

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 85

Summary of the Pure Oil Company - O. Gunderson No. 1
Divide County, North Dakota
Well No. 548 - Permit No. 562

by Morton Strassberg
June, 1954

Pure Oil Company - Gunderson No. 1, Divide County, North Dakota, C SW 1/4 NW 1/4 Section 11, T. 160N., R. 98W. (1940 feet from N. line and 4774 feet from E. line). Elevation KB 2242 and G.L. 2227.

The Pure Oil Company - Gunderson No. 1 was spudded March 27, 1954 and 651 feet of 13 3/8 inch casing was set with 600 sacks of cement. The well was completed as a dry hole May 6, 1954. Total depth 8,066 feet.

TESTS:

- DST 1 Set 7 1/4" packer at 7729, 77 feet anchor, 5/8" choke on bottom, 1 inch on top. Seven-five eighths inch rat hole 86', 18 feet perforations 17 anchor on top and bottom. Four hour test, 30 minutes shut in for BHP. Very slight blow through 1/4 inch hose when tool opened. Continued for 1 hour, increased in blow in 2 hours, continued increase in blow in 3 hours. Continued steady blow last hour. Recovered 120 feet rotary mud, 90 feet rotary mud slightly gas cut and 150 feet rotary mud slightly oil and gas cut, good odor. No free oil. Initial Hydrostatic Pressure 4300#, Initial Flowing -0-, Final Flowing 300#, 30 minutes shut in 160# and Final Hydrostatic 4130#.
- DST 2 Set 7 1/4" packer at 7813. Opened tool at 10:40 A.M., Closed 2:40 P.M., 4 hour test. Shut in 30 minutes for BHP. Weak blow when tool opened. Increased in blow in 4 minutes, steady increase in blow first hour. Little increase in blow at end of second hour. Continued steady blow for third hour and slight decrease in blow fourth hour. Pulled tool. Odor of gas 40 feet above fluid. Recovered 140 feet gas cut mud 90 feet watery gas cut mud, 180 feet black gas cut salty water, 270 feet black gas cut salty sulfur water. Pressures: Initial Hydrostatic 4470#, Initial Flowing -0-, Final Flowing 330#, 30 minutes shut in 3150#, Final Hydrostatic 4330#.

CORES:

#1	7720 - 7778
#2	7778 - 7806
#3	7807 - 7865
#4	7865 - 7923

Cement plugs were set at the following depths:

7689 - 7614	30 sacks
4714 - 4764	30 sacks
675 - 599	50 sacks
66 - surface	50 sacks

Formation tops were determined from samples, cores, electric, micro and radioactivity logs and were corrected to electric log tops unless otherwise stated. Not all lithologic tops were called in the following list. Colors were determined from the rock color chart.

FORMATION TOPS

Cretaceous System		
Pierre Formation	1574	
Niobrara Formation	3737	
Greenhorn Formation	4083	
"Muddy"	4493	
Dakota	4738	
Jurassic-System		
Morrison Formation	5020	Radioactivity
Sundance Formation	5351	
Piper Formation	5916	
Triassic System		
Spearfish Formation	6173	
Mississippian System		
Amsden Formation	6421	
Big Snowy Group	6484	
Kibbey Formation	6905	
Charles Formation	7120	
Mission Canyon Formation	7664	Microlog
Total Depth	8066	

0	70	Sand--medium to very coarse grained.
70	190	Sand--fine to very coarse grained.
190	200	Lignite--black. Fine to very coarse grained sand.
200	230	Sand--fine to very coarse grained. Medium light gray shale.
230	250	Sand--very fine to very coarse grained sand.
250	290	Sand--fine to very coarse grained. Black lignite.
290	300	Sand--fine to very coarse grained.
300	330	Sand--fine to very coarse grained. Black lignite.
330	340	Lignite--black.
340	360	Sand--fine to very coarse grained. Black lignite.
360	410	Lignite--black. Light gray shale.
410	430	Shale--light gray. Black lignite.
430	450	Shale--medium light gray calcareous.
450	470	Shale--medium light gray, silty, calcareous.
470	480	Shale--very light gray calcareous.
480	490	Shale--very light gray calcareous and dark gray,
490	530	Shale--very light gray, calcareous.
530	550	Lignite--black.
550	560	Shale--very light gray, calcareous. Medium to coarse grained sand.
560	590	Sand--very fine to very coarse grained. Black lignite.
590	610	Lignite--black. Fine to coarse grained sand.
610	640	Shale--medium light gray calcareous. Black lignite.
640	810	Lignite--black.
870	890	Shale--very light gray calcareous.

