

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR #68

Summary of the Stanolind Oil and Gas Company Walter Waswick #1
Ward County, North Dakota
Well No. 105, Permit No. 121

By Morton Strassberg
May, 1954

Stanolind Oil and Gas Company - Waswick No. 1, Ward County, North Dakota, SW NE Section 2, T. 153N., R. 85W. (1980 feet from N. line and 1980 feet from E. line). Elevation G.L. 2155, K.B. 2175.

The Stanolind-Waswick #1 was spudded July 10, 1952 and 10 3/4 inch casing was set at 997.07 feet with 600 sacks of cement. The well was completed as a dry hole October 29, 1952 and was abandoned. Total depth 11,009 feet.

Oil shows were obtained in the Red River Formation. Oil base mud was introduced at a greater depth than the above shows and may have been the cause of oil shows in the Winnipeg sandstone.

TESTS

- DST #1 6485-6515 Open 1½ hours, shut in 20 minutes. Recover 350' sal water cut mud.
DST #2 6575-6628 Open 2 hours, shut in 20 minutes. Recover 250' drilling mud.
DST #3 8120-8172 Open 90 minutes, shut in 15 minutes. Recover 4480' salt water cut with mud.
DST #4 10,130-77 Open 2½ hours, shut in ½ hour. Recover 120' drilling mud slightly cut with salt water.
DST #5 10,171-347 Open 1½ hours, shut in 15 minutes 2000' water cushion and 3800' mud cut salt water.
DST #6 10,890-908 Open 3 hours, shut in 20 minutes. Recover 2000' water cushion and 340' mud cut salt water.

CORES

- #2 - 7562-7625
#3 and 4 - 10,157-10,226
#5 - 10,930-11,008

Cement plugs were set at the following depths.

- 10,857-87 with 15 sacks
10,064-94 with 15 sacks
9,116-46 with 15 sacks
7,765-95 with 15 sacks
6,471-6,501 with 15 sacks
5,831-61 with 15 sacks
4,052-4,119 with 40 sacks
994-1,024 with 15 sacks

Formation tops were determined from samples and cores, electric, micro and radioactivity logs and were corrected to electric log top unless otherwise

stated. Not all lithologic tops were called in the following list. Colors were determined from the rock color chart.

FORMATION TOPS

<u>Formation</u>	<u>Depth</u>	
Cretaceous System		
Pierre Formation	1008	
Niobrara Formation	2880	Radioactivity log
Greenhorn Formation	3420	
Dakota	4066	
Jurassic System		
Morrison Formation	4370	
Sundance Formation	4694	
Piper Formation	5017	
Triassic System		
Spearfish Formation	5250	
Mississippian System		
Amsden Formation	5715	
Big Snowy Group	5768	
Kibby Formation	5870	
Madison Group		
Charles Formation	5991	
Mission Canyon Formation	6485	
Lodgepole Formation	6889	
Englewood Formation	7543	Radioactivity log
Devonian System		
Lyleton Formation	7575	Radioactivity log
"Nisku Equivalent"	7780	Radioactivity log
Duperow Formation	7886	
Souris River Formation	8230	
Dawson Bay Formation	8528	
Prairie Evaporites Formation	8698	
Winnipegosis Formation	8908	
Ashern Formation	9046	Radioactivity log
Silurian System		
Interlake Group	9131	Radioactivity
Ordovician System		
Upper Stony Mountain	9887	Radioactivity
Lower Stony Mountain	10,007	
Red River	10,082	
Winnipeg Shale	10,750	
Winnipeg Sandstone	10,875	
Total Depth	11,009	

<u>From</u>	<u>To</u>	<u>Formation</u>
27	40	Sand--very fine to coarse grained, poorly sorted. Lignite.
40	120	Sand--very fine to coarse grained, poorly sorted.
120	170	Sand--very coarse grained.
170	220	Sand--fine to very coarse grained.
220	240	Sandstone--very fine to very coarse grained.
240	280	Sand--coarse to very coarse grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
280	290	Lignite--black.
290	310	Missing samples.
310	330	Lignite--black.
330	350	Missing samples.
350	360	Shale--light gray.
360	380	Siltstone--light gray.
380	400	Lignite--black.
400	410	Siltstone--light gray.
410	420	Lignite--black.
420	430	Shale--light gray, silty.
430	440	Lignite--black.
440	460	Shale--light gray.
460	470	Lignite--black.
470	480	Shale--light gray. Black lignite.
480	490	Siltstone--light gray.
490	560	Sandstone--very fine to fine grained.
560	570	Lignite--black. Fine grained sandstone.
570	640	Sandstone--fine to medium grained, subangular, frosted.
640	710	Sandstone--fine to coarse grained, subangular, frosted.
710	730	Sandstone--fine to coarse grained, subangular, frosted. Black lignite.
730	740	Shale--medium gray. Fine to coarse grained free quartz.
740	750	Sandstone--very fine to medium grained.
750	760	Lignite--black.
760	790	Shale--medium light gray. Fine to medium grained free quartz.
790	810	Sandstone--fine to medium grained, subangular to frosted.
810	830	Lignite--black.
830	850	Sandstone--very fine to medium grained, subrounded to subangular, frosted.
850	890	Sandstone--fine to very coarse grained, subrounded to subangular, frosted.
890	930	Shale--medium, light gray, silty
930	960	Siltstone--light gray.
960	980	Shale--pale yellowish brown, silty.
980	1070	Shale--medium light gray.
1070	1090	Lignite--black.
1090	1110	Shale--medium light gray.
1110	1150	Lignite--black.
1150	1160	Shale--medium light gray.
1160	1170	Lignite--black.
1170	1250	Poor samples.
1250	1270	Lignite--black.
1270	1320	Shale--medium light gray, silty.
1320	1400	Sandstone--fine to medium grained, subangular, frosted to clear. Medium light gray shale.
1400	1450	Shale--medium light gray silty. Fine to medium grained sandstone.
1450	1520	Shale--medium light gray silty and pale brown.
1520	1530	Shale--medium light gray.
1530	1550	Shale--medium light gray and pale yellowish brown.
1550	1560	Shale--medium light gray.

