

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 76

Summary of Amerada Petroleum Corporation North Dakota "E" No. 1
Williams County, North Dakota
Permit #144, Well #128

By LaVerne B. Nelson
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Amerada Petroleum Corporation - North Dakota State "E" No. 1, Williams County, North Dakota. C NW NW Section 16, T. 154N., R. 95W. (660 feet from north line and 659.71 feet from west line). Elevation G.L. 2293.

The Amerada-North Dakota State No. 1 was spudded August 7, 1952. 10 3/4" surface casing was set at 704 feet and cemented with 600 sacks of cement. 7" casing was set at 8927 feet and cemented with 650 sacks of cement. The well was completed October 24, 1952 as an oil producer in the Mission Canyon.

DST

DST #1 8686-8714

Tool open 4 hours, shut in 15 minutes, 3000 feet water cushion, air immediately, weak blow for 20 minutes, dead for 20 minutes, weak blow for 8 minutes, very weak blow for 1 hour and 12 minutes; closed and reopened tool, air immediately, very weak blow for 1 hour and 45 minutes; recovered approximately 5 gallons free oil on top of 3000 foot water cushion; had small amount of gas, 8 strands above water cushion; water cushion was cut with rainbow of oil; recovered 90 feet black sulfur gas and water cut mud, gravity 42.2°; HP 5200; IFP 2380; FFP 1420; BHP 2900.

DST #2 8714-8754

Tool open 2 3/4 hours, shut in 30 minutes, air immediately, weak blow for 1 hour, good blow for 1 hour, good to weak blow for 45 minutes, recovered 2000 feet water cushion, 252 feet black sulfur gas cut mud and 30 feet black foamy oil and gas cut mud; 10% oil, G.O. no water, HP 5400; IFP 1075; FFP 1100; BHP 1200.

DST #3 8764-8813

Tool open 4 hours, shut in 30 minutes, air immediately, good blow 45 minutes, fair blow 35 minutes, weak blow 2 hours, dead 40 minutes, recovered 2000 feet water cushion, 428 feet slightly gas cut muddy salt water, HP 5200; IFP 900; FFP 1000, BHP 3600.

DST #4 8813-8913

Tool open 3 hours, shut in 30 minutes, 2000 feet water cushion, weak blow 45 minutes, very weak blow 20 minutes and died, dead 55 minutes, very weak blow for 20 minutes and died; recovered 100 feet rotary mud and 2000 feet water cushion. HP 5150, IFP 1000, FFP 1075; BHP 3000.

PERFORATIONS

Perforated 8730' - 62' with 4 shots per foot and acid with 1000 gallons, packer set at 8560, swabbed 24 hours from 8700', recovered 8 barrels black sulfur water with slight scum of oil and 14 barrels acid water. Reacidized

with 5000 gallons, swabbed 5 hours from 0 to 8000 feet, recovered 26.82 barrels salt sulfur water, trace of oil, swabbed from 8700 feet, recovered 13 barrels of oil and 67 barrels salt water in 24 hours, swabbed 4 1/2 hours from 8700, recovered 11.34 barrels fluid, 70% water, set retainer at 8722 feet.

Perforated 8674-8720 with 4 shots per foot and acid with 1000 gallons, packer set at 8720; swabbed 7 barrels oil and 40 barrels water in 14 hours; swabbed 23 barrels oil and 58 barrels water in 15 hours; reacidized with 5000 gallons; swabbed 23 barrels oil and 133 barrels water in 21 1/2 hours; swabbed 77 barrels oil and 47 barrels water in 20 hours; swabbed 46 barrels oil and 72 barrels water in 23 hours, reacidized with 1500 gallons; swabbed 19 barrels oil and 20 barrels water in 9 hours.

On flow test; swabbed 48 barrels oil and 88 barrels water through tubing in 24 hours; swabbed 67 barrels oil and 102 barrels water in 22 hours (S.C. 298, 650 PPM) swabbed 19 barrels oil and 38 barrels water in 6 hours; shut in 48 hours; flowed 124 barrels oil and 71 barrels water in 18 hours on 16/64" choke. Tubing pressure 100; GOR 1248/1; flowed 65 barrels oil and 19 barrels water in 24 hours on 12/64" choke; tubing pressure 25; GOR 1570/1; Completed 10-24-52.