890	970	Shale--medium light gray, calcareous.
910	1100	Shale--medium light gray, calcareous, arenaceous.
1100	1150	Shale--medium light to medium gray.
1150	1180	Shale--light to medium gray. Fine to coarse grained sand.
1180	1210	Shale--light to medium light gray.
1210	1230	Shale--light to medium gray. Fine to coarse grained sand.
1230	1240	Shale--light to medium gray calcareous.
1240	1310	Lignite--black.
1310	1330	Lignite--black. Fine grained calcareous sandstone.
1330	1350	Shale--light to medium light gray.
1350	1380	Shale--light to medium light gray, calcareous.
1380	1440	Shale--light to medium gray, calcareous.
1440	1460	Lignite--black. Shale, light gray calcareous.
1460	1480	Sandstone--fine grained calcareous. Black lignite.
1480	1500	Lignite--black.
1500	1510	Shale--medium light gray. Black lignite.
1510	1530	Shale--light to medium gray.
1530	1570	Shale--light to medium gray. Black lignite.
1570	1600	Sandstone--fine grained, calcareous.
1600	1690	Shale--medium light gray. Fine grained calcareous sandstone.
1690	2080	Shale--light to medium light and pale brown.
2080	2230	Shale--light to medium light gray.
2230	2390	Shale--light to medium light and olive gray.
2390	2420	Shale--light to medium light. White bentonite.
2420	2450	Shale--light to medium gray and light olive gray, bentonitic.
2450	2600	Shale--medium gray and light brown.
2600	2900	Shale--medium light to medium gray.
2900	2960	Shale--light to medium gray and light brown.
2960	3050	Shale--light to medium light gray.
3050	3110	Shale--medium light to medium gray and pale brown. Calcite prisms.
3110	3440	Shale--medium light gray.
3440	3680	Shale--medium light to medium gray.
3680	3750	Shale--medium light to medium gray and pale yellowish brown.
3750	3820	Shale--medium to medium dark gray, white specks, calcareous.
3820	4240	Shale--medium light to dark gray, white specks calcareous.
4240	4270	Shale--dark gray.
4270	4330	Limestone--medium light gray, calcite prisms. Dark gray white specked, calcareous shale.
4330	4390	Shale--dark gray, white specks, calcareous.
4390	4510	Shale--dark gray.
4510	4570	Shale--medium light and dark gray. Very light gray calcareous siltstone.
4570	4620	Shale--medium light and dark gray.
4620	4630	Shale---medium dark to dark gray. Very fine grained calcareous sandstone and coarse free quartz.
4630	4680	Shale--medium light to dark gray.
4680	4690	Sandstone --very light gray, very fine grained. Dark gray shale.
4690	4740	Shale--medium light and dark gray. Very light gray siltstone.
4740	4770	Siltstone---very light gray. Dark gray shale.

