

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 244

Summary of Phillips Petroleum Co. - Brandvold #1
Bottineau County, North Dakota
Well No. 2638 - Permit No. 2650

by William P. Eastwood
January 1961

Phillips Petroleum Co. - Brandvold #1 located in SW 1/4, SE 1/4, Section 12, T. 162N., R.78W., (1980 FEL, 790 FSL) Bottineau Co., North Dakota. Elevations Kelly Bushing 1495, Ground Level 1485. Total depth 5250 driller, 5265 Schlumberger. Contractor - Phillips.

The drilling permit was issued April 22, 1960. The well was spudded on April 25, 1960 and drilled to total depth. No production was found and the well was plugged and abandoned on May 21, 1960.

Drill stem Tests: None

Casing Record:

350 feet of 10 3/4" surface casing cemented with 185 sacks. Cut off below plow depth.

Plugging Record:

Neat cement plugs spotted at following depths:

15 sacks at 5210	15 sacks at 2950
15 sacks at 4050	15 sacks at 2040
15 sacks at 3300	15 sacks at 365
15 sacks at 3060	5 sacks at 4

Surface casing cut off below plow depth, pits filled, location leveled.

Mechanical Logs:

Schlumberger Induction - Electrical 335-5260
Schlumberger Microlaterolog - Microcaliper 2850-5264

Core Record:

1. Winnipegosis - 5044-5053 Cut 9 feet, recovered 7 1/2 feet.
2. Winnipegosis - 5053-5063 Cut 10 feet, recovered 6 1/2 feet.

The formation tops were determined by samples and mechanical logs. Color names used are those of the Rock Color Chart of the National Research Council. Limestone petrography terms are those proposed by Folk (1959) Bull. Amer. Assoc. Petroleum Geologists, vol. 43, no. 1, pp. 1-38.

FORMATION TOPS

Cretaceous

Greenhorn formation	1573
Mowry formation	1836
Fall River formation	2030

Triassic

Spearfish formation	2925
---------------------	------

Pre-Mesozoic Unconformity	3047
Mississippian	
Frobisher-Alida interval	3047
Tilston interval	3097
Bottineau interval	3287
Bakken formation	3931
Devonian	
Three Forks formation	3970
Birdbear formation	4041
Duperow formation	4149
Souris River formation	4546
Dawson Bay formation	4819
Praire formation	5000
Winnipegosis formation	5040
Silurian	
Interlake formation	5217 (?) log 5195 sample

Description of samples and core chips:

Very good samples. Very little cavings.

0-90	Pale yellowish brown limy silt. Coarse sand, and fine gravel composed of quartzite and igneous rock fragments.
90-100	Yellowish gray shale and dark greenish yellow, very sandy shale.
100-180	Medium gray, to dark gray, blocky shale with rare greenish yellow, sandy shale as above.
180-310	Medium light gray blocky shale, slightly micaceous shale.
310-370	Medium light gray shale as above, rare medium, dark gray fissile shale.
370-400	Abundant medium dark gray fissile shale rare to common, medium light gray blocky shale.
400-430	Shale as above with rare, very pale yellowish brown, very sandy limestone.
430-450	Shale, as above.
450-640	Medium light gray blocky shale. Rare medium dark gray fissile shale. Rare brownish gray, limy sandstone at 580-590.
640-770	Abundant medium dark gray shale as above. Common medium light gray shale, as above.
770-840	Medium light gray blocky shale. Rare medium dark gray fissile shale. Very rare light brown (5YR5/6) siltstone.
840-910	As above with common siltstone.
910-1020	Medium light gray to light gray blocky shale.
1020-1150	Shale, as above, common light brown siltstone and fine-grained sandstone.
1150-1200	Blocky light gray shale, as above, with common dark gray fissile shale light brown siltstone.
1200-1240	Abundant dark gray shale, as above, common light gray shale and light brown siltstone, as above.
1240-1340	Abundant dark gray shale, rare gray shale and brown siltstone. Rare bentonite.
1340-1380	Shale as above. Common moderate brown, very fine crystalline dolomite.
1380-1430	Shale as above, rare dolomite, as above.
1430-1490	Shale as above, common brown dolomite.

1573 Top of Greenhorn formation.

1490-1610 Abundant dark gray non-calcareous fissile shale. Common dark gray, calcareous blocky shale with "white specks (?)". Rare mollusk fragments.

1610-1640 Dark gray shale, as above. Some of the shale contains a few "white specks".

1640-1710 Common calcareous dark gray shale, with white specks. Rare medium gray fine-grained silty quartz sandstone.

