clastic.
9280	9300	Limestone, light to medium light gray, medium grained, clastic.
9300	9330	Limestone, same as above, pale reddish brown shale.
9330	9370	Limestone, light to medium light gray, fine to medium grained, clastic. Medium gray shale.
9370	9390	Limestone, same as above. Fine to medium, subangular, free quartz.
9390	9420	Limestone, light to medium gray, fine to medium grained, clastic. Medium to dark gray shale.
9420	9440	Shale, medium to medium dark gray. Light to medium gray, medium grained limestone.
9440	9450	Shale, same as above, fine to medium grained subangular, free quartz.
9450	9460	Shale, medium to medium dark gray. Light to medium gray, fine to medium grained quartz.
9460	9470	Shale, same as above. Free, fine to coarse, subangular, clear to iron stained quartz.
9470	9500	Shale, medium to medium dark gray. Free, fine grained, clear, angular quartz.
9500	9510	Shale, medium to medium dark gray. Medium light gray, fine grained limestone.
9510	9520	Limestone, medium light to medium dark gray, fine grained. Medium gray shale.
9520	9530	Limestone, same as above, pale reddish brown, calcareous shale.
9530	9560	Limestone, medium to medium dark gray, fine grained. Medium gray shale.
9560	9580	Limestone, same as above. Free fine to medium, subangular, clear quartz.
9580	9590	Limestone, light to medium dark gray, fine grained, dense.
9590	9600	Limestone, same as above. Medium light gray shale.
9600	9610	Circulation 3 hours. Limestone, same as above.
9610	9620	Limestone, white and medium dark gray, fine grained. Pale reddish brown calcareous shale.
9620	9640	Dolomite, light gray, fine grained dense. Medium dark gray limestone. Free fine to medium, subangular, clear to iron stained quartz.
9640	9650	Limestone, medium dark gray, fine grained, dense. Pale red shale.
9650	9660	Shale, pale red. Medium dark gray, fine grained limestone. Medium light gray fine grained dolomite.

<u>From</u>	<u>To</u>	<u>Formation</u>
9660	9670	Shale, medium to medium dark gray. Medium to medium light gray fine grained dolomite.
9670	9680	Shale, same as above, pale red shale.
9680	9690	Dolomite, grayish red, and very light to light gray, fine grained.
9690	9720	Dolomite, same as above, free fine to medium, angular, quartz.
9720	9730	Shale, pale reddish brown, calcareous.
9730		Circulation 80 minutes. Shale, reddish brown. Grayish red dolomite, fine grained.
9730	9740	Dolomite, medium light gray and grayish red, fine grained.
9740	9750	Dolomite, reddish gray and medium gray, fine grained. Medium to medium dark gray shale.
9750	9760	Dolomite, grayish red and medium gray, fine grained.
9760	9790	Limestone, light to medium light gray, fine grained, dense. Grayish red dolomite.
9790	9810	Limestone, medium light to medium gray, fine grained, dense.
9810	9820	Shale, medium dark gray and pale reddish brown.
9820	9850	Limestone, medium light to light gray, fine grained, dense.
9850	9880	Limestone, medium light to medium gray, fine grained dolomite.
9883		Circulation 2 1/2 hours. Limestone, very light to light gray, fine grained.
9880	9910	Limestone, very light to medium light gray, fine grained, some pinpoint porosity.
9900		Circulation, 2 hours. Limestone, very light to medium dark gray, fine grained to finely sucrosic.
9900	9930	Limestone, light to medium gray, fine grained dense finely sucrosic.
9930	9936	Limestone, very light to medium gray, fine to medium grained, some pinpoint porosity.
9930	9960	Shale, medium dark gray and pale reddish brown. Medium light to medium gray fine grained limestone.
9960	9990	Limestone, medium light gray, finely sucrosic and very light to medium gray, fine to medium grained.
9990	10000	Limestone, medium light to medium dark gray, fine grained, dense.
10005		Circulation 3 hours. Limestone, medium light to medium dark gray, fine grained, dense.
10005	10020	Limestone, medium light to medium dark gray, fine grained, dense.
10020	10040	Limestone, medium light to medium gray, fine grained. Free fine to medium grained, subangular, clear to iron stained quartz.
10040	10060	Limestone, medium light to medium dark gray, fine to medium grained.
10060	10080	Limestone, medium light to medium gray, fine grained, dense.
10080	10110	Limestone, very light to medium gray, fine grained, dense.
10110	10130	Limestone, medium light, fine grained to finely sucrosic and medium gray, fine grained, dense.
10130	10140	Limestone, same as above, medium dark shale.
10140	10160	Shale, medium to medium dark gray. Medium light to medium gray, fine grained, limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
10160	10170	Limestone, very light gray, fine grained to micro sucrosic slightly dolomitic and medium gray fine grained.
10170	10180	Limestone, same as above. Very fine to fine grained subrounded to rounded, frosted, free quartz.
10180	10190	Limestone, very light to light gray, fine grained, dense.
10190	10210	Limestone, same as above, medium gray shale.
