

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 186

Summary of Phillips Petroleum Co. - Ralph M. Ballard Braathen #1
Divide County, North Dakota
Well No. 1024 - Permit No. 1036

by Robert M. Eisenhard
January 1958

The Phillips Petroleum Con - Ralph M. Ballard Braathen #1 is located in the NE of the NW of Section 29 T. 162N. R. 95W., Divide County, North Dakota. The elevation is 2232.6 feet K.B.

The Phillips Petroleum Co. - Ralph M. Ballard Braathen #1 was spudded November 6, 1955; 13 3/8" casing was set at 654 feet with 720 sacks of cement and 5 1/2" production casing was set at 7154 feet with 300 sacks of cement. The Braathen #1 was drilled to a total depth of 7361 feet and plugged back to 7110 feet and completed as a new oil discovery (Noonan Field) April 23, 1956.

Logs:

Schlumberger: electric, microlaterolog, microlog, laterolog-gamma ray, temperature; Lane Wells: radioactivity.

Cores: 6944-6974; 6979-7359

Tests:

DST #1: 6760-99, open 2 hours, SI 30 min. Recovered 440' drilling mud. IFP and FFP - 151#, SIP 658#, HMP 3768#.

DST #2: 6932-74, open 4 hours, SI 30 min. Recovered 690' muddy water slightly oil and gas cut, 300' water slight sulphur odor. IFP 55#, FFP 490#, SIP 2865#, HMP 3761#.

DST #3: 6946.5-57, open 7 hours, SI 30 min. Recovered 360' fluid; 60' oil and mud, est. 80% oil, 300' mud, est. 20' oil, highly oil and gas cut. IFP 0, FFP 135#, SIP 535#, HMP 3829#.

DST #4: 7041-97, open 4 1/2 hours, SI 30 min. Sulphur gas to surface in 2 1/4 hrs. Recovered 240' sulphur cut mud, 180' highly gas cut mud, 450' oil and gas cut mud, est. 50% oil, 28% water and 22% mud. IFP 85#, FFP 277#, SIP 2462#, HMP 3951#.

DST #5: 7080-97, open 6 hours, SI 45 min. Recovered 480' oil and gas cut mud, 90' sulphur water estimated 20% oil. IFP 205#, FFP 195#, SIP 2450#, HMP 4069.

DST #6: 7150-7213, open 3 1/2 hours, SI 30 min. Recovered 410' slightly oil and gas cut mud, 100' sulphur water. IFP 75#, FFP 195#, SIP 2450#, HMP 4069#.

DST #7: 7344-61, open 4 hours, SI 30 min. Recovered 1740' mud cut sulphur gas. IFP 369#, FFP 824#, SIP 2355#, HMP 4063#.

Completion Test Data:

The Braathen #1 was tentatively completed March 12, 1956 after a 24 hour completion test. The test was taken on pump with 1 1/2" working barrels and 7091' of 2 1/2" tubing was run.

Result of Test:

The well produced 12 bbls. net oil per 24 hours. The gas volume was too small to measure with no free water. Gravity of oil was 36.2 (corrected to 60° API).

Perforated with 4 holes per foot, 7089-7092, 7076-7085, and 6946-6952. Acidized with 3000 gal. Squeezed perforations 6946-6952. Top of pay - 7072'.

A 2nd completion test was run April 23, 1956, after reacidizing perforations 7076-7085 and 7089-7092 with 5000 gallons of 15% regular acid. The well pumped 36 barrels of oil/24 hours and 22 barrels of water/24 hours. The GOR was 29 cubic feet of gas per barrel of oil.

Transporter: Westland Oil Company, Williston, North Dakota.

Formation tops were picked from samples and electric logs; corrected to electric logs. Not all formation tops are called in the following list. Colors are from the rock color chart.

