

# NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 27

## Summary of the Lion Oil Company Sebelius No. 1 Rolette County, North Dakota

By Morton Strassberg  
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Lion Oil Company-Sebelius No. 1, Rolette County, North Dakota. SE 1/4 NW 1/4 Section 23, T. 161N, R. 73W (1980 feet from N. line, 1980 feet from W. line) Elevation: 1627 feet K. B.

The Lion Oil Seblius No. 1 was spudded June 8, 1952 and 9 5/8 inch casing was set at 403 feet. The well was completed as a dry hole July 7, 1952, and was abandoned. Total depth 5505 feet.

Tests-DST 3310-3384 open 15 minutes, shut in 10 minutes, recovered 1760 feet salt water. F.P. 1000, S.I.P. 1375, H.P. 1800.

Cores - #1 2614-2656  
          #2 2656-2707  
          #3 2707-2762  
          #4 3369-3384  
          #5 3543-3553

Fifteen sack cement plugs were set at the following depths: 5353, 4820, 4120, 3310, 2670, 1810, 420, at top of surface casing.

Formation tops were determined from sample and electric logs not all lithologic tops called in following list. Colors determined from rock color chart.

### Formation Tops

<u>Formation</u>	<u>Depth</u>
Cretaceous System	
Niobrara Formation	1090
Greenhorn Formation	1488
Belle Fourche-Mowry	1610
Muddy Zone	1728
Dakota	1868
Jurassic System	
Morrison Formation	2043
Sundance Formation	2142
Piper Formation	2430
Triassic System	
Spearfish Formation	2633
Mississippian System	
Charles Formation	2653
Lodgepole Formation	2692
Bakken Formation	3262
Devonian System	
Three Forks Formation	3287

<u>Formation</u>	<u>Depth</u>
Nisku Formation	3302
Duperow Formation	3388
Souris River Formation	3761
Dawson Bay Formation	4000
Prairie Evaporites	4138
Winnipegosis Formation	4196
Ashern Formation	4307
Silurian System	
Interlake Group	4370
Ordovician System	
Upper Stony Mtn.	4598
Lower Stony Mtn	4686
Red River Formation	4761
Winnipeg Formation	5350
Winnipeg Sandstone	5470
Pre-Cambrian	5502

<u>From</u>	<u>To</u>	<u>Formation</u>
460	540	Shale, medium gray.
540	700	Shale, medium light gray.
700	730	Shale, medium light gray.
730	750	Shale, medium light to medium gray.
750	760	Shale, same, inoceramus fragments.
760	780	Shale, same, no inoceramus.
780	790	Shale, medium light gray, very light gray micaceous bentonite.
790	800	Shale, medium light gray.
800	810	Shale, same as above, white bentonite.
810	820	Shale, same as above, white, micaceous, bentonite.
820	870	Shale, medium light gray.
870	900	Shale, light gray bentonitic.
900	910	Shale, light to medium dark gray, bentonitic.
910	930	Shale, medium gray, bentonitic.
940	990	Shale, medium gray, bentonitic.
990	1050	Shale, medium gray, white bentonite.
1050	1060	Shale, dark to medium dark gray.
1060	1070	Shale, medium to medium dark gray.
1070	1080	Shale, medium to medium dark gray.
1080	1100	Shale, same as above, bentonitic.
Niobrara 1090		
1110	1160	Shale, same as above. White bentonite.
1160	1320	Shale, medium to medium dark gray, bentonitic.
1320	1420	Shale, medium dark to dark gray, very bentonitic.
1420	1460	Shale, medium dark gray, bentonitic.
1460	1470	Shale, medium dark to dark gray. Light gray fragmental limestone, made up entirely of calcite prisms.
1470	1480	Shale, medium dark gray, white specks.
Greenhorn 1488		
1480	1500	Shale, medium dark to dark gray, white specks. Shell fragments.