4770	4820	Siltstone--very light gray and very fine grained sandstone.
4820	4840	Sandstone--very light gray, very fine grained. Iron stained siltstone concretions.
4840	4860	Sandstone--very light gray, very fine grained. Medium to dark gray shale.
4860	4870	Sandstone--very light gray, very fine grained. Iron stained siltstone concretions. Dark gray shale.
4870	4890	Shale--medium dark to dark gray. Very fine grained sandstone. Iron stained siltstone concretions.
4890	4940	Shale-medium to dark gray. Very light gray siltstone.
4940	4960	Shale--medium to dark gray. Very light gray siltstone and coarse free quartz.
4960	4990	Sandstone--fine grained and very light gray siltstone.
4990	5020	Shale--medium to dark gray. Very light gray siltstone.
5020	5070	Sandstone--very fine to fine grained. Medium to dark gray shale.
5070	5090	Sandstone--fine to very coarse grained. Medium to dark gray shale.
5090	5110	Sandstone--fine to very coarse grained. Greenish gray siltstone. Medium dark gray shale.
5110	5130	Shale-medium to dark gray. Greenish gray siltstone and fine to very coarse grained sandstone.
5130	5240	Shale--medium to dark gray. Light to greenish gray siltstone.
5240	5350	Shale--medium light to greenish and dark gray. Light to greenish gray siltstone.
5350	5360	Shale--light to medium gray. Light to greenish gray siltstone. Light gray limestone.
5360	5370	Limestone--white to very light gray, fine grained to fragmental. Medium light to greenish gray shale. Very fine grained sandstone.
5370	5380	Sandstone--very fine grained, slightly glauconitic. Medium to greenish gray shale. Very light gray fine grained limestone.
5380	5400	Shale--medium to greenish gray.
5400	5420	Sandstone--salt and pepper, fine grained calcareous. Medium to greenish gray shale.
5420	5450	Shale--medium light to medium gray. Light gray to grayish green siltstone.
5450	5490	Siltstone--light gray to pale yellowish brown calcareous. Medium light to medium and pale brown.
5490	5510	Shale--medium light to medium gray. Light to medium light gray siltstone.
5510	5520	Siltstone--light to pale yellowish brown. Medium light to greenish gray.
5520	5530	Shale--medium to dark greenish gray. Light to greenish gray siltstone.
5530	5560	Shale--medium to dark greenish gray. Very light gray fragmental limestone.
5560	5680	Shale--medium light to medium and dark greenish gray.
5680	5700	Shale--medium light to greenish gray and pale brown.
5700	5710	Shale--medium light to greenish gray.
5710	5730	Shale--medium light to greenish gray and pale brown.
5730	5770	Shale--medium light to greenish gray and grayish red.

5770	5780	Limestone--very light to yellowish gray, fine grained to fragmental. Medium light to greenish gray and grayish red shale.
5780	5820	Shale--medium light to greenish gray and gray red. Very light gray fine grained limestone.
5820	5930	Shale-medium light to greenish gray, pale brown and gray red. Very light gray fragmental, arenaceous limestone.
5930	5950	Shale--medium light to greenish gray and grayish red. Pale brown fine grained limestone.
5950	5960	Shale--medium light to greenish gray and gray red. Very light gray fine grained limestone.
5960	6000	Limestone--white fine grained to sublithographic. Medium gray and gray red shale.
6000	6060	Limestone--very light to pale yellowish brown, sub-lithographic. Medium gray shale.
6060	6080	Shale--medium gray and gray red. Very light to pale yellowish brown, sublithographic limestone.
6080	6100	Shale--medium gray and gray red.
6100	6150	Shale--medium gray and gray red. Pale yellowish brown limestone with anhydrite inclusions.
6150	6160	Shale--medium gray. White anhydrite.
6160	6190	Shale--medium gray and gray red silty.
6190	6240	Siltstone--pale reddish brown. Medium gray and gray red shale.
6240	6310	Siltstone--pale reddish brown. Medium gray shale.
6310	6420	Siltstone--pale reddish brown, calcareous, arenaceous.
6420	6440	Shale--medium gray. Medium light gray fine grained dolomite.
6440	6450	Dolomite--pale yellowish brown, fragmental to sub-lithographic, anhydrite inclusions.
6450	6470	Dolomite--yellowish gray to pale yellowish brown, fine grained to sublithographic.
6470	6490	Sandstone--fine grained, calcareous. Yellowish gray to pale yellowish brown, sublithographic dolomite. Grayish red shale.
6490	6520	Shale--medium gray and gray red. Fine grained sandstone.
6520	6600	Shale--gray and pale red, dark yellowish orange and medium gray.
6600	6630	Shale--gray and moderate red and medium to medium dark gray.
6630	6690	Shale--medium to dark gray and gray red.
6690	6720	Shale--gray red and medium dark gray. Gray red siltstone.
6720	6750	Shale--gray red and medium dark to dark gray. Fine grained sandstone.
6750	6770	Shale--medium to dark gray and gray red.
6770	6780	Dolomite--yellowish to pinkish gray, fine grained. Medium to dark gray and gray red shale.
6780	6800	Shale--medium gray and gray red. Pale red fine grained limestone. Fine grained free quartz.
6800	6820	Limestone--grayish pink to pale red. Medium gray to gray red shale.
6820	6830	Shale--medium gray and moderate reddish orange. Pale red dolomite.
6830	6840	Limestone--grayish red, fine grained argillaceous.
6840	6880	Limestone--grayish red, fine grained, argillaceous. Pale red fine grained dolomite.