FORMATION TOPS

Cretaceous System

Pierre formation	1450
Niobrara formation	3486
Greenhorn formation	3800
Dakota Group	4165
Dakota Group sands	4420

Jurassic System

Piper lime	5542
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Triassic System

Spearfish formation	5793
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Mississippian System

Kibbey limestone	6290
Charles formation	6490

4000-4060	Shale, dark gray, compact and medium light gray, soft.
4060-4070	Shale dark gray and minor medium light gray, compact.
4070-4080	Shale, dark gray, fissile.
4080-4100	Shale, as above to medium light gray, compact.
4100-4110	Shale, dark gray, fissile to medium light gray, lumpy.
4110-4200	Shale, dark gray, fissile to medium light gray, compact.
4200-4220	Shale, grayish black to medium dark gray, compact.
4220-4230	Shale, dark gray to medium gray, compact.
4230-4270	Shale as above; lumpy medium light gray bentonite.
4270-4300	Shale, dark gray to medium gray, compact.
4300-4340	Shale as above; lumpy medium light gray bentonite.
4340-4350	Shale, dark gray, compact.
4350-4390	Shale as above, minor medium light gray shale.
4390-4430	Shale, dark gray, fissile.

4430-4470 Shale, as above; white very fine to fine grained sandstone, of subangular to subrounded quartz grains, friable.

4470-4480 Sandstone and shale as above.

4480-4490 Sandstone and shale as above; minor white well cemented quartz siltstone.

4490-4500 Shale, dark gray, fissile; some sandstone as above.

4500-4600 Shale, dark gray, fissile.

4600-4630 Shale as above, with minor white fine to medium grained quartz sandstone.

4636-4650 Shale, dark gray, fissile.

4650-4670 Shale as above; minor quartz sandstone as above.

4670-4680 Shale as above; white lumpy bentonite.

4680-4700 Shale as above; some quartz sandstone as above.

4700-4720 Shale, dark gray, fissile, to medium light gray; minor white fine to very fine grained quartz sandstone, subangular to subrounded grains.

4720-4730 Shale, medium dark gray, compact.

4730-4750 Shale as above; some very coarse subangular to subrounded free quartz grains.

4750-4760 Shale, and free quartz grains as above with some white sandstone as above.

4760-4770 Shale and free quartz grains as above.

4770-4790 Shale, dark gray, fissile.

4790-4800 Shale, medium dark gray, fissile.

4800-4820 Shale as above to medium light gray.

4820-4840 Shale, as above; lumpy light gray bentonite.

4840-4850 Shale, dark gray to light gray, compact.

4850-4880 Shale as above; lumpy light gray bentonite.

4880-4890 Shale, dark gray to light gray.

4890-4980 Shale, dark gray to greenish gray (5GY6/1).

4980-5020 Shale as above, some calcareous white quartz siltstone to very fine sandstone.

5020-5040 Shale, dark gray to medium light gray; minor calcareous sandstone as above; minor white limestone with well rounded coarse limestone grains; minor white lumpy bentonite.

5040-5070 Shale, dark gray to greenish gray (5GY6/1); minor limestone and calcareous sandstone as above.

5070-5080 Shale as above.

5080-5100 Shale as above; minor white calcareous very fine grained quartz sandstone.

5100-5160 Shale, dark gray, medium light gray to greenish gray (5GY6/1).

5160-5360 Shale, greenish gray (5GY6/1), slightly calcareous, minor fissile dark gray shale.

5360-5390 Shale, dark gray, medium light gray and greenish gray (5GY6/1).

5390-5420 Shale, dark gray to medium light gray.

5420-5440 Shale as above; minor fine crystalline white limestone (with very fine quartz grains).

5440-5450 Shale, dark gray to medium light gray; fine crystalline medium gray limestone.

5450-5470 Limestone, light brownish gray, fine crystalline; some shale as above.

5470-5480 Limestone, brownish gray (5YR5/1) fine crystalline, light brownish gray limestone and shale as above.

5480-5500 Shale, dark gray, medium light gray and greenish gray; mixed limestones as above.

5500-5530 Shale, dark gray to medium light gray and minor moderate red (5R4/6) and greenish gray (5GY6/1) shale.

5530-5550 Shale as above; some light brownish gray fine crystalline limestone (with some fine quartz grains).

5550-5570 Limestone, very pale orange, fine crystalline to recrystallized oolitic; dark gray and greenish gray (5GY6/1) shale.

5570-5580 Shale and limestone as above.