<u>From</u>	<u>To</u>	<u>Formation</u>
1500	1510	Shale, medium to medium dark gray.
1510	1520	Shale, medium dark to dark gray. Light gray fragmental limestone.
1520	1530	Shale, medium dark to dark gray. Much shell fragments.
1530	1550	Limestone, fragmental composed entirely of inoceramus shell fragments. Dark gray shale.
1550	1570	Shale, dark gray, little shell fragments.
1570	1580	Shale, same as above, white specks.
1580	1600	Shale, dark gray. White bentonite.
1600	1610	Shale, medium dark to dark, gray. White bentonite.
Belle Fourche Mowry 1610		
1610	1620	Shale, medium to medium dark gray, white specks.
1620	1630	Shale, same as above, white bentonite.
1630	1640	Shale, medium dark gray.
1640	1650	Shale, medium dark to dark gray, white specks.
1650	1690	Shale, same as above, white bentonite.
1690	1740	Shale, medium dark to dark gray, white specks.
Muddy 1728		
1740	1770	Shale, medium dark gray.
1770	1780	Shale, same as above, white specks.
1780	1810	Shale, medium dark gray.
1810	1830	Shale, same as above, few white specks.
1820	1840	Shale, medium to medium dark gray, white specks.
1840	1850	Shale, medium dark gray, white specks.
1850	1860	Sandstone, medium to coarse, subrounded, to subangular. Medium dark gray shale, pyrite.
1860	1870	Sandstone, fine grained, subrounded, frosted, calcite cement, few medium subrounded, frosted grains. Medium dark gray shale.
Dakota 1868		
1870	1890	Sandstone, same as above, pyritic.
1890	1900	Sandstone, light gray, very fine grained, calcareous, fine grained calcareous, and medium to coarse, subrounded, frosted.
1900	1910	Sandstone, fine to medium subrounded to subangular, frosted, little very fine grained.
1910	1940	Sandstone, same as above, pyritic.
1940	1980	Shale, dark gray. Fine to medium grained, subrounded, frosted and very fine, light gray sandstone.
1980	1990	Shale, medium dark gray, fine to very fine grained sandstone.
1990	2000	Shale, same as above, no gypsum.
2000	2010	Shale, same as above, more shale.
2010	2020	Shale, same as above, Very fine grained, light gray, calcareous sandstone.
2020	2030	Sandstone, light gray, very fine grained, calcareous. Little white anhydrite. Medium dark gray shale.
2030	2040	Shale, medium dark gray. Some very fine grained sandstone and anhydrite.

<u>From</u>	<u>To</u>	<u>Formation</u>
Morrison 2043		
2040	2060	Shale, as above, few medium grained subrounded quartz.
2060	2070	Shale as above, light gray, very fine, calcareous sandstone.
2100	2110	Shale, medium dark to dark gray. Very fine grained calcareous sandstone.
2110	2130	Shale as above, light gray bentonite.
2130	2150	Shale, medium dark gray and light gray bentonite.
Sundance 2142		
2150	2160	Shale, medium dark gray and light gray bentonite.
2160	2190	Shale, medium dark, light gray, and little pale red.
2190	2200	Shale as above, little very fine grained sandstone.
2200	2210	Shale, light to medium light gray.
2210	2200	Shale as above, very fine grained sandstone.
2220	2240	Shale, medium light to medium gray, very fine grained sandstone.
2240	2260	Shale as above, pale red shale.
2260	2270	Shale as above, no sandstone.
2270	2280	Shale, medium to medium dark gray.
2280	2290	Shale, light to medium dark gray.
2290	2310	Shale as above, little pale red.
2310	2330	Shale as above, white anhydrite.
2330	2340	Shale, medium to medium dark and pale red calcareous.
2340	2350	Shale as above, anhydrite and fibrous gypsum. Few medium quartz grains.
2350	2360	Shale, medium to medium dark gray, little pale red calcareous.
2360	2370	Shale as above, free quartz medium grained, subangular, frosted.
2370	2400	Shale as above, more pale red shale.
2400	2410	Shale, medium gray, calcareous and pale red.
2410	2430	Shale as above, fine to medium subrounded frosted quartz grains.
Piper 2430		
2430	2440	Limestone, white, fine grained, dolomitic, pinpoint porosity.
2440	2450	Limestone as above, little fine grained subangular quartz.
2450	2460	Shale, medium dark gray. White, fine grained limestone and fine subangular quartz grains.
2460	2470	Shale, medium dark and light gray calcareous, white to very light gray dolomitic limestone.
2470	2490	Shale, dark gray. White gypsum and light olive gray limestone.
2490	2510	Limestone, white, fine grained dense. Medium dark gray shale.
2510	2550	Limestone, white, fine grained, dense. Medium gray shale.
2550	2560	Limestone, white to very light gray, sublithographic, medium gray shale.

