

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 206

Summary of the Cardinal Drilling Co. and
Lees Drilling Co. - George F. Stratton #1
Bottineau County, North Dakota
Well No. 1790 - Permit No. 1802

by Jay Garske
September 1958

Cardinal Drilling Co. and Lees Drilling Co. - George F. Stratton #1.
Location: Center SW/4 SE/4 Section 24, T. 161N., R. 82W. Elevation: 1535 K.B.
Total Depth 4343 feet. Plug back depth 4165 feet.

The Cardinal Drilling Co. and Lees Drilling Co. George F. Stratton #1
was spudded March 20, 1958 and completed April 14, 1958 as a new oil discovery
(Wiley Field).

Logs: Electrical, Laterolog, microlaterolog, and gamma ray-neutron.

Cores: None

Tests:

DST #1: Misrun

DST #1A: Misrun

DST #1B: 4108-4136: Open 2 hours, shut in 30 minutes. Recovered: 480
feet of slightly oil and gas cut mud, and 175 feet of slightly mud and water
cut oil. Pressures: IHP 2305#, FHP 2305#, IFP 90#, FFP 215#, SIP 1800#.

Perforations:

Perforated the Mission Canyon formation from 4112 to 4128 with 4 shots
per foot, and acidized with 250 gallons of MCA plus 250 gallons of regular.

Completion Data:

Initial production was 67 barrels of oil plus 71% water, based on a 24
hour pump test. API gravity 27.6.

Casing Record:

8 5/8" casing set at 375 feet with 275 sacks of cement.

4 1/2" casing set at 4200 feet with 150 sacks of cement.

Formation tops were determined from samples and electrical logs,
corrected to the electrical logs. Doubtful or obscure formations were not
picked. Colors and descriptive numbers were taken from the Goddard, et. al.,
1951 Rock Color Chart distributed by the Geological Society of America, New
York, N.Y.

FORMATION TOPS

Cretaceous System

Niobrara formation	1705
Greenhorn formation	2012

Fall River sandstone	2539
Jurassic System	2820
Piper Limestone	3430
Triassic System	
Spearfish formation	3635
Mississippian System	
Charles formation	3897
Mission Canyon formation (MC-3)	4112

390-450	Shale, dark gray and olive gray 5Y4/1, lumpy, soft, glauconitic and slightly bentonitic in part.
450-480	Shale, yellowish gray 5Y8/1 to light olive gray 5Y6/1, soft, disaggregated, bentonitic, slightly calcareous.
480-510	Shale, greenish gray 5GY6/1, lumpy, compact.
510-540	Shale, dark gray, greenish gray 5GY6/1 and olive gray 5Y4/1, lumpy, compact.
540-750	Shale, light greenish gray to greenish gray 5GY6/1, fissile, compact.
750-780	Shale, grayish black and greenish gray 5GY6/1, fissile to lumpy, compact.
780-900	Shale, greenish gray 5GY6/1 to light olive gray 5Y6/1, fissile to lumpy, compact.
900-960	Shale as above to medium gray.
960-1050	Shale, as above with numerous clay ironstone fragments.
1050-1170	Shale as above with few clay ironstone fragments.
1170-1380	Shale, medium gray to light olive gray 5Y6/1, fissile to lumpy, compact.
1380-1440	Shale, medium dark gray, fissile to lumpy, compact.
1440-1530	Shale, dark gray to grayish black, fissile, compact.
1530-1590	Shale as above to light olive gray 5Y6/1.
1590-1680	Shale, greenish gray 5GY6/1 to light olive gray 5Y6/1, and medium gray to grayish black, fissile to lumpy, compact.
1680-1740	Shale, medium gray to dark gray, fissile to lumpy, compact, with scattered soft, white, calcareous specks.
1740-1860	Shale, medium gray to dark gray, and greenish gray 5GY6/1, lumpy, compact.
1860-1920	Shale, medium gray to dark gray, fissile to lumpy, compact.
1920-1950	Shale, dark gray, fissile to lumpy, compact, with abundant soft, white, calcareous specks.
1950-1980	Shale, medium dark gray, fissile, compact with few scattered white specks.
1980-2040	Shale, dark gray, fissile to lumpy, compact.
2040-2100	Shale, dark gray, flaky, soft.
2100-2160	Shale, medium gray to dark gray, fissile, soft.
2160-2190	Shale, light olive gray 5Y6/1, lumpy, compact.
2190-2220	Shale, medium gray to dark gray, lumpy, compact, with scattered white calcareous specks, and numerous prismatic fragments of Inoceramus.
2220-2310	Shale, dark gray, fissile to lumpy, compact.
2310-2370	Shale, dark gray to grayish black, fissile, compact.
2370-2540	Shale, light olive gray 5Y6/1, to dark gray, fissile to lumpy, compact.
2540-2550	Shale, as above, and few pieces of very fine grained sandstone, moderately well cemented, calcareous, pyritic, very light gray.