5580-5600 Shale, dark gray to medium light gray and greenish gray; yellowish gray to light brownish gray (5YR7/1) fine crystalline to recrystallized oolitic limestone.

5600-5620 Limestone, pinkish, gray, fine crystalline to sublithographic; shale as above.

5620-5630 Limestone as above, minor shale as above.

5630-5660 Limestone, white to light brownish gray (5YR7/1), fine crystalline to sublithographic.

5660-5670 Limestone, very pale orange, as above; dark gray shale; minor very pale blue bentonite.

5670-5690 Shale and limestone as above.

5690-5720 Shale, dark gray to medium light gray and dark reddish brown; limestone as above.

5720-5740 Shale, dark gray to medium light gray, minor greenish gray and dark reddish brown; minor limestone as above.

5740-5760 Shale, dark gray to medium light gray; medium gray fine crystalline anhydritic limestone and white anhydrite.

5760-5790 Shale, medium light gray to greenish gray, slightly calcareous.

5790-5810 Shale, greenish gray (5GY6/1) and moderate reddish brown, silty.

5810-5850 Shale, medium dark gray to greenish gray (5GY6/1); moderate reddish orange siltstone.

5850-5910 Siltstone and shale as above.

5910-5970 Sandstone, very fine grained, moderate reddish orange, medium dark gray to greenish gray (5GY6/1) shale.

5970-5980 Sandstone and shale as above; minor very pale blue bentonite.

5980-6100 Sandstone and shale as above.

6100-6150 Sandstone, moderate reddish orange, very fine grained, medium dark gray, light gray and greenish gray (5GY6/1) shale; some rounded frosted, iron stained coarse quartz grains (from sandstone).

6150-6160 Sandstone and shale as above and dusky red shale.

6160-6170 Sandstone and shale as above; pale red (5R6/2) calcareous shale; moderate reddish orange shale.

6170-6180 Sandstone and shale as above, pale red (5R6/2) calcareous shale to argillaceous limestone; minor moderate reddish orange shale.

6180-6200 Sandstone, shales and argillaceous limestone as above; minor grayish pink calcareous very fine grained quartz sandstone.

6200-6250 Sandstone, moderate orange pink, very fine grained, calcareous; minor white fine grained calcareous quartz sandstone; dark gray, greenish gray (5GY6/1) and grayish red shale (5R4/2); minor very light gray bentonite.

6250-6260 Sandstone and shale as above; rounded, iron stained frosted coarse quartz grains.

6260-6300 Sandstone, moderate reddish orange to pale reddish brown, fine to very fine grained; dark gray to greenish gray (5GY6/1) shale; coarse grains as above.

6300-6310 Shale, greenish gray (5GY6/1) fissile; sandstone as above.

6310-6325 Sandstone and shale as above, minor white to very light gray sub-lithographic limestone.

6325-6350 Shale, medium gray, greenish gray (5GY6/1) and dark reddish brown; sandstone, as above; very minor white to light brownish gray sub-lithographic (5YR7/1) limestone.

6350-6360 Shale, greenish gray and minor dark gray and dark reddish brown; white to light brownish gray (5YR7/1) fine crystalline to re-crystallized oolitic limestone.

6360-6390 Shale and limestone as above; minor yellowish gray rounded (5Y8/1) coarse limestone grains; fine grained pale red purple calcareous sandstone to siltstone; moderate reddish orange siltstone as above.

6390-6425 Shale, medium dark gray to greenish gray; moderate reddish orange calcareous siltstone, minor limestone as above; minor dark reddish brown shale.

6425-6430 Shale, dark gray; moderate reddish orange siltstone as above.

6430-6455 Lost circulation samples.

6455-6460 Shale, dark gray; moderate reddish orange slightly calcareous siltstone.

6460-6465 Shale, dark gray to greenish gray (5GY6/1); siltstone as above.

6465-6480 Shale and siltstone as above; minor white anhydrite.

6480-6490 Siltstone and shale as above.

6490-6500 Siltstone and shale as above; moderate red (5R5/4) to moderate orange pink, fine crystalline, anhydritic limestone.

6500-6505 Siltstone and limestone as above; white sublithographic anhydrite.

6505-6520 Limestone and anhydrite as above.