<u>From</u>	<u>To</u>	<u>Formation</u>
2560	2570	Shale, medium to medium dark gray and pale red, calcareous. White to light gray limestone.
2570	2590	Shale as above, white aragonite.
2590	2600	Shale as above, considerable white aragonite.
2600	2614	Aragonite, white. Pale brown and medium dark gray shale.
Core 1		
2618	2625	Dolomite, very light to light gray, argillaceous, fine grained, dense.
2625	2630	Shale, light gray with medium gray streaks, calcareous. White aragonite.
2630	2633	Aragonite, white to light gray.
Spearfish 2633		
2633	2637	Shale, medium light gray, massive.
2637	2638	Aragonite, white to medium gray. Greenish gray massive shale.
2638	2639 1/2	Aragonite, white.
2639 1/2	2643	Aragonite, white to medium light gray.
2644	2656	Shale, light brownish gray and white aragonite.
Charles 2653		
Core 2		
2656	2662	Aragonite, white to pinkish gray.
2662	2664	Aragonite, white and medium to pink gray.
2664	2671	Aragonite, white to light gray.
2671	2675	Limestone, yellow to pinkish gray dense, tight.
2675	2686	Limestone, light brownish gray. Fine grained dense tight, argillaceous.
2686	2692	Limestone, light brownish gray and medium light gray variegated, argillaceous, tight.
Lodgepole 2692		
2692	2107	Limestone, pinkish gray, fine grained, tight.
2707	2717	Limestone, pinkish gray to light gray variegated, fine grained, tight.
Core 3		
2717	2720	Limestone, pinkish gray, fine grained, tight.
2720	2728	Limestone, pinkish gray, pseudo-oolitic, interstitial porosity.
2728	2740	Limestone, light brownish gray, fragmental, pinpoint porosity and light brownish gray fine grained tight argillaceous.
2740	2752	Limestone, variegated light gray and dusky red argillaceous, fine grained, tight.
2752	2762	Limestone, pinkish gray, medium to coarse grained, clastic, vuggy.
2762	2800	Limestone, same as above, pinpoint and interstitial porosity.

<u>From</u>	<u>To</u>	<u>Formation</u>
2800	2850	Limestone, light brownish to pinkish gray, fine to medium grained, interstitial porosity, clastic.
2850	2890	Limestone, pinkish gray, fine to medium grained, interstitial porosity, clastic.
2890	2910	Limestone, white to very light gray oolitic, intergranular porosity.
2910	2920	Limestone, same as above, some clastic limestone.
2920	2942	Limestone, same as above, iron stained.
2940	2980	Limestone, pinkish gray, medium grained, clastic interstitial porosity.
2980	3040	Limestone, light gray, medium grained, clastic, pinpoint porosity.
3040	3080	Limestone, light to medium light gray, fine grained, pinpoint porosity.
3080	3110	Limestone, very light to light gray, fine grained, pinpoint porosity. Medium gray shale.
3110	3140	Limestone, light gray, fine grained, dense.
3140	3160	Limestone, light gray fine grained. Some medium gray, fine grained, dense dolomite.
3160	3170	Limestone, light gray fine grained, dense.
3170	3210	Limestone, very light gray, fine grained.
3210	3220	Limestone, same as above. Medium gray fine grained dense dolomite.
3220	3240	Limestone, same as above, less dolomite.
3240	3250	Limestone, light to medium light gray, fine grained, dense.
3250	3260	Limestone, same as above, considerable, medium dark gray shale.
3260	3270	Shale, medium dark gray, medium light gray, fine grained limestone.
Bakken 3262		
3270	3300	Dolomite, light gray, fine grained, pinpoint porosity.
Three Forks	3287	
3300	3310	Dolomite, very light gray, fine grained, pinpoint porosity.
Nisku 3302		
3310	3330	Limestone very light to light gray, fine to medium grained, pinpoint porosity.
3330	3340	Dolomite, pale yellowish brown, fine grained, sucrosic, interstitial porosity.
Core 5		
3343	3353	Limestone, very light to light gray, fine grained, pinpoint porosity.
3360	3370	Limestone, pale yellowish brown, sucrosic, dolomitic.
Core 4		
3369	3384	Limestone, yellowish gray, fine grained, pinpoint porosity.