<u>From</u>	<u>To</u>	<u>Formation</u>
1560	1600	Shale--medium light gray and pale yellowish brown.
1600	1650	Shale--medium light gray.
1650	1690	Shale--medium light gray and pale brown.
1690	1710	Shale--light gray.
1710	1840	Shale--light to medium light gray and pale brown.
1840	1860	shale--light to medium light gray.
1860	1890	Shale--medium light and pale brown.
1890	2040	Shale--medium light to medium gray.
2040	2200	Shale--light to medium light gray.
2200	2220	Shale--medium light to medium and light olive gray.
2220	2250	Shale--medium light to medium gray.
2250	2320	Shale--medium light gray.
2320	2350	Shale--medium light to medium gray.
2350	2380	Shale--medium light gray.
2380	2400	Shale--medium light and light olive gray.
2400	2460	Shale--medium light gray and pale yellow brown.
2460	2470	Shale--medium light gray.
2470	2530	Shale--medium light to medium gray and pale brown.
2530	2660	Shale--medium light to medium gray and pale brown, bentonitic.
2660	2680	Shale--medium light to medium gray, bentonitic.
2680	2740	Shale--medium light to medium gray and pale yellowish brown, bentonitic.
2740	2780	Shale--medium light to medium gray. White bentonite.
2780	2830	Shale--medium light to medium gray, bentonitic.
2830	2860	Shale--medium light to medium gray.
2860	2890	Shale--medium light to medium gray, bentonitic.
2890	2930	Shale--medium light to medium gray. White bentonite.
2930	2950	Shale--medium light to medium dark gray.
2950	2960	Shale--medium gray.
2960	2980	Shale--medium to medium dark gray.
2980	3040	Shale--medium gray.
3040	3069	Shale--medium to medium dark gray.
3060	3070	Shale--medium light to medium gray.
3070	3100	Shale--medium gray.
3100	3110	Shale-medium gray. White bentonite.
3110	3120	Shale--medium to medium dark gray. White bentonite.
3120	3150	Shale--medium gray. White bentonite.
3150	3200	Shale--medium to medium dark gray, bentonitic.
3200	3250	Shale--medium gray, bentonitic.
3250	3270	Shale--medium to medium dark gray, bentonitic.
3270	3350	Shale--medium gray. White bentonite.
3350	3490	Missing samples.
3490	3520	Shale--medium to dark gray, white specks, calcareous.
3520	3710	Missing samples.
3710	3720	Shale--medium light to dark gray.
3720	3750	Missing samples.
3750	3920	Shale--medium light to dark gray.
3920	4090	Shale--medium to dark gray.
4090	4120	Shale--medium to dark gray. Light gray siltstone.
4120	4130	Sandstone--coarse grained. Subangular, frosted. Medium to dark gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
4130	4150	Shale--medium to dark gray, few coarse free quartz grains.
4150	4179	Siltstone--iron stained and siltstone concretions. Medium to medium dark gray shale.
4179	(Circulation ½ hr.)	Siltstone--light gray to iron stained and siltstone concretions. Medium to dark gray shale.
4180	4240	Shale--medium to medium dark gray. Light gray siltstone and iron stained siltstone concretions.
4240	4320	Shale--medium light to medium dark gray. Iron-stained siltstone and siltstone concretions. Light gray very fine grained sandstone.
4320	4340	Shale--medium light to medium dark gray. Iron stained siltstone.
4340	4360	Shale--medium light to medium dark gray. Light gray siltstone.
4363	(Circulation)	Shale--medium light to medium gray. Pale brown siltstone.
4360	4380	Shale--medium light to medium dark gray. Light gray siltstone.
4380	4390	Shale--light to medium gray. Light brown siltstone.
4395	(Circulation)	Shale--light to medium dark gray. Pale brown siltstone.
4400	4410	Shale--light to medium dark gray. Light gray, fine grained sandstone.
4410	4420	Shale--light to medium dark gray. Light to pale brown very fine grained sandstone.
4420	4470	Sandstone--light gray, fine grained, slightly calcareous. Light to medium dark gray shale.
4470	4480	Shale--dusky yellow to light greenish gray. Light to yellowish gray fine grained sandstone.
4480	4490	Sandstone--yellowish gray, very fine to fine grained, calcareous.
4490	4510	Sandstone--yellowish gray, very fine grained glauconitic calcareous. Light brown siltstone. Light to medium dark gray and light greenish gray shale.
4510	4540	Sandstone--light brown, very fine grained silty. Medium to coarse grained free quartz. Iron stained siltstone concretions. Light greenish gray shale.
4540	4560	Shale--light to light greenish gray. Light to pale brown siltstone.
4560	4590	Siltstone--grayish orange pink, calcareous and iron stained siltstone concretions. Light to light greenish gray shale.
4590	4610	Siltstone--light gray to grayish orange pink and iron stained siltstone concretions. Light to greenish gray shale.
4610	4640	Shale--light to medium dark gray. Light gray to grayish orange pink siltstone and siltstone concretions.
4640	4660	Sandstone--light gray, very fine grained, calcareous. Medium light to medium dark gray shale.
4660	4680	Shale--light to greenish gray and silty pale brown. Very light gray, very fine grained to silty sandstone.
4680	4690	Shale--light to medium dark gray, bentonitic. Light gray siltstone.
4690	4700	Shale--light to greenish gray and pale brown. Light brown siltstone.
4700	4820	Shale--light to greenish and medium dark gray. Light gray and pale brown siltstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
4820	4850	Shale--light to greenish gray and pale brown. Light brown and light gray siltstone.
4850	4880	Shale--light to greenish gray. Pale yellowish brown siltstone.
4880	4890	Shale--light to greenish gray and calcareous pale reddish brown.
4890	4910	Shale--pale reddish brown and grayish red calcareous and light gray. Light gray and light brown siltstone.
4910	4920	Shale--light to greenish gray and pale reddish brown to grayish red.
4920	4930	Shale--light to greenish gray.
4930	4960	Sandstone--light gray, very fine grained, calcareous. Light to greenish gray and grayish red shale.
4960	5000	Shale--light to medium dark gray and grayish red. Very fine grained calcareous sandstone.
5000	5020	Shale--light to greenish gray and gray red. Light gray sublithographic limestone.
5026	(Circulation)	Shale--pale reddish brown to grayish red calcareous. Light gray sublithographic limestone.
5030	5050	Shale--light to medium gray and gray red. Very light gray limestone.
5050	(Circulation 3/4 hr.)	Limestone--very light to pinkish gray, fine grained.
5060	5070	Shale--pale and grayish red calcareous. Light gray limestone.
5070	5080	Limestone--light gray to pale yellowish brown. Medium light gray calcareous shale.
5080	5130	Limestone--very light to yellowish gray, sublithographic.
5130	5150	Shale--grayish red calcareous and medium gray. Yellowish to light brownish gray fine grained to sublithographic limestone.
5150	5160	Shale--light olive gray and gray red, calcareous.
5156	(Circulation ½ hr.)	Shale--pale reddish brown, calcareous, silty.
5160	5170	Shale--same as above.
5170	5270	Shale--medium light to medium gray and pale reddish brown, white gypsum.
5200	5230	Shale--grayish red silty and medium light gray. White anhydrite.
5230	5260	Shale--grayish red, silty. White anhydrite.
5260	5300	Shale--moderate reddish brown. White anhydrite.
5300	5350	Shale--grayish red and medium light gray.
5350	5400	Shale--medium light gray.
5400	5420	Shale--pale reddish brown, silty and medium light gray.
5420	5440	Shale--grayish red and pale reddish brown, silty and medium light gray. White gypsum..
5540	5570	Shale--moderate reddish brown calcareous and medium light gray. White gypsum.
5570	5630	Shale--pale and grayish red, silty calcareous and medium light gray.
5630		Siltstone--pale reddish brown.
5631	(Circulation)	Siltstone--pale reddish brown.
5640	5660	Shale--pale reddish brown to grayish red and medium light gray. Pale reddish brown siltstone.