10210	10220	Shale, medium dark gray. Very fine grained sandstone. Very light to medium gray, fine grained limestone.
10220	10225	Shale, medium to medium dark gray. Very fine grained sandstone.
10225	10240	Shale, medium to medium dark gray. Medium dark gray, fine grained dense, dolomite. Fine grained sandstone.
10240	10245	Shale, medium to medium dark gray. Medium light to medium grained limestone. Fine grained calcareous sandstone.
10245	10250	Shale, medium to medium dark gray. Medium light to medium gray, fine grained limestone. Fine grained calcareous sandstone.
10250	10260	Dolomite, medium to medium dark gray, fine grained, dense. Medium light to medium gray limestone. Very fine grained sandstone.
10260	10270	Limestone, medium light gray, fine grained, dense and medium dark gray argillaceous. Fine grained calcareous sandstone.
10270	10280	Shale, medium dark gray to olive. Limestone, medium to medium dark gray. Fine grained quartz.
10280	10295	Shale, same as above, no quartz.
10295	10310	Limestone, medium light to medium gray, fine grained medium dark gray shale. Fine to medium grained free quartz.
10310	10320	Limestone, medium light to medium gray, fine grained, argillaceous. Free fine to medium, subrounded, frosted quartz.
10320	10335	Limestone, same as above, pale red argillaceous dolomite.
10335	10355	Shale, medium to medium dark gray and some pale red. Medium light to medium gray, fine grained limestone.
10355	10370	Circulation 1 hour. Limestone, medium light to medium dark gray, slightly argillaceous. Free, fine, frosted quartz. Medium to medium dark gray shale.
10370	10380	Dolomite, medium light to medium dark gray, fine grained. Medium dark gray shale. Medium gray fine grained limestone.
10380	10395	Dolomite, medium light to medium dark gray, fine grained. Medium gray fine grained limestone.
10395	10410	Dolomite, medium light gray to medium gray. Medium to medium dark gray shale.
10410	10415	Limestone, medium light to medium gray, fine grained. Medium to medium dark gray, fine grained dolomite.
10415	10430	Dolomite, white, fine grained, dense to finely granular.
10430	10435	Dolomite, white to very light gray, finely granular to dense.
10435	10445	Dolomite, same as above. Medium to medium dark gray shale.
10445	10470	Dolomite, white to very light gray, finely granular to dense.
10470	10505	Dolomite, white to very light gray, fine grained, dense to finely granular.

<u>From</u>	<u>To</u>	<u>Formation</u>
10505	10510	Dolomite, same as above, very fine to fine grained subrounded, frosted, free quartz.
10510	10515	Dolomite, white to very light gray, fine grained dense to finely granular, slight pinpoint porosity.
10515	10535	Dolomite, same as above, fine, free, subrounded quartz.
10535	10560	Dolomite, light olive to very light gray, finely granular to dense.
10560	10570	Dolomite, light to medium light gray fine grained, dense to finely granular.
10570	10605	Dolomite, very light gray to light gray, fine grained to micro sucrosic.
10605	10640	Dolomite, very light to light gray, sublithographic to micro sucrosic, some pinpoint porosity.
10640	10655	Dolomite, same as above. Medium dark gray shale.
10655	10705	Dolomite, very light to light gray, fine grained, dense to micro sucrosic.
10716		Circulation 99 minutes. Shale, same as above.
10716	10765	Shale, same as above.
10765	10770	Dolomite, white to very light gray, sublithographic to micro sucrosic. Fine to medium, free subangular, clear to frosted quartz.
10775	10780	Dolomite, same as above.
10780	10790	Dolomite, light to light olive gray, fine grained dense to micro sucrosic, some pinpoint porosity.
10790	10795	Dolomite, same as above, medium dark and olive gray shale.
10795	10820	Dolomite, light to medium light gray, fine grained dense to micro sucrosic. Medium to medium dark gray and moderate red calcareous shale
10820	10830	Dolomite, same as above. Fine to medium grains of subangular clear quartz.
10830	10835	Dolomite, very light to light gray, fine grained, dense.
10835	10850	Dolomite, light to light olive gray dolomite, fine grained, dense, some pinpoint porosity. Fine to medium free, subangular, clear quartz
10850	10860	Dolomite, very light to yellowish gray, fine grained dense to sublithographic. Fine to medium, free, subangular, clear quartz.
10860	10880	Dolomite, same as above. Moderate red calcareous shale and medium dark gray.
10880	10895	Dolomite, very light to medium gray, fine grained, dense. Moderate red calcareous and medium dark gray shale. Free, fine grained, clear, subangular quartz.
10895	10905	Dolomite, light to medium gray fine grained, dense. Medium dark gray shale.
10905	10920	Shale, medium to medium dark and moderate red, calcareous. Light to medium dark gray, fine grained, dense dolomite.
10925	10935	Dolomite, light to medium dark gray, fine grained dense. Medium to medium dark gray and moderate red calcareous shale.