6880	6890	Sandstone--fine grained calcareous. Pale red fine grained dolomite. Medium gray and gray red shale.
6890	6940	Siltstone--pale red to pale reddish brown, calcareous. Fine to medium grained sandstone.
6940	6960	Shale--medium gray.
6960	6980	Shale--medium gray, gray red, and moderate yellowish brown.
6980	6990	Sandstone--fine to medium grained, calcareous, iron stained. Pale reddish brown calcareous siltstone. Medium gray and gray red shale.
6990	7010	Dolomite--pale reddish brown, fine grained, argillaceous.
7010	7030	Limestone--white to pale yellowish brown. White anhydrite.
7030	7040	Limestone--very light gray, oolitic, some inter granular porosity.
7040	7050	Siltstone--pale red, calcareous, arenaceous. Very light to yellowish gray fine grained to oolitic limestone.
7050	7060	Sandstone--pale red, fine grained calcareous. Medium to medium dark gray shale.
7060	7080	Siltstone--pale red to pale reddish brown, arenaceous, calcareous.
7080	7090	Shale--medium to medium dark gray. Pale red, arenaceous, silty dolomite.
7090	7120	Shale--medium gray and gray red. Pale red calcareous siltstone.
7120	7130	Shale--medium to medium dark gray and gray red. Pale red silty dolomite.
7130	7220	Dolomite--pale red, silty. Medium gray and gray red shale.
7220	7240	Dolomite--pale red, fine grained and pale reddish brown, silty.
7240	7250	Anhydrite--white to light gray.
7250	7270	Anhydrite--white to light gray. Pale yellowish brown sucrosic dolomite.
7270	7280	Dolomite--pale yellowish brown, fine grained to sucrosic. White anhydrite.
7280	7310	Shale--medium gray.
7310	7320	Anhydrite--white to pale yellowish brown.
7320	7340	Limestone--brownish gray, sublithographic. White anhydrite.
7340	7350	Limestone--pale brown, oolitic. White anhydrite.
7350	7390	Anhydrite--white to pale yellowish brown.
7390	7400	Anhydrite--yellowish to light gray.
7400	7410	Limestone--brownish gray, sublithographic. Light gray anhydrite.
7410	7440	Limestone--brownish gray, oolitic to sublithographic, intergranular porosity.
7440	7450	Limestone--brownish gray, sublithographic to oolitic. White anhydrite.
7460	7530	Shale--medium gray. White anhydrite.
7530	7560	Limestone--brownish gray to pale yellowish brown, fine grained to oolitic and sublithographic, some intergranular porosity.
7560	7570	Limestone--brownish gray, sublithographic.
7570	7590	Shale--medium dark gray and gray red.
7590	7600	Anhydrite--white.
7600	7610	Shale-medium to medium dark gray. Pale yellowish brown limestone, fine grained to oolitic, intergranular porosity.