<u>From</u>	<u>To</u>	<u>Formation</u>
5660	(Circulation 1 hr.)	Siltstone--moderate reddish orange.
5660	5690	Siltstone--moderate reddish orange. Pale red and reddish brown shale.
5690	5740	Siltstone--pale reddish brown arenaceous. Medium light gray and pale reddish brown shale.
5740	5750	Shale--pale red and pale reddish brown. Pale reddish brown siltstone.
5756	(Circulation)	Limestone--very light to yellowish gray, fine grained. White gypsum. Pale red shale.
5750	5756	Shale--pale reddish brown and grayish red. White anhydrite.
5756	5762	Limestone--yellowish gray oolitic to fragmental and pale red sublithographic.
5762	5768	Core #1. Limestone--grayish orange pink to pale red, sublithographic.
5768	5775	Limestone--pale brown and very pale orange, sublithographic.
5775	5778	Limestone--yellowish gray to pale brown, oolitic to fragmental, anhydrite inclusions.
5778	5788	Dolomite--pale red to grayish red, microsugrosic. White anhydrite.
5788	5798	Dolomite---pale red microsugrosic.
5798	5806	Dolomite--pale reddish brown, microsugrosic.
5806	5850	Dolomite--grayish orange pink to pale red fine grained. Grayish orange pink to yellowish gray sublithographic, limestone. Grayish red shale.
5850	5880	Dolomite--moderate reddish orange. Pale red shale.
5880	5890	Dolomite--medium light gray and pale reddish brown fine grained. Pale red and medium light gray shale.
5890	5900	Shale--pale and gray red.
5900	5930	Dolomite--pinkish gray and pale reddish brown fine grained.
5930	5940	Shale--medium to medium dark gray - Cave.
5940	5980	Shale--pale reddish brown, and medium to medium dark gray. Cave? White anhydrite.
5980	6000	Dolomite--light gray fine grained. Medium light to medium gray and pale red shale. White anhydrite.
6000	6050	Anhydrite--light gray to white. Medium light to medium gray and pale reddish brown shale cave?
6050	6070	Shale--medium light to medium dark gray and pale reddish brown. Cave? White anhydrite.
6070	(Circulation 1½ hrs.)	Limestone--very light to yellowish gray, sublithographic to fine grained.
6070	6090	Limestone--same as above.
6090	6100	Limestone--yellowish gray to pale yellowish brown, fine grained. White anhydrite.
6106	(Circulation 1 hr.)	Limestone--very light gray sublithographic.
6100	6130	Limestone--very light to light gray, fine grained to sublithographic.
6130	6140	Anhydrite-white. Light gray fine grained limestone.
6140	6150	Shale--medium light to medium gray. Light gray fine grained limestone.
6150	6160	Shale--medium light gray.
6167	(Circulation 1½ hrs.)	Anhydrite--white. Medium light to medium gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
6160	6170	Anhydrite--same as above.
6179	(Circulation)	Shale--medium light to medium gray. Medium light gray fine grained limestone.
6180	6190	Shale--same as above
6190	6200	Dolomite--light gray, lithographic. Medium light to medium gray shale.
6200	6240	Anhydrite-white to light gray. Light gray sublithographic dolomite.
6247	(Circulation ½ hr.)	Anhydrite--white to light bluish gray.
6240	6250	Anhydrite--same as above.
6250	6260	Limestone--yellowish gray, fine grained.
6260	6290	Shale--medium light to medium gray. White to light bluish gray anhydrite.
6290	6320	Dolomite--bluish gray, sublithographic. Grayish orange pink limestone.
6323	(Circulation 1½ hrs.)	Limestone--very light to yellowish gray, fine grained to fragmental.
6320	6340	Limestone--pale yellowish brown, oolitic, tightly cemented.
6340	6370	Limestone--yellowish gray to very pale orange, fragmental to oolitic.
6370	6380	Dolomite--light bluish gray, sublithographic. Yellowish gray fragmental to oolitic.
6380	6390	Limestone--pale yellowish brown, fine grained to fragmental.
6398	(Circulation 2 hrs.)	Anhydrite--white to light bluish gray. Light bluish gray dense dolomite.
6400	6480	Anhydrite--same as above.
6480	6505	Anhydrite--white to light bluish gray. Pale yellowish brown fragmental limestone.
6505	6510	Limestone---pale yellowish brown, fragmental to oolitic.
6510	(Circulation 1 hr.)	Limestone--very pale orange to pale yellowish brown, fine grained to fragmental.
6510	6515	Limestone--same as above.
6515	(Circulation 1½ hrs.)	Limestone--very pale orange to pale yellowish brown, oolitic to fragmental, fluorescence; slight cut.
6515	6530	Limestone--very pale orange to pale yellowish brown, oolitic to fragmental. Medium to medium dark gray shale cave.
6530	6580	Limestone--light brownish gray, oolitic to fragmental and yellowish gray microsucrosic.
6582	(Circulation 1 hr.)	Limestone--pale yellowish brown, oolitic to fragmental.
6580	6625	Limestone--pale yellowish brown, oolitic to fragmental.
6628	(Circulation)	Limestone--very pale orange to pale yellowish brown, fragmental to oolitic.
6625	6640	Shale--medium gray cave. Pale yellowish brown oolitic to fragmental limestone.
6641	(Circulation 1 hr.)	Limestone--pale yellowish brown, fragmental to oolitic.
6640	6645	Limestone--same as above.
6645	6690	Limestone--very pale orange to pale yellowish brown, fragmental.
6690	6695	Limestone--very light to yellowish gray, fine grained to chalky.