2550-2560 Shale and sandstone as above and some coarse to very coarse loose quartz grains, subangular to rounded, vitreous to frosted, colorless.

2560-2570 Shale, dark gray, lumpy, some sandstone, very fine to medium grained, subrounded to rounded, friable, calcareous, little pyrite, and some coarse to very coarse loose quartz, as above.

2570-2580 Shale, light olive gray 5Y6/1 to dark gray, lumpy, compact.

2580-2600 Shale, sandstone, pyrite and loose quartz as above (2560-2570).

2600-2630 Shale, dark gray, fissile to lumpy, compact, little pyrite, and some medium, to coarse grained loose quartz, subangular to rounded, vitreous to frosted, colorless.

2630-2640 Shale as above, and little sandstone, fine grained, moderately well cemented, slightly calcareous, pyritic, pale reddish brown to dark reddish brown.

2640-2710 Shale, light olive gray 5Y6/1 to dark gray, fissile to lumpy compact.

2710-2740 Shale, dark gray, fissile, compact, and some sandstone, fine grained, subangular to subrounded, friable, calcareous, light gray to light brownish gray.

2740-2750 Sandstone, fine to medium grained, subangular to rounded, friable to moderately well cemented, calcareous, pyritic, very light gray to light olive gray 5Y6/1, and some shale as above.

2750-2760 Shale, light gray to dark gray, fissile to lumpy, compact.

2760-2800 Shale, as above to light olive gray 5Y6/1.

2800-2810 Shale as above, and some coarse to very coarse grained loose quartz, subangular to well rounded, vitreous to frosted, colorless.

2810-2830 Shale, medium gray to dark gray, fissile, compact.

2830-2840 Shale as above, and some siltstone, grayish orange pink to light gray, lumpy, calcareous.

2840-2860 Shale, light gray to dark gray, fissile to splintery, compact.

2860-2890 Shale as above, with few pieces to dark yellowish orange 10YR6/6.

2890-2910 Sandstone, very fine grained, silty in part, friable, calcareous, very pale orange, and shale, dark gray to greenish gray 5GY6/1, fissile to splintery, compact.

2910-2920 Sandstone and shale as above and some gypsum, earthy to snowy, white to pinkish gray 5YR8/1.

2920-2970 Sandstone, very fine to fine grained, friable, calcareous, light gray to light brownish gray, and much shale, dark gray and greenish gray 5GY6/1, fissile to splintery, compact.

2970-3010 Sandstone and shale as above, and some gypsum, snowy, pinkish gray to white.

3010-3030 Shale, dark gray and greenish gray 5GY6/1, fissile to splintery, compact.

3030-3060 Shale, as above, and little gypsum, snowy, pinkish gray to white.

3060-3210 Shale, as above.

3210-3230 Shale as above, and few pieces of chalky, white limestone.

3230-3390 Shale, greenish gray 5GY6/1, moderate reddish brown to dark reddish brown, and dark gray, fissile to splintery, compact.

3390-3400 Shale as above, and little shaly dolomite, very fine granular, grayish orange pink.

3400-3440 Shale and much dolomite, as above.

3440-3580 Limestone, very fine granular, argillaceous, grayish orange pink to very pale orange, and much shale as above.

3580-3670 Shale, medium gray to dark gray, greenish gray 5GY6/1 and dark reddish brown, fissile to splintery, compact, and little gypsum, snowy, pinkish gray to white.

3670-3700 Shale, dark gray to grayish black, and moderate reddish brown to dark reddish brown, fissile to splintery, compact.

3700-3730 Shale as above, and few pieces of siltstone, moderate reddish orange, gypsiferous, soft.

3730-3830 Shale, as above, and some very fine to fine grained sandstone, subangular to rounded, friable, moderate reddish orange.

3839- Circulation 1/2 hour: Shale, medium gray to grayish black, greenish gray 5GY6/1, and pale reddish brown to dark reddish brown, fissile to splintery, compact.

3830-3860 Shale as above, and few pieces sandstone, very fine to medium grained, subangular to rounded, friable, moderate reddish orange.