<u>From</u>	<u>To</u>	<u>Formation</u>
Duperow 3388		
3382	3390	Dolomite, light gray fine grained and pale yellowish brown sucrosic.
3390	3400	Dolomite, grayish orange pink, fine grained.
3400	3410	Dolomite, white sucrosic to pale red argillaceous medium dark gray shale.
3410	3420	Dolomite, white to very light gray fine grained.
3420	3430	Dolomite, light gray, fine grained, some pinpoint porosity.
3430	3440	Limestone, light gray, fine grained.
3440	3450	Dolomite, light gray fine grained dense.
3450	3460	Limestone, pale yellowish brown, fine to medium grained.
3460	3480	Limestone, white to very light gray fine grained dense to finely granular.
3480	3520	Limestone, very light gray to pinkish gray, finely granular pinpoint porosity.
3520	3530	Limestone, white to very light gray, fine grained porous.
3530	3540	Dolomite, light gray, fine grained, sucrosic, interstitial porosity. Very light gray fine grained limestone.
3540	3560	Dolomite, pale red, sucrosic, interstitial porosity.
3560	3570	Limestone, white to very light gray, fine grained, some pinpoint porosity. Yellowish gray sucrosic dolomite.
3570	3600	Limestone, moderate yellowish brown, sucrosic, dolomitic interstitial porosity.
3600	3630	Dolomite, pale yellowish brown, fine grained, sucrosic interstitial porosity.
3630	3680	Limestone white, fine grained, dense.
3680	3690	Limestone, white to very light gray, fine grained, very porous.
3690	3700	Dolomite, light gray, fine grained, calcareous, very porous.
3700	3750	Limestone, white, fine grained, pinpoint porosity.
3750	3760	Dolomite, light gray, sucrosic, interstitial porosity.
Souris River 3761		
3760	3770	Dolomite, same as above, white, fine grained limestone.
3770	3790	Limestone, white, fine grained, dense.
3790	3800	Limestone, light gray, fine grained, dense.
3800	3820	Dolomite, yellowish gray, finely granular, pinpoint porosity.
3820	3830	Limestone, very light gray, fine grained, dolomitic.
3830	3840	Dolomite, very light to light gray.
3840	3850	Dolomite, yellowish gray, fine grained, sucrosic, interstitial porosity.
3850	3860	Limestone, very light gray, fine grained. Some light gray fine grained dolomite.
3860	3870	Dolomite, light gray, fine grained.

<u>From</u>	<u>To</u>	<u>Formation</u>
3870	3880	Limestone, light gray, fine grained. Some light gray fine grained dolomite.
3880	3890	Limestone, light grey, fine grained.
3890	3900	Limestone, same as above, white anhydrite.
3900	3910	Dolomite, yellowish gray, fine grained, dense.
3910	3920	Dolomite, yellowish gray, fine grained, sucrosic.
3920	3930	Dolomite, very light to light gray, fine grained.
3930	3940	Dolomite, light olive gray, fine grained, pinpoint porosity.
3940	3970	Dolomite, same as above, some light gray fine grained dolomite.
3970	3990	Dolomite, same as above, some light gray fine grained limestone.
3990	4000	Limestone, very light gray, fine grained, dense. Light gray, finely granular, dolomite with pinpoint porosity.
Dawson Bay 4000		
4000	4010	Limestone, white, sublithographic, dense.
4010	4020	Limestone, same as above, yellowish gray finely granular dolomite.
4020	4030	Limestone, same as above, more dolomite.
4030	4050	Dolomite, pale yellowish brown, sucrosic, interstitial porosity.
4050	4080	Dolomite, pale yellowish brown, sucrosic, interstitial porosity.
4080	4100	Dolomite, light olive gray, fine grained, pinpoint porosity.
4100	4140	Limestone, very light to light gray, fine grained, dense.
Prairie Evaporites 4138		
4140	4150	Dolomite, pinkish gray, fine grained, argillaceous.
4150	4170	Dolomite, light brown, fine grained, argillaceous.
4170	4180	Dolomite, light to medium light gray, fine grained.
4180	4190	Dolomite, same as above, white anhydrite.
Winnipegosis 4196		
4190	4200	Dolomite, very light gray, fine grained dense to light gray, finely granular, pinpoint porosity.
4200	4230	Dolomite, light brownish gray, fine grained, sucrosic, interstitial porosity.
4230	4340	Limestone, light olive gray, fine grained, pinpoint porosity.
4240	4250	Limestone, yellowish gray, fine grained, pinpoint porosity.
4250	4290	Limestone, light gray, fine grained dense.
4290	4310	Limestone, very light to light gray, fine grained dense.
Ashern 4307		
4310	4320	Dolomite, light gray, fine grained, dense.