6520-6547 Salt.

6550-6555 Shale, dark gray.

6555-6560 Shale, dark gray to medium light gray; limestone as above; some white anhydrite.

6560-6580 Shale, dark gray to medium gray; medium light gray fine crystalline limestone; white anhydrite.

6580-6585 Shale as above; white to light gray anhydrite; fine crystalline medium light gray to light gray limestone.

6582-6612 Salt.

6612-6620 Lost circulation.

6620-6625 Shale, medium dark gray to light gray, calcareous.

6625-6630 Limestone, brownish gray to very light brownish gray (5YR7/1) fine crystalline; some light bluish gray fine crystalline anhydritic limestone.

6630-6635 Limestone as above; some dark gray shale.

6635-6645 Limestone and shale as above; pale olive waxy shale.

6645-6650 Shale, dark gray, fissile; minor olive shale and limestone as above.

6650-6670 Limestone, brownish gray to very light brownish gray, fine crystalline; some dark gray shale.

6670-6695 Shale, medium dark gray to greenish gray (5GY6/1); very light brownish gray (5YR7/1) fine crystalline to oolitic limestone; some white and light gray anhydrite.

6695-6700 Anhydrite, sublithographic, white to light gray; some shale as above.

6700-6710 Anhydrite, sublithographic, white; shale as above.

6710-6715 Salt.

6715-6720 Shale, medium dark gray, fissile, anhydrite as above.

6720-6730 Anhydrite, fine crystalline, medium light gray, calcareous; minor white anhydrite as above; shale as above.

6730-6735 Anhydrite, fine crystalline to sublithographic, white to light gray, slightly calcareous; medium dark gray shale.

6735-6745 Limestone, medium gray, fine crystalline, anhydritic; dark gray to medium gray slightly calcareous shale.

6745-6760 Limestone and shale as above; medium light gray to white, fine crystalline to sublithographic anhydrite.

6760-6775 Limestone, medium brownish gray (5YR5/1) to very light brownish gray (5YR7/1), fine crystalline; anhydrite, fine crystalline to sublithographic, white to light bluish gray; dark gray shale.

6775-6790 Limestone and some anhydrite as above.

6790-6800 Limestone as above; minor anhydrite as above.

6800-6805 Shale, dark gray to medium light gray; minor limestone and anhydrite as above.

6805-6810 Anhydrite, light bluish gray, sublithographic, slightly calcareous, some fine quartz grains; minor medium dark gray and pale yellowish brown shale.

6810-6815 Anhydrite as above to white.

6815-6820 Anhydrite as above; minor dark gray shale.

6820-6830 Anhydrite as above; medium brownish gray (5YR5/1) fine crystalline limestone; minor dark gray shale.

6830-6835 Anhydrite and shale as above; minor brownish gray shale.

6835-6840 Shale, dark gray some anhydrite and limestone as above.

6840-6845 Shale, anhydrite and limestone as above, minor pale red purple fine crystalline limestone.

6845-6850 Shale, anhydrite and limestone as above.

6850-6872 Salt.

6875-6880 Shale, medium dark gray to moderate red (5R4/6).

6880-6885 Shale as above; fine crystalline white to very light gray slightly calcareous anhydrite.

6885-6890 Shale, dark gray, fissile, minor anhydrite as above.

6890-6900 Shale, dark gray; white to light gray, fine crystalline anhydrite.

6900-6905 Shale, dark gray, fissile; minor anhydrite as above.

6905-6910 Shale and anhydrite as above; medium brownish gray (5YR5/1) fine crystalline limestone.

6910-6915 Shale and anhydrite as above; limestone as above to very light brownish gray (5YR7/1).

6915-6920 Shale, dark gray and greenish gray (5GY6/1); anhydrite and limestone as above.

6920-6925 Anhydrite and shale as above; very light brownish gray fine crystalline limestone.

6925-6940 Anhydrite and shale as above.

6940-6945 Anhydrite and shale as above; light brownish gray fine crystalline limestone.

Core #1

6944-6945 Limestone, brownish gray, recrystallized oolitic ? to grayish orange pink, fine crystalline; some clear anhydrite crystals in vugs.