Formation tops were determined from samples gamma ray, and electric logs. Depths were determined from electric log depth. Color determined from rock color chart. Not all lithologic formation tops called in following list.

FORMATION TOPS

| | |
|----------------------|------|
| Cretaceous System | |
| Greenhorn | 3864 |
| Muddy | 4342 |
| Dakota | 4620 |
| Jurassic System | |
| Morrison | 5037 |
| Sundance | 5222 |
| Piper | 5748 |
| Triassic system | |
| Spearfish | 6088 |
| Mississippian System | |
| Amsden | 6904 |
| Heath | 7115 |
| Kibbey | 7638 |
| Charles | 7797 |
| Mission Canyon | 8482 |

- 3690-3810 Shale; medium gray and medium dark gray; flaky and lumpy, slightly calcareous traces of pale yellowish brown, very hard, siltstone, Inoceramus prisms, and crystals of pyrite.
- 3810-3870 Shale; medium gray and dark gray, lumpy, slightly calcareous, traces of pale yellowish brown siltstone, Inoceramus prisms, and pyrite crystals.
- 3870-3990 Shale; medium dark gray, lumpy, calcareous, speckled; Inoceramus prisms and sucrosic limestone.

3990-4080 Shale; dark gray, lumpy.

4080-4170 Shale; medium light gray, slightly calcareous, lumpy.

4170-4230 Shale; medium light gray, lumpy; calcareous, bentonitic; traces of bluish white; micaceous bentonite.

4230-4320 Shale; dark gray; fissile brittle.

4320-4410 Shale; as above; very light gray, very fine grained to silt; cemented sandstone or siltstone.

4410-4470 Shale; medium dark gray, flaky; some light brown siltstone. Trace of pyrite.

4470-4600 Shale; medium gray, lumpy.

4600-4640 Shale; medium dark gray, flaky and splintery, brittle.

4640-4730 Sandstone; very fine grained, well cemented, quartz. Much shale as above traces of red brown, iron stained siltstone.

4730-4750 Shale; medium dark and medium gray, splintery.

4750-4820 Shale; medium dark and medium gray, flaky and splintery, brittle, gamma and electric logs indicate sandstone.

4820-4910 Shale; medium dark gray and medium gray, splintery, brittle traces of very fine grained well cemented sandstone.

4910-4920 Shale; dark gray and medium gray, splintery, brittle. Much very fine grained, cemented quartz.

4920-4970 Shale; medium dark gray, flaky and splintery, brittle traces of sandstone as above.

4970-4980 Shale; as above; much very fine grained, well cemented quartz.

4980-5020 Shale; medium gray, flaky and splintery, brittle traces of sandstone as above.

5020-5050 Sandstone; very fine to fine grained, well cemented, quartz. Much shale as above.

5050-5210 Shale; greenish gray, and medium dark gray, flaky; traces of light brown shale.

5210-5230 Shale; medium light gray, flaky, traces of siltstone.

5230-5310 Shale; medium light gray, lumpy, some very fine grained siltstone, streaks of greenish gray shale.

5310-5330 Sandstone; very fine grained, well cemented; quartz. Little glauconite, shale as above.

5330-5420 Shale; medium gray and greenish gray, flaky; a little bluish white, micaceous bentonite.

5420-5460 Shale; light gray and greenish gray, flaky and splintery, calcareous.

5460-5510 Shale; medium light gray and medium dark gray, flaky; some greenish gray shale; traces of very fine grained, white limestone.

5510-5550 Shale; light gray, lumpy, calcareous.

5550-5570 Shale; medium light gray and greenish gray, flaky and splintery, calcareous some moderate brown, silty shale.

5570-5580 Shale; greenish gray and moderate brown, lumpy, calcareous much yellowish gray, very fine grained, dense limestone.

5580-5610 Shale; greenish gray, flaky and splintery, calcareous, some moderate brown shale, traces orange, fine grained sandstone.

5610-5630 Shale; greenish gray; and moderate brown, some yellowish gray, sucrosic limestone.