<u>From</u>	<u>To</u>	<u>Formation</u>
6695	6700	Limestone--same as above. Nodosaria.
6705	(Circulation 1 hr.)	Limestone---very pale orange, fine grained to fragmental.
6705	6714	Limestone--very light gray, fine grained to sublithographic.
6714	(Circulation)	Limestone---light to yellowish gray, fine grained to fragmental.
6715	6725	Limestone---same as above.
6725	6735	Limestone--very light to yellowish gray, fine grained to fragmental. Very light gray microsucrosic dolomite.
6735	6745	Dolomite--very light gray, microsucrosic, calcareous. Very light gray, fine grained to fragmental limestone.
6745	6780	Limestone--very light to yellowish gray, fine grained to fragmental and microsucrosic.
6781	(Circulation 1 hr.)	Limestone--very light gray, fine grained, dolomite.
6785	6795	Limestone--same as above.
6795	6810	Limestone--very light to yellowish gray, fine grained to fragmental. Medium gray shale.
6810	6815	Dolomite--yellowish gray, microsucrosic. Medium gray shale.
6815	6855	Limestone--yellowish gray, fine grained to fragmental.
6855	6880	Limestone--very light to yellowish gray, fine grained to fragmental.
6880	6900	Limestone--very light to yellowish gray, chalky to fine grained.
6900	6920	Limestone--light to very light gray, fine grained.
6920	6940	Limestone--very light to light gray, fragmental.
6940	6970	Limestone--very light to medium gray, fine grained to fragmental.
6978	(Circulation)	Limestone--very light to medium gray fragmental.
6980	7015	Limestone--same as above.
7015	7280	Limestone--very light to medium light gray, fragmental.
7280	7295	Limestone--very light to medium light gray, fragmental. Medium to medium dark gray shale.
7295	7320	Shale--medium light to medium gray.
7320	7345	Shale--medium to medium dark gray.
7346	(Circulation)	Shale--medium to medium dark gray.
7346	7365	Shale--medium light to medium dark gray calcareous.
7365	7455	Shale--medium to medium dark gray. Medium light to medium gray fragmental dolomitic limestone streaks.
7455	7500	Shale--medium to medium dark gray. Pale brown siltstone and fine grained free quartz.
7500	7530	Shale--light to medium gray.
7530	7540	Shale--medium light to medium gray and pale brown silty.
7540	7555	Anhydrite-white. Medium light to medium gray shale.
7555	7562	Limestone--medium light to medium gray, fine grained.
7562	7574	Core #2. Shale--dark gray to black, calcareous, gives off petroliferous odor when heated.
7574	7580	Limestone--light gray, microsucrosic, dolomitic.
7580	7590	Dolomite--light to medium light gray, carbonaceous streaks.
7590	7597	Sandstone--medium light gray, very fine to medium grained, calcareous cement, carbonaceous streaks.
7597	7600	Shale--dark gray, gives petroliferous odor when heated.
7600	7602	Shale--greenish gray, very hard.