6945-6947 Anhydrite, white to clear, very fine crystalline.

6947-6948 Anhydrite as above, with some grayish orange pink, fine crystalline limestone.

6948-6949 Limestone, brownish gray, fine crystalline; clear crystal anhydrite. Scattered fluorescence.

6949-6952 Limestone, pale yellowish brown, fine crystalline; some grayish brown crystal anhydrite; scattered porosity and slight scattered fluorescence.

6952-6953 Limestone, pale yellowish brown, fine crystalline with intermixed crystallized grayish brown anhydrite.

6953-6955 Limestone, pale yellowish brown, sublithographic with crystallized pale brown anhydrite, some slight porosity.

6955-6956 Limestone as above, with much anhydrite as above; some slight scattered fluorescence.

6956-6957 Limestone, brownish gray, very fine crystalline, dense.

6957-6958 Limestone, brownish gray, fine crystalline, crystallized brownish gray, anhydrite; ostracodes?.

6958-6960 Limestone, pale yellowish brown, sublithographic; with much anhydrite as above.

6960-6961 Anhydrite, very light gray, sublithographic; minor very pale yellowish brown (10YR7/2) very fine crystalline, dolomitic limestone.

6961-6962 Anhydrite, very light gray to medium light gray, sublithographic.

6962-6963 Anhydrite, very light gray as above.

6963-6964 Anhydrite, medium light gray, sublithographic.

6964-6965 Anhydrite, yellowish gray, sublithographic.

6965-6966 Anhydrite, medium gray to yellowish gray, sublithographic.

6966-6967 Anhydrite, medium dark gray, very fine crystalline, slightly calcareous.

6967-6969 Anhydrite, medium gray, sublithographic.

6969-6970 Anhydrite, very pale yellowish brown (10YR7/2) very fine crystalline.

6970-6971 Anhydrite, medium light gray, very fine crystalline.

6971-6972 Anhydrite, medium gray, very fine crystalline.

6972-6973 Anhydrite, light gray, very fine crystalline.

6973-6974 Limestone, medium gray, very fine crystalline, dolomitic.

Core #2

6979-6980 Limestone, medium brownish gray (5YR5/1) oolitic and very pale yellowish brown (10YR7/2) clayey.

6980-6984 Limestone, medium gray, fine crystalline; stylolites.

6984-6986 Limestone, light brownish gray, fine crystalline; dusky yellowish brown crystallized anhydrite.

6986-6989 Limestone, very pale yellowish brown (10YR7/2) very clayey.

6989-6990½ Limestone, very pale yellowish brown, fine crystalline, much brownish gray crystallized anhydrite, some fluorescence.

6990½-6991½ Limestone, very pale yellowish brown, fine crystalline, anhydritic; clear to white fine crystalline anhydrite.

6991½-6995 Limestone, very pale yellowish brown, very clayey, some anhydrite as above.

6995-7003 Anhydrite, medium gray, fine crystalline, slightly calcareous; medium light gray anhydritic lithographic limestone.

7003-7006½ Anhydrite, medium brownish gray (5YR5/1) crystallized; minor fine crystalline, pale yellowish brown limestone.

7006½-7008½ Limestone, light brownish gray, fine crystalline; medium brownish gray (5YR5/1) crystallized anhydrite; very slight porosity and scattered fluorescence.

7008½-7009½ Anhydrite, medium brownish gray (5YR5/1) crystallized; minor limestone as above.

7009½-7013½ Anhydrite, very pale yellowish brown (10YR7/2) sublithographic, slightly calcareous; grayish brown (5YR3/2) fine crystalline limestone.

7013½-7014½ Limestone, very pale yellowish brown (10YR7/2) very fine crystalline; some clear crystallized anhydrite.

7014½-7019 Anhydrite, very fine crystalline, white to pale yellowish brown, very calcareous; some very pale yellowish brown (10YR7/2) limestone.

7019-7024 Limestone, very pale yellowish brown (10YR7/2) fine crystalline; white to very pale yellowish brown, very fine crystalline, anhydrite.

7024-7034 Limestone; brownish gray, fine to recrystallized fragmental?.

