

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 139

Summary of the Sun Oil Company - Arthur Espe No. 1  
Rolette County, North Dakota  
Permit No. 673 - Well No. 659

By Clarence Carlson  
February, 1956

Sun Oil - Arthur Espe #1, Rolette County, North Dakota. C NW SW Section 5, T. 163N., R. 72W. Elevation 2288 K.B., 2282 G.L.

The Sun Oil - Arthur Espe #1 was spudded August 2, 1954, and 10 3/4 inch casing was set at 250 feet with 200 sacks of cement. The well was completed as a dry hole August 20, 1954. Total depth - 3660 feet.

Cores: 3293-3428

DST: none

Logs: Electric, Gamma ray-neutron, Microlog.

Plugging Records:

3583-3620 - 15 sacks  
3263-3300 - 15 sacks  
2393-2430 - 15 sacks  
228- 265 - 15 sacks  
surface casing - 5 sacks

Formation tops were determined from sample and electric logs, corrected to electric log tops. Not all formation tops called in the following list.

Cretaceous System

|                     |      |
|---------------------|------|
| Pierre Formation    | 745  |
| Niobrara Formation  | 1677 |
| Greenhorn Formation | 2038 |
| Dakota Group Sand   | 2427 |

Jurassic System 2748

|                 |      |
|-----------------|------|
| Piper Limestone | 2942 |
|-----------------|------|

Triassic System

|                     |      |
|---------------------|------|
| Spearfish Formation | 3162 |
|---------------------|------|

Mississippian System

|                     |      |
|---------------------|------|
| Lodgepole Formation | 3280 |
| Englewood Formation | 3520 |

Devonian System

|                   |      |
|-------------------|------|
| Lyleton Formation | 3558 |
| Nisku Formation   | 3610 |

|         |  |
|---------|--|
| 0-50    | Glacial till, sand and gravel, composed of quartz, limestone pebbles and shale.        |
| 50-140  | Sand, fine to coarse, subrounded to angular quartz, some limestone and shale, pebbles. |
| 140-180 | Sand, as above with increased amounts of shale, light gray.                            |

180-200 Sand, fine to coarse, colorless quartz, with many limestone and shale pebbles.

270-440 Shale, light gray compact and glacial material as above.

440-500 Shale, light gray to medium light gray, lumpy, spongy to compact, bentonitic, silty.

500-560 Shale and siltstone, medium light gray, micaceous, bentonitic.

560-620 Shale, medium light gray, lumpy, compact, bentonitic, a little lignite from 580.

620-660 Shale and siltstone, medium light gray, bentonitic, lumpy, compact.

660-740 Shale, medium light gray, light brown, silty, lumpy, spongy to compact.

740-830 Shale, medium light gray, silty, bentonitic, lumpy, spongy, compact.

830-850 Shale, medium dark gray, platy to lumpy, compact to spongy.

850-930 Shale, medium gray, lumpy, spongy to compact.

930-1010 Shale, medium light gray, lumpy, compact.

1010-1040 Shale, medium gray to medium dark gray, lumpy to platy, compact.

1040-1450 Shale, medium light gray, lumpy, compact.

1450-1470 Shale as above, some light gray bentonite, some shale, pale brown, lumpy, bentonitic.

1470-1520 Shale, medium gray, bentonitic, lumpy.

1520-1560 Shale, medium gray, bentonitic, lumpy, some light gray, bentonite.

1560-1580 Shale as above and pale brown, lumpy.

1580-1650 Shale, medium dark gray, flaky, spongy.

1650-1670 Shale, medium gray, flaky, spongy, calcareous, white specked.

1670-1680 Shale as above, some light bluish gray bentonite.

1680-1860 Shale, medium dark gray, flaky to platy, compact.

1860-1970 Shale, medium dark gray and medium light gray, platy to lumpy, compact.

1970-1980 Shale, medium dark gray, flaky, spongy.

1980-2020 Shale, medium dark gray, flaky, spongy, some inoceramus fragments.