<u>From</u>	<u>To</u>	<u>Formation</u>
7602	7616	Dolomite--very pale orange, microsucrosic.
7616	7617	Shale--greenish gray, very hard.
7617	7623	Dolomite--very pale orange, microsucrosic, inclusions of greenish gray shale.
7634	7625	Shale--greenish gray, dolomitic.
7625	7635	Dolomite--grayish orange pink microsucrosic. Medium dark to dark gray shale.
7635	7645	Dolomite--grayish orange pink, microsucrosic. Medium light to medium dark gray shale.
7645	7665	Dolomite--light brown, microsucrosic. Greenish to medium dark gray shale.
7665	7700	Dolomite--light brown, microsucrosic.
7700	7710	Dolomite--light brown, microsucrosic. Medium light to dark gray.
7710	7720	Dolomite--light brown, microsucrosic. Grayish red calcareous shale.
7720	7740	Dolomite--moderate orange pink to light brown, microsucrosic. Grayish red calcareous and medium to medium dark gray shale.
7740	7745	Dolomite--grayish orange pink to light brown, microsucrosic. Grayish red, calcareous shale.
7745	7775	Shale--medium to medium dark gray.
7775	7780	Shale--medium to medium dark gray and gray red. Medium to coarse grained free quartz. Light brown microsucrosic dolomite.
7780	7790	Dolomite--grayish orange pink to light gray, microsucrosic. Medium to coarse grained free quartz.
7790	7795	Shale--pale reddish brown, calcareous.
7795	7805	Dolomite--light brown to very light gray, microsucrosic. Pale reddish brown calcareous shale. Medium light gray fine grained limestone.
7805	7830	Limestone--yellowish gray, fine grained to sublithographic.
7830	7850	Limestone--pale yellowish brown to yellowish gray, fine grained to fragmental. Pale yellowish brown microsucrosic dolomite.
7850	7870	Dolomite--pale yellowish brown, microsucrosic. Pale yellowish brown fragmental limestone.
7870	7890	Limestone--grayish orange pink to pale yellowish gray, fine grained to fragmental.
7890	7910	Limestone--very light gray to pale yellowish brown, fragmental.
7910	7925	Shale--medium light gray. Very light gray to very pale orange fragmental limestone.
7925	7935	Limestone--very light to pale yellowish brown, fragmental. Medium to medium dark gray shale.
7935	7950	Limestone--very pale orange, fragmental.
7950	7960	Dolomite--light to medium light gray, sublithographic.
7960	7970	Limestone--pale brown fine grained dense to fragmental.
7970	7975	Limestone--light to pale brown, oolitic to fragmental.
7976	(Circulation)	Limestone--pale brown, oolitic to fragmental.
7976	7980	Limestone--same as above.
7980	7985	Limestone--very pale orange to pale brown, fine grained to oolitic.

<u>From</u>	<u>To</u>	<u>Formation</u>
7986	(Circulation 1 hr.)	Limestone--very, pale orange fine grained and pale brown oolitic.
7986	8000	Limestone--very light gray to very pale orange, fine grained to fragmental.
8000	8010	Limestone--yellowish gray, fragmental to sublithographic. Grayish orange pink sucrosic dolomite.
8010	8045	Limestone--very light to very pale orange, fine grained to sublithographic.
8045	8065	Limestone--yellowish gray to pale yellowish brown, fine grained. Medium dark gray shale.
8065	8075	Limestone--very light to yellowish gray, fine grained. White anhydrite.
8075	8100	Limestone--yellowish gray to pale yellowish brown, fine grained. Pale yellowish brown and very light gray sucrosic dolomite.
8100	8110	Limestone--yellowish gray, fine grained.
8110	(Circulation 1½ hrs.)	Limestone--very light to yellowish gray fine grained.
8110	8130	Limestone--very light to yellowish gray, fine grained. Pale yellowish brown sucrosic dolomite.
8130	8135	Dolomite--pale yellowish brown, sucrosic calcareous. Very light gray fine grained limestone.
8136	(Circulation 1 hr.)	Dolomite--same as above.
8136	8140	Dolomite--same as above.
8140	8160	Limestone--very light to pale yellowish brown, fine grained to oolitic. Pale yellowish brown calcareous sucrosic dolomite.
8160	8170	Dolomite--pale yellowish brown, calcareous, sucrosic. Yellowish gray fine grained limestone.
8170	8190	Dolomite--pale yellowish brown, calcareous, sucrosic. Medium to medium dark gray shale. Very light gray fine grained limestone.
8190	(Circulation)	Dolomite--same as above.
8190	8235	Limestone--light to very light gray, fine grained to fragmental. Medium to medium dark gray shale.
8236	(Circulation)	Limestone--very light to pale yellowish brown fine grained to chalky. Medium gray shale.
8236	8255	Limestone--yellowish gray to pale yellowish brown, fine grained to fragmental.
8255	8260	Limestone--very light to pale yellowish brown, fine grained to sublithographic. Medium to coarse grained free quartz. Medium to medium dark gray shale.
8260	8300	Limestone--very light to pale yellowish brown, fine grained to fragmental and pale brown sublithographic.
8300	8325	Shale--medium light to medium dark gray. Very light to yellowish gray fine grained limestone.
8325	8380	Limestone--very light to light gray, fine grained to microsucrosic.
8380	8400	Limestone--very light to light gray, fine grained. Yellowish gray sucrosic dolomite.
8400	8415	Limestone--very light to pale yellowish brown, fine grained to sublithographic.