5630-5650 Shale; greenish gray, and moderate brown, much very fine grained, calcareous sandstone and fine grained, sucrosic limestone.

5650-5680 Limestone; fine grained, arenaceous, some fragmental siltstone and shale as above.

5680-5710 Shale; medium gray, and greenish gray, lumpy and splintery, calcareous, some limestone.

5710-5720 Shale; greenish gray; moderate brown, and light olive gray, flaky, calcareous brittle.

5720-5750 Shale; greenish gray and moderate brown, slightly calcareous, brittle, some very fine grained sandstone.

5750-5770 Limestone; white to yellowish gray, dense, sublithographic chalky in part.

5770-5790 Limestone; pale red and yellowish gray, sublithographic.

5790-5803 Missing samples.

5803-5810 Shale; greenish gray, flaky.

5810-5820 Limestone; white to yellowish gray, very fine grained to sublithographic.

5820-5830 Shale; greenish gray and moderate brown, splintery, slightly calcareous.

5830-5860 Limestone; white to very pale orange, dense, lithographic traces of orange sucrosic anhydrite.

5860-5880 Shale; greenish gray and moderate brown, splintery, brittle, limestone as above

5880-5900 Limestone; white to yellowish gray, dense, sublithographic, fragmental crystalline in part, shale as above.

5900-5930 Shale; greenish gray; and moderate brown; brittle slightly calcareous.

5930-5950 Limestone; white to yellowish gray; dense, very fine grained to sublithographic, white crystalline, sucrosic anhydrite; shale as above.

5950-6000 Shale; moderate red to grayish red and greenish gray; brittle, dolomitic, white, sucrosic anhydrite and yellowish gray limestone, some very fine grained quartz sandstone and siltstone.

6000-6030 Limestone; much fine grained, dense, yellowish gray limestone, fine grained quartz; shale as above.

6030-6060 Sandstone; moderate reddish orange, very fine grained to silty, moderate brown siltstone.

6060-6210 Shale; greenish gray; brittle, calcareous sandstone and silt as above; traces of pyrite crystals.

6210-6250 Shale; grayish red; massive, silty, greenish gray shale; white slender needle like crystals of gypsum.

6250-6340 Shale; greenish gray; dolomite, brittle, moderate red shale; traces of pyrite.

6340-6390 Shale; medium gray to medium dark gray, platy.

6390-6500 Missing samples.

6500-6600 Sandstone; moderate reddish orange, very fine grained to silt; greenish gray to medium gray shale. Traces of gypsum and anhydrite.

6600-6650 Shale; medium dark gray; platy; flaky; much sandstone as above; some anhydrite.

6650-6730 Shale; moderate reddish orange, silty; some reddish orange sandstone. Traces of crystalline anhydrite.

6730-6770 Shale; medium gray to medium dark gray, platy; friable some reddish orange silt and shale.

6770-6790 Shale; moderate reddish orange, silty, some, moderate reddish orange, very fine grained, cemented sandstone and medium gray shale.

6790-6810 Sandstone; moderate reddish orange, very fine grained, a little moderate reddish orange shale and medium gray shale, traces of anhydrite.

6810-6820 Sandstone; as above; much white, needle like crystals of gypsum.

6820-6860 Sandstone; as above; no gypsum; traces of anhydrite.

6860-6900 Shale; moderate reddish orange; silty; some moderate reddish orange, very fine grained sandstone.

6900-7200 Missing samples.

7200-7280 Shale; moderate red, lavender; moderate yellow variegated, splintery, brittle; some fine to medium well rounded quartz.

7280-7290 Shale; as above; some moderate reddish orange sandstone and fine to medium grained quartz.

7290-7310 Sandstone; fine to medium grained; well rounded quartz, moderate reddish orange sandstone shale as above.

7310-7410 Shale; variegated moderate red, lavender, reddish orange and dark gray, brittle.

7410-7440 Missing samples.

7440-7500 Shale; variegated moderate red, pale purple, moderate yellow, and dark gray, brittle, some white needle like gypsum.

7500-7540 Shale; medium light gray, moderate red, and pale purple, variegated, brittle, some gypsum.

7540-7570 Shale; variegated pale purple, moderate red, lavender and white, brittle.