7034-7039 Limestone, very pale yellowish brown (10YR7/2) microsuorotic, some fluorescence.

Core #3

7039-7045 Limestone, very pale yellowish brown (10YR7/2) microsucrosic, slight fluorescence.

7045-7046 Limestone, medium brownish gray (5YR5/1) fine crystalline, some porosity and fluorescence; some limestone as above.

7046-7056 Limestone, light brownish gray, fine crystalline; some pale brown crystallized anhydrite; some porosity and scattered fluorescence.

7056-7059 Limestone, very light brownish gray (5YR7/1) fine crystalline, fossiliferous.

7059-7070 Limestone, medium light gray, fine crystalline, some irregular dark gray shaley laminations.

7070-7072 Limestone, very pale yellowish brown (10YR7/2) microsucrosic, anhydritic.

7072-7073 Limestone, light brownish gray, fine crystalline, oolitic, some porosity.

7073-7074 Limestone, light brownish gray, fine crystalline, good porosity, slight scattered fluorescence.

7074-7080 Limestone, very pale yellowish brown (10YR7/2); very fine crystalline, good porosity in patches, with good fluorescence in spots; stylolites.

7080-7085 Limestone, very pale yellowish brown (10YR7/2) some porosity, slight fluorescence.

7085-7086 Limestone, very pale yellowish brown (10YR7/2) fine crystalline to oolitic, good porosity; some anhydrite fillings, some fluorescence.

7086-7095 Limestone, very pale yellow brown (10YR7/2) fine crystalline to oolitic, good scattered porosity, some fluorescence.

7095-7097 Limestone as above, some porosity, slight fluorescence.

Core #4

7097-7108 Limestone, very pale yellowish brown, fine crystalline to micro-sucrosic; much fragmental fossil material.

7108-7125 Limestone, light brownish gray, very fine crystalline; crystallized white anhydrite in vugs.

7125-7128 Limestone, light brownish gray and medium light gray, fine crystalline to fine oolitic; stylolites.

7128-7140 Limestone, mottled pinkish gray and light gray, sublithographic, dolomitic.
7140-7143 Limestone, medium brownish gray (5YR5/1), fine crystalline.
7143-7154 Limestone, medium dark gray, fine crystalline and very light brownish gray (5YR7/1) fossiliferous.
7154-7155 Limestone, very pale yellowish brown (10YR7/2) recrystallized oolitic, slight fluorescence, good cut.
7155-7169 Limestone, medium brownish gray (5YR5/1), fine crystalline, slight cut.
7169-7184 Limestone, light brownish gray, oolitic.
7184-7209 Limestone, light brownish gray, oolitic and fragmental.

Core #5

7209-7213 Limestone, light brownish gray, oolitic, good porosity, good fluorescence, good cut.
7213-7214 Limestone, light brownish gray, oolitic, good fluorescence, good cut.

Core #6

7214-7229 Limestone, light brownish gray, recrystallized oolitic.
7229-7271 Limestone, light brownish gray, fine crystalline.
7271-7300 Limestone, brownish gray, fine crystalline, some cut.
7300-7308 Limestone, brownish medium light gray, microsucrosic dolomitic, very fine pinpoint porosity, good fluorescence and cut.
7308-7315 Limestone, medium brownish gray (5YR5/1) fine crystalline; with calcite.
7315-7320 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic, some very fine porosity, good fluorescence and cut; and brownish black microsucrosic, shaley, dolomite.

Core #7

7320-7325 Limestone, brownish, medium gray, fine crystalline.
7325-7328 Dolomite, brownish medium gray, microsucrosic.
7328-7333 Limestone, light brownish gray, medium crystalline.
7333-7335 Limestone, light brownish gray, fine crystalline.
7335-7346 Limestone, light brownish gray, oolitic to recrystallized fragmental?, good porosity, fluorescence and cut,
7346-7347 Limestone, brownish medium gray, fine crystalline.
7347-7357 Limestone, light brownish gray oolitic to recrystallized fragmental, good porosity, fluorescence and cut.
7355-7359 Limestone, very light brownish gray, fine crystalline; white very fine crystalline, oolitic and fossiliferous dolomite.
7359 Total Depth.