<u>From</u>	<u>To</u>	<u>Formation</u>
4320	4330	Limestone, light gray, fine grained, dense.
4330	4340	Limestone, light brown, argillaceous, fine grained.
4340	4350	Limestone, same as above, medium dark gray shale.
4350	4390	Limestone, pale red, fine grained, argillaceous, medium gray shale.
Interlake 4370		
4390	4410	Limestone, pinkish gray, sublithographic.
4410	4420	Limestone, white, fine grained, sublithographic.
4420	4440	Limestone, white to pinkish gray, sublithographic to fine grained.
4440	4450	Dolomite, white to pinkish gray, fine grained.
4450	4470	Dolomite, same as above, white sublithographic limestone.
4470	4480	Limestone, white, sublithographic.
4480	4520	Dolomite, white, fine grained, dense.
4520	4540	Limestone, white, sublithographic.
4550	4570	Dolomite, white, fine grained dense.
4570	4580	Dolomite, moderate orange pink, fine grained dense.
4580	4600	Dolomite, white, fine grained, dense.
Upper Stony Mtn. 4598		
4600	4610	Dolomite, white, iron stained mottled, fine grained, dense.
4610	4640	Dolomite, white iron stained, fine grained, dense.
4640	4670	Dolomite, white, fine grained, dense.
Lower Stony Mtn. 4686		
4670	4700	Dolomite, light gray, finely granular.
4700	4750	Limestone, light to medium light gray.
4750	4760	Limestone, same as above, medium dark gray shale.
Red River 4761		
4760	4770	Limestone, very light to light gray, fine grained dense.
4770	4790	Limestone, same as above, medium gray shale.
4790	4820	Limestone, very light gray, fine grained dense.
4820	4830	Dolomite, white, sublithographic.
4830	4840	Dolomite, white, sublithpgraphic.
4840	4850	Dolomite, same as above, some light gray dolomite.
4850	4870	Dolomite, very light to light gray, fine grained, dense.
4870	4880	Limestone, very light gray, fine grained dense. Light gray fine grained dolomite.
4880	4970	Limestone, white to very light, fine grained, dense.
4970	5030	Limestone, very light gray fine grained dense and medium light gray, fine grained, dolomitic.
5030	5110	Limestone, white to very light gray fine grained dense and light gray, finely granular.
5110	5130	Limestone, white to very light gray fine grained.
5130	5150	Limestone, same as above and light gray, finely granular, dolomitic.

<u>From</u>	<u>To</u>	<u>Formation</u>
5150	5160	Limestone, same as above, medium dark gray shale.
5160	5250	Limestone, white to very light gray dense.
5250	5270	Limestone, white to light gray, fine grained, dense. Light gray fine grained dense dolomite.
5270	5300	Limestone, white to light gray, fine grained, dense.
5300	5310	Limestone, white to light gray fine grained.
5310	5320	Shale, medium dark gray and olive gray. Fine to medium grained, subrounded to subangular, frosted sandstone.
5320	5340	Limestone, very light to light gray fine grained.
5340	5350	Limestone, same as above. Much medium gray shale.
Winnipeg 5350		
5350	5370	Shale, dark greenish gray and olive gray. Light gray, fine grained limestone and pyrite.
5370	5380	Shale, same as above. No limestone and pyrite.
5380	5390	Shale, dark greenish gray.
5390	5400	Shale, dark greenish gray and gray red.
5400	5410	Shale, same as above, mostly gray red.
5410	5440	Shale, dark greenish gray and olive gray.
5440	5450	Shale, dark greenish gray and olive gray.
5450	5470	Shale, dark greenish gray and brown gray.
Winnipeg Sand 5470		
5470	5500	Sandstone, fine to medium grained subrounded, frosted iron stained.
Pre-Cambrian 5502		
5500	5510	Sandstone, same as above. Pink granite.