<u>From</u>	<u>To</u>	<u>Formation</u>
8415	(Circulation 1½ hrs.)	Limestone--very light gray, chalky to sub-lithographic.
8415	8420	Limestone--same as above.
8420	8425	Limestone--very light to yellowish gray, fine grain to chalky.
8425	8435	Shale--medium light to medium dark gray and dark reddish brown. Yellowish gray, microsucrosic dolomite.
8435	8445	Dolomite--yellowish gray, microsucrosic. Medium light to medium dark gray shale.
8445	8510	Dolomite--yellowish gray, microsucrosic. Very light gray fine grained to sublithographic limestone.
8510	8520	Limestone--yellowish gray to pale yellowish brown, fine grained to fragmental. Yellowish gray microsucrosic dolomite.
8520	8530	Shale--medium light to medium dark gray. Very light gray fine grained limestone.
8530	8545	Limestone--yellowish gray fine grained to fragmental. Medium light to medium dark gray shale.
8545	(Circulation)	Dolomite--grayish orange pink, microsucrosic. Medium light to medium dark gray shale.
8545	8550	Dolomite--same as above.
8550	8560	Limestone--very light to light gray, fine grained to sub-lithographic. Yellowish gray microsucrosic dolomite.
8560	8580	Dolomite--grayish orange pink, microsucrosic, some pinpoint porosity.
8580	8600	Dolomite--grayish orange pink to pale yellowish brown sucrosic, some pinpoint porosity.
8600	8660	Dolomite--pale yellowish brown, rhombic, some intergranular porosity.
8660	8675	Limestone--very light gray to pale yellowish brown, chalky to sublithographic. Pale brown, rhombic, intergranular porosity dolomite.
8675	8680	Limestone--same as above. Little white anhydrite.
8680	8710	Limestone--brownish gray to pale yellowish brown sub-lithographic and very light gray chalky.
8710	8715	Limestone--pale yellowish brown to brownish gray, sub-lithographic. Medium to medium dark gray shale.
8715	8719	Shale--pale reddish brown and grayish orange pink slightly calcareous. Very light to pale brown sublithographic limestone.
8719	(Circulation 1½ hrs.)	Limestone--pale yellowish brown to brownish gray, sublithographic. Very light gray microsucrosic dolomite.
8720	8730	Shale--pale reddish brown, silty, calcareous. Very light gray microsucrosic dolomite. Brownish gray sublithographic limestone.
8730	8750	Dolomite--very light gray, microsucrosic. Very light to brownish gray sublithographic limestone. Pale reddish brown argillaceous dolomite.
8750	8760	Dolomite--pale reddish brown, microsucrosic, argillaceous and very light to yellowish gray, microsucrosic.
8760	8790	Dolomite--very light gray and pale reddish brown microsucrosic. Very light to pale yellowish brown fine grained to sublithographic limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
8790	8805	Shale--medium to medium dark gray. Pale reddish brown argillaceous and very light gray microsucrosic dolomite. Very light to brownish gray, sublithographic limestone.
8805	8840	Dolomite--very light to light gray and argillaceous pale reddish brown, microsucrosic. Medium light to medium dark gray shale. Very light to brownish gray sublithographic limestone.
8840	8890	Dolomite--yellowish gray, pale yellowish brown and grayish orange pink, microsucrosic.
8890	8905	Dolomite--pale reddish brown and grayish orange pink, microsucrosic. Medium gray shale.
8905	8930	Shale--medium to medium dark gray. Pale reddish brown and light gray sucrosic dolomite.
8930	8955	Limestone--medium gray, fine grained, argillaceous.
8955	8970	Limestone--medium light to medium gray, fine grained, argillaceous.
8970	8990	Limestone--medium light to medium gray, fine grained argillaceous. Medium gray shale.
9000	9030	Limestone--medium light to medium dark gray, fine grained to fragmental.
9030	9045	Limestone--medium light to medium dark gray, fine grained to fragmental.
9045	9085	Limestone--medium light to medium dark gray, fine grained to fragmental. Pale reddish brown calcareous shale.
9085	9140	Limestone--very light to medium dark gray, fragmental. Pale reddish brown calcareous shale.
9140	9181	Limestone--very light gray fine grained and medium light to medium dark gray fine grained to fragmental. Pale reddish brown calcareous shale.
9181	(Circulation)	Limestone--white to pinkish gray, fine grained to oolitic.
9181	9222	Limestone--white to grayish orange pink, fine grained to oolitic.
9222	(Circulation)	Limestone--pale red, sublithographic and white fine grained to oolitic.
9225	9230	Limestone--white to pinkish gray fine grained to oolitic, dolomitic.
9230	9259	Limestone--white, fine grained to oolitic, dolomitic. Medium gray shale.
9259	(Circulation)	Dolomite--white to pinkish gray, fine grained to microsucrosic and oolitic.
9259	9320	Dolomite--same as above.
9320	9330	Shale--medium gray. White fine grained to microsucrosic dolomite.
9332	(Circulation ½ hr.)	Dolomite--white to pinkish gray, fine grained to microsucrosic, calcareous. Medium gray shale.
9332	9395	Dolomite--same as above.
9395	(Circulation)	Dolomite--white to yellowish gray, fine grained to microsucrosic, calcareous. Yellowish gray sublithographic limestone.
9395	(Circulation)	Dolomite--white to yellowish gray, fine grained to microsucrosic, calcareous. Yellowish gray sublithographic to fine grained limestone.