7610	7620	Limestone--pale yellowish brown, fine grained and medium light gray fine grained argillaceous.
7620	7630	Dolomite--light to medium light gray, sucrosic.
7630	7650	Limestone--light to medium light gray, fine grained.
7650	7670	Anhydrite--white. Light to medium light gray fine grained limestone.
7670	7710	Anhydrite--white to light gray.
7710	7720	Limestone--pale yellowish brown to pale brown, fine grained to sublithographic.
7720		(2 hrs. Circ.) Anhydrite--white to light gray.
7721	7722	(Core) Anhydrite--light to medium gray.
7722	7723	Anhydrite--medium to medium dark gray.
7723	7724	Anhydrite--medium gray with light gray fine grained dolomite inclusions.
7724	7726	Anhydrite--light to medium dark gray.
7726	7730	Anhydrite--medium to medium dark gray.
7730	7731	Limestone--yellowish gray, fine grained.
7731	7733	Anhydrite--medium gray.
7733	7737	Anhydrite--medium to medium dark gray.
7737	7738	Anhydrite--white to medium gray.
7738	7740	Limestone--brownish gray, sublithographic, anhydrite inclusions.
7740	7741	Anhydrite--light olive gray.
7741	7742	Anhydrite--white to brownish gray, pale yellowish brown limestone inclusions.
7742	7743	Limestone--pale yellowish brown, fine grained to sub-lithographic.
7743	7744	Limestone--dusky yellowish brown, sublithographic, anhydrite inclusions and vugs.
7744	7745	Limestone--brownish gray, fine grained.
7745	7746	Limestone--dusky yellowish brown, sublithographic.
7746	7747	Limestone--dusky yellowish brown, fine grained to oolitic light.
7747	7748	Limestone--brownish black, sublithographic.
7748	7750	Dolomite--pale yellowish brown, fine grained.
7750	7751	Limestone--pale yellowish brown, fine grained.
7751	7752	(End Core) Limestone--brownish gray to pale yellowish brown, sublithographic.
7755	7765	Limestone--pale yellowish brown to brownish gray, fine grained to fragmental.
7765		Limestone--pale yellowish brown to brownish gray, fine grained to fragmental. Some fluorescence and cut.
7766	7772	(Core) Anhydrite--white to medium light gray.
7772	7773	Anhydrite--medium gray.
7773	7782	Anhydrite--medium dark gray.
7782	7784	Anhydrite--pale brown.
7784	7787	Limestone--medium light gray, fine grained.
7787	7792	Limestone--light brownish gray, oolitic, tight.
7792	7796	Dolomite--pale yellowish brown anhydritic.
7796	7798	Limestone--pale yellowish brown, fine grained, streaked oil stain, fluorescence and very good oil cut.
7198	7801	Limestone--medium light gray, sublithographic.
7801	7804	Limestone--brownish gray, sublithographic.
7804	7809	Limestone--medium gray sublithographic.