1710-1780 Abundant dark gray fissile shale. Rare speckled shale and silty sandstone as above.

1836 Top of Mowry formation

1780-1850 As above with rare very light gray silty shale. Rare mollusk fragments.

1850-1900 As above, with common silty medium gray sandstone.

1900-2060 Dark gray fissile shale.

2030 Top of Fall River formation.

2060-2080 Shale, as above, with abundant coarse rounded quartz and grains. Rare medium light gray, silty fine-grained sandstone.

2080-2110 Very abundant quartz grains. Common shale, as above.

2110-2160 Common to abundant moderate red siltstone and fine-grained, silty sandstone. Common quartz grains & black shale.

2160-2280 Abundant dark gray shale, as above. Very rare quartz, gray & redbeds as above. Rare white, very fine grained sandstone. Rare small light brown phosphate (?) pellets at 2260-2270.

2280-2360 Common white to light gray, fine-grained sandstone, slightly calcareous. Black shale, as above. Very rare phosphate pellets.

2360-2400 Rare dark yellowish brown siltstone. Very rare, coarsely crystalline, calcite fragments. Sandstone & shale as above.

2400-2450 As above, with common moderate pink fine to crystalline gypsum.

2450-2500 Gypsum and rare light gray sandstone. Common medium light gray, silty shale.

2500-2550 Common moderate red limy siltstone & silty shale. Common light gray & dark shale, as above.

2550-2570 As above, with common white subsucrosic limestone.

2570-2610 Abundant moderate red shale and siltstone. Black shale cavings. Common limestone, as above. Some of the fragments of limestone show small pale yellowish brown pellets & intraclasts, loosely packed in a white microsparite matrix.

2610-2630 Abundant medium light gray shale, with common medium gray sandy shale & rare limestone, as above. Common black shale cavings.

2630-2660 Missing.

2660-2700 Abundant, very pale orange, very fine crystalline, limy dolomite. Shale & sandstone cavings. Some of the dolomite fragments have small inclusions of white, medium-crystalline gypsum.

2700-2740 Dolomite, as above, with common, light gray sandy shale and rare, light olive clayey shale. Abundant black shale cavings.

2740-2750 Dolomite and shale, as above, with common, very light gray sub-lithographic limestone.

2750-2850 Very light gray to white limestone, as above. Black shale cavings. At 2820-2850 are common fragments of medium, light gray sub-lithographic limestone.

2850-2890 Abundant, very pale yellow brown sublithographic limestone, common white, fine crystalline gypsum, rare dolomite, as above. Common shale cavings.

2890-2950 Abundant, moderate red shale, common gypsum & limestone, as above.

2925 Top of Spearfish formation.

2950-3010 Abundant, moderate red shale, rare olive shale, rare gypsum & limestone. Common black shale cavings. Rare to common, moderate red, fine-grained quartz sandstone at 2980-3010.

3010-3033 Abundant, red sandstone, as above. Common red shale, as above. Black shale cavings.

3033 Circulation 1 hour. As above

3033-3040 Abundant, moderate red sandstone, as above. Black shale cavings.

3047 Pre-Mesozoic unconformity and top of Frobisher-Alida interval

3040-3060 Abundant, pale yellowish brown, finely crystalline dolomite, rare pale yellowish brown intramicrite limestone. Red, green, & black shale, as above. Very rare, white gypsum, as above.

3060 Circulation 1 hour. As above.

3060-3090 Dolomite & limestone, as above. Badly caved with dark gray and light gray shale.

3097 Top of Tilston interval

3090-3100 Anhydrite, pinkish gray, fine crystalline to cryptocrystalline. Shale cavings.

3100-3120 As above, with common pinkish gray, fine crystalline, limy dolomite.

3120-3130 Anhydrite & limy dolomite, as above. Rare, very pale yellowish brown intramicroparite limestone.

3130 Circulation 3/4 hour. Limestone, very pale yellowish brown intramicroparite with patches of sparry calcite. Rare dolomite & anhydrite, as above. Limestone consists of small pale yellowish brown intraclasts in a very pale yellowish brown matrix. Fair pinpoint porosity.

3130-3160 As above. Rare pelomicroparite with good pinpoint porosity, at 3140-3150.

3160-3270 Limestone, pale yellowish brown, pelomicroparite with good pinpoint porosity and pale yellowish brown intramicroparite, as above. 3210-3220 and 3230-3240 are missing.