<u>From</u>	<u>To</u>	<u>Formation</u>
9395	9475	Dolomite--same as above.
9475	9495	Dolomite--white to yellowish gray, microsucrosic.
9495	9510	Dolomite--white to yellowish gray, microsucrosic to fine grained.
9510	9560	Dolomite--pale yellowish brown and white, fine grained to microsucrosic.
9560	9630	Dolomite--grayish orange pink to pale yellowish brown, fine grained to sucrosic.
9630	9665	Dolomite--pale yellowish brown, fine grained to sucrosic, some intergranular porosity.
9665	9703	Dolomite--very pale orange to pale yellowish brown, fine grained to sucrosic.
9703	(Circulation 1½ hrs.)	Dolomite--very pale orange to pale yellowish brown, fine grained to sucrosic.
9703	9760	Dolomite--same as above.
9760	9780	Dolomite--very pale orange, fine grained dense and grayish orange pink, fine grained to sucrosic.
9780	9820	Dolomite--very pale orange to grayish orange pink, fine grained to sucrosic. Medium gray shale.
9820	9865	Dolomite--very pale orange, sublithographic to fine grained.
9865	9875	Shale--medium to medium dark gray. Very pale orange sublithographic dolomite.
9875	9890	Shale--medium to medium dark gray and calcareous pale reddish brown.
9890	9900	Dolomite--very pale orange to pale yellowish brown, fine grained to sublithographic. Medium gray and calcareous pale reddish brown.
9900	9910	Shale--medium to medium dark gray and calcareous. Pale yellowish brown sublithographic dolomite.
9910	9930	Dolomite--pale yellowish brown, sublithographic. Medium dark gray shale.
9930	9960	Dolomite--pale yellowish brown sublithographic. Medium gray shale.
9960	9970	Sandstone--fine grained calcareous. Pale yellowish brown fine grained to sublithographic dolomite.
9970	10,000	Dolomite--pale yellowish brown, fine grained to sublithographic. Fine grained calcareous sandstone.
10,000	10,020	Dolomite--pale yellowish brown, fine grained to sublithographic.
10,020	10,035	Dolomite--pale yellowish brown, fine grained to sublithographic. Medium to medium dark gray shale.
10,035	10,050	Limestone--light to medium light gray fragmental and pale yellowish brown fine grained. Pale yellowish brown sublithographic dolomite.
10,050	10,060	Limestone--pale yellowish brown, fine grained, dolomitic and light gray fragmental.
10,060	10,065	Dolomite--pale yellowish brown, fine grained to sublithographic. Pale yellowish brown fine grained and light gray fragmental limestone.
10,065	10,090	Limestone--very light to medium gray, fragmental. Medium gray shale.
10,090	10,120	Limestone--very light to medium gray, fragmental and pale yellowish brown fine grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,120	10,130	Limestone--very light to pale yellowish brown, fine grained to fragmental.
10,130	10,140	Limestone--very pale orange to pale yellowish brown, fragmental to sublithographic.
10,140	10,145	Limestone--very pale orange to pale yellowish brown, fragmental to sublithographic. Very pale orange microsucrosic dolomite.
10,145	10,150	Limestone--dark yellowish brown, lithographic and very pale orange fine grained to fragmental.
10,157	10,158	Core #3. Limestone--pale yellowish brown, finely sucrosic.
10,158	10,160	Limestone--pale yellowish brown, finely sucrosic.
10,160	10,162	Limestone--yellowish gray, finely sucrosic.
10,162	10,166	Limestone--pale yellowish brown, microsucrosic, dolomitic.
10,166	10,168	Limestone--pale yellowish brown, microsucrosic, tight, streaked oil stain, good oil cut.
10,168	10,170	Limestone--pale yellowish brown and dusky yellowish brown streaked oil stain, good oil cut, fine grained to sublithographic, tight.
10,170	10,171	Limestone--pale brown to pale yellowish brown, medium to coarse grained, some intergranular porosity, slight oil cut.
10,171	10,172	Limestone--pale yellowish brown, oolitic to fragmental, intergranular porosity, dead oil stain, good oil cut.
10,172	10,174	Limestone--yellowish gray, and dark yellowish brown sublithographic, streaked oil stain, slight oil cut.
10,174	10,176	Limestone--brownish gray, lithographic.
10,176	10,178	Limestone--dusky yellowish brown, fragmental to sublithographic tight. Slight oil cut.
10,178	10,180	Limestone--dusky yellowish brown, fragmental to sublithographic tight. Slight oil cut.
10,180	10,182	Limestone--pale yellowish brown fragmental, dead oil stain, good oil cut.
10,182	10,186	Limestone--brownish gray, fragmental, slight oil cut.
10,186	10,188	Limestone--brownish gray, coarse grained to sublithographic.
10,188	10,190	Dolomite--yellowish gray and medium dark gray, sublithographic.
10,190	10,192	Dolomite--pale yellowish brown and medium, sublithographic, white anhydrite inclusions.
10,192	10,200	Anhydrite--brownish gray to medium dark gray.
10,200	10,202	Anhydrite--brownish gray. Yellowish gray microsucrosic dolomite.
10,202	10,204	Dolomite--yellowish gray, microsucrosic.
10,204	10,206	Dolomite--yellowish gray, microsucrosic. White to medium dark, gray.
10,206	10,208	Anhydrite--white to medium dark gray.
10,208	10,210	Dolomite--yellowish gray, microsucrosic, streaked oil stain and oil cut.
10,210	10,212	Limestone--dark yellowish brown, sublithographic, dead oil stain.
10,212	10,214	Limestone--pale yellowish brown, sublithographic.
10,214	10,216	Anhydrite--pale yellowish brown to medium dark gray.
10,216	10,220	Limestone--pale yellowish to gray brown, fragmental with large anhydrite inclusions.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,220	10,222	Dolomite--yellowish gray, microsucrosic, oil stain and cut. Brownish gray fragmental limestone.
10,222	10,224	Dolomite--brownish gray, sublithographic.
10,224	10,226	Core end. Limestone--pale yellowish brown, sucrosic to fragmental, anhydrite inclusions.
10,226	10,235	Poor samples.
10,235	10,250	Dolomite--yellowish gray to pale yellowish brown, fine grained to microsucrosic. Pale yellowish brown sub-lithographic limestone.
10,250	10,270	Limestone--pale yellowish orange to pale yellowish brown, fine grained to sublithographic. Yellowish gray microsucrosic dolomite.
10,270	10,285	Dolomite--pale yellowish orange, fine grained.
10,285	10,300	Limestone--very pale orange, fine grained.
10,300	10,320	Dolomite--very pale orange, microsucrosic. Very pale orange fine grained limestone.
10,320	10,330	Limestone--very pale orange to pale yellowish brown fine grained stone.
10,330	10,340	Dolomite--pale yellowish brown, microsucrosic, calcareous.
10,340	10,350	Limestone--pale yellowish brown, fine grained, dolomitic.
10,350	10,360	Limestone--pale yellowish brown, fine grained to sub-lithographic.
10,360	10,375	Limestone--white to pale yellowish brown, fine grained to sublithographic.
10,375	10,390	Limestone--pale yellowish brown, fine grained to sub-lithographic.
10,390	10,455	Limestone--very pale orange to pale yellowish brown, fine grained to fragmental.
10,455	10,515	Limestone--yellowish gray to pale yellowish brown, fine grained to fragmental, dolomitic in part.
10,515	10,535	Limestone--very pale orange to pale yellowish brown fine grained to fragmental.
10,535	10,620	Limestone--white to pale yellowish brown, fine grained to fragmental.
10,620	10,640	Limestone--yellowish gray to pale yellowish brown, fine grained to fragmental.
10,640	10,665	Limestone--very light gray to pale yellowish brown, fragmental to sublithographic.
10,665	10,675	Limestone--very light to pale yellowish brown, fine grained to sublithographic.
10,675	10,700	Limestone--very light gray to pale yellowish brown, fine grained to fragmental and sublithographic.
10,700	10,710	Limestone--very light to brownish gray, fragmental to sub-lithographic.
10,710	10,720	Limestone--white, chalky.
10,720	10,770	Limestone--white to yellow gray chalky. Medium light to medium gray shale.
10,770	10,795	Shale--medium dark to greenish gray. Very light gray to pale yellowish brown, chalky to fragmental limestone.
10,795	10,815	Shale--medium to medium dark gray.
10,815	10,840	Shale--dark to dark greenish gray.
10,840	10,875	Shale--dark greenish gray, splintery.