3865- Circulation 3/4 hour: As above.

3860-3870 Shale, as above.

3870-3890 Shale as above, and little gypsum, snowy to earthy, white to grayish orange pink 10R8/2.

3890-3905 Shale, medium gray to grayish black, and dark reddish brown, and some sandstone, very fine to fine grained, friable, moderate reddish orange to moderate reddish brown.

3905- Circulation 1/2 hour: Dolomite, calcitic, fine granular, dense, grayish orange 10YR7/4.

3905-3910 Dolomite, fine granular as above to very fine crystalline, dense, pale red purple 5RP6/2, and some shale, medium gray to dark gray, fissile, compact.

3910-3915 Dolomite, subcrystalline, dense, pale red purple to grayish red purple 5RP4/2.

3915-3925 Dolomite, as above to grayish orange pink 10R8/2.

3925-3940 Dolomite as above, and little anhydrite, snowy to earthy, white.

3940- Circulation 3/4 hour: Limestone, fine to medium oolitic, good intergranular porosity, very pale orange.

3940-3960 Limestone as above and much shale, medium gray to grayish black, fissile, compact.

3960-3985 Limestone, oolitic as above to very fine granular, dense, very pale orange, and some shale as above.

3985-3990 Anhydrite, snowy to earthy, white to pinkish gray, and much caved material.

3990-4010 Poor samples, nearly all cavings, probably anhydrite, as above.

4010-4015 Dolomite, anhydritic subcrystalline, dense, light gray to light bluish gray 5B7/1.

4015-4020 Anhydrite, snowy to earthy, white, and much caved material.

4020-4045 Anhydrite, subcrystalline, dense, white to light bluish gray 5B7/1, and some dark gray fissile shale.

4045-4055 Shale, medium gray to dark gray and moderate reddish brown, fissile to splintery, compact, and little anhydrite as above.

4055-4085 Anhydrite, earthy to subcrystalline, white, poor samples, mostly varicolored shale cavings.

4085-4115 Anhydrite, subcrystalline, dense, white to medium light gray, and some shale cavings.

4115-4119 Dolomite, calcitic, fine granular, fair to good pinpoint and intergranular porosity, grayish orange pink, and much caved material.

4119- Circulation 1/2 hour: Poor sample, mostly cavings, little dolomite as above, and few pieces of very fine granular limestone with good intergranular porosity, soft, brownish gray, no fluorescence or cut.

4120-4130 Poor samples, nearly all shale and anhydrite cavings, little dolomite, very fine granular, grayish orange pink.

4130- Circulation 1/2 hour: Limestone, very fine granular, scattered pinpoint porosity, very pale orange to grayish orange 10YR7/4, fair fluorescence and slight cut.

4130-4135 Limestone as above, with good fluorescence and fair cut, and much caved shale and anhydrite.

4135-4140 Limestone as above, with scattered staining, good fluorescence and very good cut, and much caved material.

4140-4145 Limestone as above, with good fluorescence and fair cut.

4142- Circulation 3/4 hour: Limestone, very fine granular, scattered pinpoint porosity, very pale orange to grayish orange pink 5YR7/2.

4145-4150 Limestone as above, and much shale, medium light gray to grayish black, fissile to splintery, compact.

4150-4155 Limestone as above, with slight stain, fair fluorescence and very good cut.

4155-4160 Limestone as above, with slight fluorescence and fair cut.

4160-4180 Limestone, very fine granular with scattered pinpoint porosity, to very fine crystalline, dense, very pale orange to grayish orange pink 5YR7/2, and some varicolored shale cavings.

4180- Circulation 3/4 hour: Limestone, very fine granular, scattered pinpoint porosity, very pale orange.

4180-4200 Poor samples, composed entirely of varicolored shale cavings.

4200-4220 Limestone, fine granular, fair to good pinpoint and intergranular porosity, very pale orange to pale yellowish brown.

4220-4240 Dolomite, calcitic, microsucrosic, pale yellowish brown.

4240-4290 Limestone, dolomitic, microsucrosic, very pale orange to pale yellowish brown.

4290-4300 Dolomite, calcitic, very fine crystalline, dense, light gray and very pale orange.

4300-4310 Limestone, sublithographic, dense, very pale orange.

4310-4330 Limestone, as above to very fine granular.

4330-4340 Dolomite, very fine crystalline, dense, light gray to medium light gray, and some limestone, as above.

4340- Circulation 1 hour: Limestone, very fine granular, chalky in part, very pale orange to pale yellowish brown.

4340 Total Depth.