10935	10955	Shale, medium to medium dark and pale red calcareous. Light to medium dark gray, fine grained, dense dolomite.
10955	10970	Dolomite, light to medium dark gray fine grained dense. Medium to medium dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
10970	10975	Dolomite, same as above, moderate red calcareous shale.
10974		Circulation 2 hours. Dolomite, light to medium dark gray, fine grained dense to micro sucrosic. Medium to medium dark gray and pale red calcareous shale.
10974		Circulation 3 hours, Dolomite, light to medium gray, fine grained dense to micro sucrosic. Medium dark gray and moderate red calcareous shale.
10975	10980	Dolomite, same as above.
10980	10990	Shale, medium dark gray. Light to medium gray, fine grained dolomite. Fine to medium, free, subangular, clear quartz.
10990	11000	Dolomite, light to medium gray, fine grained dense. Medium to medium dark gray shale.
11000	11015	Shale, medium to medium dark gray. Very light to medium gray dolomite. Fine to medium, free, subangular, clear to frosted quartz.
11015	11020	Dolomite, light to medium gray, fine grained dense. Medium dark gray shale.
11020	11025	Dolomite, light to medium gray, fine grained. Medium gray, fine grained limestone. Medium to medium dark gray shale.
11025	11030	Dolomite, same as above, pyritic.
11030	11045	Dolomite, light to medium gray, fine grained, dense. Medium light gray, fine grained limestone. Medium to medium dark gray shale.
11045	11055	Limestone, light to medium light gray, fine grained. Very light to medium gray, fine grained dolomite. Medium to medium dark gray shale.
11055	11060	Shale, medium to medium dark gray. Light to medium gray, fine grained limestone. Medium to medium dark gray, fine grained dolomite.
11060	11075	Limestone, light to medium gray, fine grained. Medium to medium dark gray dolomite. Medium to medium dark gray shale.
11075	11080	Limestone, same as above. No shale.
11080	11095	Limestone, medium light to medium gray, fine grained. Light to medium gray dolomite.
11095	11100	Limestone, light to medium gray, fine grained dense. Light gray, fine grained dolomite.
11100	11110	Limestone, very light to medium gray, fine grained, dense.
11110	11130	Limestone, light to medium dark gray, fine grained, dense.
11130	11160	Limestone, light to medium gray, fine grained, dense.
11160	11167	Limestone, light to medium dark gray, fine grained, dense.
11167	11185	Limestone, medium light to medium dark gray, fine grained, dense.
11185	11195	Limestone, light to medium gray, fine grained, dense.
11195		Circulation 3 hours. Dolomite, light to medium gray, fine grained dense. Light to medium gray, fine grained, dense limestone.
11195	11220	Dolomite, same as above.
11220	11230	Limestone, light to medium gray, fine grained, dense and medium to medium light gray fine grained.
11233		Circulation 60 minutes. Limestone, very light to medium gray, fine to medium grained.
11230	11270	Limestone, very light to medium gray, fine to medium grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
11270	11285	Limestone, medium light to medium dark gray, fine grained, dense.
11290		Circulation 1 1/2 hours. Limestone, medium light to medium gray, fine grained, dense.
11290	11295	Limestone, same as above. Medium gray shale.
11295	11305	Shale, medium gray. Medium gray fine grained limestone.
11308		Circulation 1 1/2 hours. Shale, same as above.
11310	11340	Limestone, medium light to medium dark gray, fine grained. Medium gray shale partings.
11340	11355	Limestone, light to medium gray, fine grained dense to finely sucrosic. Medium gray shale partings.
11355		Circulation 1/2 hour. Limestone, light to medium gray, fine grained, dense to micro sucrocis. Medium gray shale.
11355	11365	Shale, medium gray. Light to medium gray, fine grained limestone.
11365	11410	Limestone, light to medium, fine grained to micro sucrosic. Medium gray shale.
11410		Circulation 1 1/2 hours. Limestone, very light to medium gray, fine grained, dense. Medium gray shale.
11410	11415	Limestone, same as above, more shale.
11415	11420	Shale, medium gray. Light to medium gray, fine grained to micro sucrosic limestone.
11420	11430	Limestone, light to medium gray, fine grained, dense to micro sucrosic. Medium gray shale.
11430	11465	Limestone, very light to medium gray, fine grained, dense to micro surcrosic. Medium gray shale.
11465	11470	Limestone, very light gray fine grained, dense to medium light gray finely granular. Medium gray shale.
11469		Circulation 1 hour. Limestone, light to medium light gray, finely granular. Medium gray shale.
11470	11475	Limestone, same as above. Pale red calcareous shale.
11475	11485	Limestone, same as above. More shale.
11485	11510	Limestone, light to medium light gray, fine granular to light brownish gray sucrosic. Medium gray shale.
11510	11515	Sandstone, very fine to fine grained, subrounded, frosted to iron stained. Light to medium gray and light brownish gray, finely granular. Medium to medium dark gray shale.
11515		Circulation 1 1/2 hours. Limestone, light to medium gray, finely granular to sucrosic. Medium gray shale.