7570-7670 Shale; dark gray, light olive brown, pale red purple, variegated, brittle, some fine to medium sized, well rounded quartz.

7670-7700 Limestone; white and yellowish brown, very fine grained, dense shale as above.

7700-7800 Missing samples.

7800-7812 Shale; dark gray; pale red, light brown and light olive gray; trace of white and pale red massive anhydrite. Some light brown siltstone.

7812-7980 Shale; samples same as above, microlog indicates salt beds which have been washed out.

7980-8000 Shale; varicolored shale; microlog indicates shale bed, sample as above.

8000-8120 Missing samples.

8120-8180 Shale; as above microlog indicates salt.

8180-8200 Limestone; white to yellowish gray, chalky to very fine grained, dense some shale; and siltstone as above some anhydrite.

8200-8210 Limestone; as above; some oolitic limestone with good tubular porosity.

8210-8220 Anhydrite; white crystalline; some limestone as above.

8220-8260 Limestone; yellowish gray; very fine grained, sucrosic, chalky in part, some shale and anhydrite.

8260-8290 Salt; microlog indicates salt samples show limestone anhydrite and shale as above.

8290-8305 Missing samples.

8305-8335 Dolomite; yellowish gray, coarse grained, grainy, some white and pale red massive anhydrite shale as above.

8335-8340 Limestone; yellowish gray, oolitic, good tubular porosity, some massive and crystalline white anhydrite. Some greenish gray shale.

8340-8345 Shale; greenish gray, lumpy, calcareous.

8345-8375 Limestone; yellowish gray; very fine grained, some greenish gray, pale red dark gray shale; some light brown, to moderate reddish brown calcareous, siltstone; some white massive and crystalline anhydrite.

8375-8410 Limestone; light brown and yellowish gray, lithographic some anhydrite and shale as above.

8410-8445 Limestone; yellowish gray, coarse grained, grainy, good interstitial porosity; shale and anhydrite as above.

8445-8480 Salt; microlog indicates salt, samples as above.

8480-8496 Limestone; yellowish gray, very fine grained to sublithographic, dense.

8496-8510 Dolomite; yellowish gray, sublithographic to grainy, good interstitial porosity in grainy dolomitic shale and anhydrite.

8510-8535 Shale; greenish gray, highly calcareous, some limestone and dolomite as above.

8535-8565 Limestone; yellowish gray, very fine grained, dense, lenses of coarse grained grainy limestone with good porosity shale as above. Good spotted fluorescence. No cut.

8565-8585 Limestone; yellowish gray, dense, sublithographic; poor porosity shale and siltstone as above.

8585-8600 Limestone; yellowish gray to brown, grainy, good porosity, good fluorescence, no cut.

8600-8610 Dolomite; brown, dense, sublithographic, streaks of good to fair porosity. Fluorescence with no cut.

8610-8630 Limestone; yellowish gray, very fine grained, streaks of good to fair porosity, some dolomite, good fluorescence with slight oil cut.

8630-8640 Limestone; yellowish gray, oolitic and fine grained, fair porosity, fluorescence and no cut.

8640-8670 Limestone; yellowish gray and white coarse grained and oolitic; good porosity good H₂S odor from acid and limestone; slight fluorescence.

8670 1 1/2 hour circulation. Yellowish brown and yellowish gray, oolitic, good H₂S odor in acid, slight fluorescence.

8670-8680 Limestone; as above fair to poor porosity.

8680-8700 Limestone; white to yellowish gray, fine grained and oolitic; good porosity fluorescence and oil cut.

8700-8720 Limestone; yellowish brown to yellowish gray, oolitic, slight fluorescence good porosity.

8720-8750 Limestone; yellowish gray, very fine grained to sublithographic, streaks of good porosity; spotted fluorescence, some white chalky limestone.

8750-8765 Limestone; white to yellowish gray, fine grained, dense, spotted fluorescence. Some greenish gray shale streaks.

8765-8775 Limestone; yellowish gray, oolitic, good porosity slight fluorescence, some dense, fine grained limestone.

8775-8810 White to yellowish gray, very fine grained, dense, sublithographic, fair porosity. Limestone.