<u>From</u>	<u>To</u>	<u>Formation</u>
10,875	10,890	Shale--dark to dark greenish gray, splintery.
10,890	10,930	Sandstone--fine to medium grained, subangular, frosted to clear. Dark to dark greenish gray shale.
10,930	10,935	Core #5. Sandstone--very light gray, very fine grained, tightly cemented, dead oil stain, slight oil cut.
10,935	10,940	Sandstone--medium to coarse grained, rounded to subrounded, frosted, dead oil stain, oil cut, some porosity. Lens medium dark gray carbonaceous shale gives oil cut and gives petroliferous odor when heated.
10,940	10,945	Sandstone--very fine to coarse grained, rounded frosted, some porosity, carbonaceous residue, slight oil cut.
10,945	10,950	Sandstone--fine to coarse grained, rounded, frosted, friable, oil cut.
10,950	10,955	Sandstone--fine to medium grained, rounded, frosted, carbonaceous residue, slight oil cut.
10,955	10,965	Sandstone--fine to coarse grained, rounded, frosted, friable, oil stain, oil cut.
10,965	10,970	Sandstone--fine to coarse grained, rounded, frosted, friable, has good fluorescence, very good oil cut.
10,970	10,974½	Sandstone--very fine grained, tightly cemented, black carbonaceous residue.
10 974½	10,975	Shale--medium dark gray, carbonaceous, arenaceous, inclusion of fine to coarse grained sandstone.
10,975	10,976	Shale--medium dark gray, carbonaceous, arenaceous.
10,976	10,976½	Conglomerate, medium gray, carbonaceous, residue.
10,976½	10,980	Sandstone--fine to coarse grained, quartzitic with dark greenish gray greasy shale streaks.
10,980	10,985	Sandstone--fine to coarse grained, tightly cemented. Dark greenish gray shale streaks.
10,985	10,986	Sandstone--fine to very coarse grained, rounded frosted some red iron stains, tightly cemented.
10,986	10,990	Sandstone--white very fine grained, red and green stains, tightly cemented.
10,990	11,000	Sandstone--white, very fine grained, tightly cemented. Medium dark gray, slate.
11,000½	11,001	Sandstone--fine to coarse grained, subangular, frosted to clear. Ordovician conodonts - Drepanodus.
11,001	11,004	Sandstone--fine to medium grained, subangular, frosted to clear. Carbonaceous shale streaks.
11,004	11,008	Sandstone--medium grained, subrounded to subangular, frosted, friable, porous very good fluorescence and oil cut.