7809	7810	Limestone--light brownish gray, fragmental.
7810	7811	Limestone--pale yellowish brown, fine grained to fragmental.
7811	7812	Limestone--pale brownish gray, fine grained.
7812	7815	Dolomite--light gray, fine grained.
7815	7816	Limestone--medium gray, oolitic.
7816	7817	Limestone--pale yellowish brown, fine grained, anhydrite streaks.
7817	7818	Limestone--pale yellowish brown, fine grained.
7818	7819	Dolomite--very light gray, chalky.
7819	7823	Limestone--pale yellowish brown, microsucrosic.
7823	7824	Limestone--pale yellowish brown, oolitic to fragmental, fossiliferous.
7824	7825	Limestone--brownish gray, fine grained, dead oil, slight oil cut.
7825	7826	Limestone--brownish gray, oolitic to fragmental, spotty fluorescence, dead oil stain and slight oil cut.
7826	7828	Limestone--brownish gray, fine grained, stylolites, dead oil stain, good oil cut.
7828	7830	Limestone--medium dark gray, fine grained to fragmental, carbonaceous residue.
7830	7833	Limestone--pale yellowish brown, oolitic to fragmental.
7833	7834	Limestone--medium to medium dark gray, fine grained to fragmental.
7834	7836	Limestone--medium, dark gray, fine grained dense.
7836	7838	Limestone--pale yellowish brown, fine grained, slight oil cut.
7838	7842	Limestone--medium to medium dark gray, oolitic to fragmental, dead oil stain, good oil cut.
7842	7844	Limestone--medium dark gray, fine to medium grained and fragmental.
7844	7845	Limestone--light brownish gray, fine grained to oolitic.
7845	7846	Limestone--light brownish gray, oolitic to fragmental.
7846	7849	Limestone--brownish gray, fine to medium grained.
7849	7851	Limestone--medium to medium dark gray, fine grained, carbonaceous residue, oil cut.
7851	7853	Limestone--light olive gray, fine grained.
7853	7855	Limestone--pale yellowish brown, fine grained, slight oil cut.
7855	7856	Limestone--medium gray, fine grained.
7856	7862	Limestone--medium to medium dark gray, fine grained to fragmental.
7862	7865	Limestone--medium dark gray, fine grained to fragmental.
7865	7866	Limestone--dusky yellowish brown, fine to medium grained.
7866	7868	Limestone--medium to medium dark gray, fragmental.
7868	7870	Limestone--medium gray, oolitic to fragmental.
7870	7873	Limestone--medium dark gray, fine grained to fragmental.
7873	7876	Limestone--medium dark gray, fine grained to fragmental, carbonaceous residue.
7876	7878	Limestone--medium light to medium gray, fine grained, fossiliferous.
7878	7881	Limestone--medium dark gray, fine grained, carbonaceous residue.
7881	7882	Limestone--medium dark gray, oolitic to fragmental and sublithographic.

7882	7884	Limestone--medium gray, fine grained to fragmental.
7884	7885	Limestone--medium dark gray, fragmental, carbonaceous residue, slight oil cut.
7885	7895	Limestone--medium dark gray, fine grained to fragmental.
7895	7897	Limestone--medium light to medium gray, fine grained to fragmental.
7897	7900	Limestone--medium gray, fine grained, carbonaceous residue.
7900	7904	Limestone--medium gray, fine grained to fragmental.
7904	7908	Limestone--medium gray, fragmental.
7908	7909	Limestone--light brownish gray, oolitic to fragmental.
7909	7910	Limestone--medium gray, oolitic to fragmental.
7910	7911	Limestone--light brownish gray, fine grained to fragmental.
7911	7912	Limestone--pale yellowish brown, fine grained to fragmental.
7912	7913	Limestone--brownish gray, fine grained to fragmental, carbonaceous residue, oil cut.
7913	7918	Limestone--pale yellowish brown, fragmental.
7918	7919	Limestone--brownish gray, fragmental, carbonaceous residue, slight oil cut.
7919	7920	Limestone--brownish gray, fragmental.
7920	7922	Limestone--pale brown, fragmental, spotty fluorescence, good oil cut.
7922	7923	(End Core) Limestone--brownish gray, fragmental, slight oil cut.
7925	7930	Limestone--brownish gray, fragmental.
7930	7945	Limestone--pale yellowish brown to brownish gray, fine grained to fragmental.
7945	7950	Limestone--pale yellowish brown, fine grained to fragmental.
7950	7990	Limestone--pale yellowish brown to brownish gray, fine grained to fragmental.
7990	7995	Limestone--medium to medium dark gray, fine grained.
7995	8010	Limestone--pale yellow brown to brownish gray, fine grained to fragmental.
8010	8025	Limestone--brownish gray, fine grained to fragmental.
8025	8035	Limestone--pale yellowish brown, fine grained to fragmental.
8035	8065	Limestone--pale yellowish brown to brownish gray, fine grained to fragmental.
8066		(3 hours Circulation) Limestone--brownish gray fragmental.