3287 Top of Bottineau interval

3270-3310 Common, moderate yellowish brown intrasparite limestone. Intraclasts & fossil fragments (crinoids & brachiopods) in a sparry calcite cement. Low porosity, common pelletoidal & oolitic limestone, as above. Black shale cavings.

3310-3340 Limestone, medium gray, shaly, fine-crystalline. Limestone & shale cavings as above.

3340-3360 Abundant moderate yellowish brown intrasparite limestone, as above, with good pinpoint porosity which appears to be secondary, rare gray limestone as above.

3360-3410 Limestone, intrasparite and intramicroparite, as above but color is darker, tending toward medium gray. The limestone also contains numerous small pellets which may be intraclasts or fossil fragments.

3410-3510 Intrapelsparite, as above but pinpoint porosity not as good. Common medium gray microsparite, shaly, limestone.

3510-3550 Limestone, moderate yellowish brown to medium gray, intrapelsparite & microsparite. Small intraclasts and pellets in a fine to medium crystalline cement. Low porosity.

3550-3600 As above, with rare pale yellowish brown sublithographic (micrite) limestone, and rare oosparite, consisting of dark gray, small oolites in a very coarsely crystalline cement. Amount of black shale cavings (?) increased at 3570. Rare ostracodes.

3600-3620 Limestone, moderate to pale yellowish brown, pelintramicrosparite with fair pinpoint porosity. Crinoid & rare brachiopod and ostracode fragments. Rare medium gray pelmicrosparite limestone.

3620-3650 Limestone, pale yellowish brown, pelmicrosparite with rare pieces of pelintrasparite, as above and very rare, very porous oolitic limestone. Pelmicrosparite has very low porosity.

3650-3710 Limestone, pale yellowish brown to light gray. Pelintramicrosparite. Small intraclasts & pellets in a fine crystalline matrix. Low porosity. Fine-ribbed brachiopod fragments.

3710-3860 Limestone, medium light gray. Microsparite with patches of micrite. Probably contains very small pellets. Low porosity.

3860-3910 As above, with common medium light gray sublithographic (micrite) limestone. Tight.

3931 Top of Bakken formation

3910-3940 Limestone, as above. Common black shale.

3940-3960 Abundant black fissile shale. Rare limestone, as above. Rare, dark gray calcareous fine-grained sandstone. No cut.

3960-3980 Shale, as above. Common bluish gray (5B7/1) microsparite limestone.

3970 Top of Three Forks formation

3980-3990 Common, black shale, common limestone, as above and moderate red shale. Yellowish brown limestone cavings.

3990-4030 Black & red shale. Rare yellowish gray (5Y8/1) very fine grained sandstone. Rare pink gypsum cavings.

4041 Top of Birdbear formation

4030-4090 Common to abundant, pale yellowish brown microsugrosic (microsparite) limestone. Rare black shale. Rare dark yellowish brown intrasparite, consisting of intraclasts & fossil fragments in a medium to coarsely crystalline cement.

4090-4130 Limestone, moderate yellowish brown, pelmicrosparite and slightly microsugrosic, good pinpoint porosity. Common pale yellowish brown limestone, as above.

4149 Top of Duperow formation

4130-4150 Common limestone, as above with common to abundant moderate yellowish brown microsugrosic limestone, as above, but with less pinpoint porosity.

4150-4160 Abundant, black shale. Rare limestone, as above.

4160-4180 Common limestone, as above. Rare, pale yellowish brown microsugrosic dolomite.

- 4180-4220 Dolomite, limy, microsucrosic to sucrosic, good porosity, dark yellowish brown. Rare limestone, as above.
- 4220-4230 Common, very pale orange, very fine crystalline, dolomite, common sucrosic dolomite, as above. Rare oomicrosparite limestone.
- 4230-4310 Limestone and dolomite, both very pale orange and very fine crystalline. Rare to common, pale yellowish brown pelmicrosparite to sucrosic porous limestone.
- 4310-4350 Limestone, very pale orange, pelmicrosparite and pelmicrite, good pinpoint porosity. Common very pale orange microsucrosic dolomite. Difficult to tell between the limestone and dolomite without testing by acid, but there seems to be more limestone than dolomite. The dolomite is generally finer crystalline than the limestone.
- 4350-4370 Limestone and dolomite as above with common very pale orange fine crystalline to sublithographic limestone with very low porosity. Rare moderate yellowish brown sucrosic, porous dolomite at 4360-4370.
- 4370-4410 Dolomite, moderate yellowish brown, sucrosic, good pinpoint and intercrystalline porosity, slightly limy.
- 4410-4480 Limestone, very pale yellowish brown, sublithographic (micrite) with rare pinpoint porosity. Common sucrosic dolomite as above.
- 4480-4530 Limestone, very pale orange, intrasparite with patches of microsparite. The small moderate brown intraclasts may be dolomite crystals. Rare to common sucrosic dolomite as above.
- 4546 Top of Souris River formation
- 4530-4550 Abundant moderate brown sucrosic dolomite with good pinpoint porosity. Rare greenish gray (5GY6/1) sucrosic limy dolomite which is finer crystalline and less porous than the brown dolomite. Rare limestone as above.
- 4550-4560 As above with rare medium light gray sublithographic limestone.
- 4560-4570 Common yellowish brown and very pale orange dolomitic (?) limestone as above. Common sucrosic dolomite as above.
- 4570-4580 As above with common medium light gray finely crystalline dolomite.
- 4580-4630 Dolomite, pale yellowish brown, limy, sucrosic to microsucrosic. Rare gray dolomite as above. Rare limestone as above. Very rare white anhydrite.
- 4630-4680 Abundant moderate yellowish brown sucrosic slightly limy dolomite. Good pinpoint porosity.
- 4680-4700 Abundant pale yellowish brown microsucrosic dolomite, common greenish gray fine crystalline dolomite, rare moderate yellowish brown sucrosic dolomite as above.
- 4700-4710 Common brown sucrosic dolomite as above, common microsucrosic dolomite as above, rare limestone.
- 4710-4750 As in 4680-4700 above.
- 4750-4760 Common brown sucrosic dolomite, common pale yellow brown microsucrosic dolomite.
- 4760-4800 Abundant sucrosic dolomite as above.
- 4819 Top of Dawson Bay formation
- 4800-4840 Common to rare moderate yellowish brown sucrosic dolomite. Common pale yellowish brown microsucrosic dolomite. Rare pale yellowish brown sucrosic dolomite with good pinpoint porosity.

4840-4860 Dolomite as above. Abundant black shale cavings (?).
4860-4910 Abundant moderate to dark yellowish brown sucrosic dolomite. Good pinpoint and intercrystalline porosity.
4910-4920 Dolomite, moderate yellowish brown, slightly limy, microsucrosic. Fair intercrystalline porosity.
4920-4930 Sucrosic porous dolomite as in 4860-4910 above.
4930-4950 Common pale yellowish brown microsucrosic dolomite, common sucrosic porous dolomite.
4950-4980 Abundant moderate brown sucrosic porous dolomite. Black shale cavings at 4960-80.
4980-5000 As in 4930-4950 above.

5000 Top of Prairie formation

5000-5030 Dolomite as above with a white, finely crystalline soft mineral which fizzes slightly and flakes off in HCl but does nothing in water.
5030 Circulation 1 hour. As above.
5030-5035 Anhydrite (?) and dolomite as above.

5040 Top of Winnipegosis formation

5037-5044 Circulation 3/4 hour. Dolomite, pale yellowish brown, limy, microsucrosic. Anhydrite as above.

Core Chips

5044-5045 Dolomite, pale yellowish brown, microsucrosic, good intercrystalline porosity and permeability, thin shaly laminae, slightly limy.
5045-5046 Dolomite, pale yellowish brown, sucrosic, very good pinpoint and intercrystalline porosity.
5046-5047 Dolomite, pale yellowish brown, microsucrosic. Common small pores. Fair intercrystalline porosity.
5047-5049 As above with parts of the rock slightly coarser crystalline.
5049-5050 Dolomite, pale yellowish brown, sucrosic, slightly limy. Fair intercrystalline porosity. Rare pinpoint pores.
5050-5059 As above but with abundant pinpoint pores. Larger pores at 5057 1/2-59. No oil staining.
5059-5063 Missing.
5063-5160 Dolomite, moderate yellowish brown, sucrosic, good to fair porosity.
5160-5180 As above with common medium light gray very fine crystalline slightly limy dolomite.
5180-5195 Dolomite, light gray very fine crystalline and pale yellowish brown microsucrosic. Rare moderate yellowish brown sucrosic dolomite as above.

5217 Top of Interlake formation (?).

5195-5250 Dolomite, very pale orange, very fine crystalline to cryptocrystalline. Tight. Rare sucrosic dolomite as above. At 5220-30 are rare pieces of rock consisting of large very pale yellowish brown dolomite crystals in a white limy very fine crystalline matrix.

Total Depth Driller - 5250
Schlumberger - 5265