2020-2160 Shale, medium dark gray, flaky, spongy, calcareous white specked, many inoceramus fragments.

2160-2300 Shale, medium dark gray, flaky, spongy.

2300-2420 Shale, medium gray to medium dark gray, platy, compact to spongy.

2420-2430 Shale as above and sandstone, medium to coarse, subangular to subrounded, colorless quartz, calcareous and pyrite cement.

2430-2460 Sand, colorless, loose, fine to coarse, rounded to subangular quartz, a little shale, medium gray, flaky.

2460-2520 Sand as above.

2520-2550 Shale, medium dark gray and medium gray, platy, compact, some sand as above.

2550-2570 Sandstone, very light gray, very fine to fine grained, slightly calcareous, a few traces of Glauconite shale, as above and some light greenish gray lumpy, compact, slightly calcareous.

2570-2590 Shale, medium to medium dark gray, lumpy to platy, some light greenish gray, as above, some loose, medium quartz grains.

2590-2620 Shale as above, some sandstone very light gray, fine grained, slightly calcareous.

2620-2640 Shale, medium light gray, lumpy, compact, also light greenish gray, flaky, slightly calcareous, some loose, medium to coarse quartz.

2640-2660 Shale as above, some sandstone white to light gray, fine grained, very calcareous.

2660-2670 Shale, light greenish gray, lumpy, compact, slightly calcareous, some loose quartz grains and shale, medium gray.

2680-2690 Shale, medium gray, splintery, spongy to compact.

2690-2730 Shale as above, some sandstone, light brownish gray, very fine grained, calcareous.

2730-2770 Shale, medium gray and light greenish gray, splintery compact, sandstone as above, a few pieces of limestone, very light gray, fine grained, fragmental, some shale, moderate reddish brown, lumpy, compact.

2770-2780 Shale, moderate reddish brown to pale red, and light greenish gray, platy, compact, calcareous, some limestone very light gray, very fine grained argillaceous and arenaceous.

2780-2790 Siltstone, medium gray, very calcareous, some shale as above.

2790-2810 Shale, pale reddish brown to pale red, lumpy, compact, calcareous.

2810-2820 Shale as above, some limestone yellowish gray, fine grained, argillaceous.

2820-2830 Shale, pale reddish brown and medium gray, platy, compact, slightly calcareous.

2830-2840 Shale, pale reddish brown, greenish gray, medium gray, platy, compact, slightly calcareous, some sandstone, very light gray, fine grained, very calcareous.

2840-2860 Shale as above.

2860-2870 Sandstone, very light gray, fine grained, calcareous.

2870-2910 Shale, varicolored, splintery, compact, some sandstone as above.

2910-2950 Shale, medium gray, greenish gray, pale red, splintery, compact, some sandstone very light gray to white, fine grained, calcareous.

2970-2990 Limestone, light gray, fine grained, fragmental.

2990-3020 Limestone, white to very light gray, fine grained.

3020-3040 Limestone, yellowish gray to light gray, fine grained.

3040-3070 Shale, varicolored, splintery to lumpy, compact, a little sandstone, very light gray, fine to medium grained.

3070-3090 Shale, medium gray, anhydrite, white, some limestone, light gray, very fine grained, dolomitic argillaceous.

3090-3115 Shale, light olive to pale red, platy, compact, calcareous, some white anhydrite.

3115-3155 Anhydrite, white.

3155-3160 Anhydrite, white, shale, pale reddish brown.

3160-3185 Shale, pale brown to pale reddish brown, lumpy, compact, some white anhydrite.

3185-3190 Siltstone, moderate reddish orange, arenaceous, calcareous, some white, sugary anhydrite.

3190-3230 Siltstone as above and loose sand, fine to medium, rounded, frosted quartz grains.

Cores

3293-3300 Limestone, pale red and yellowish gray, fine grained, microsucrosic, with a few shell fragments.

3300-3310 Limestone as above and grayish orange pink, crinoidal limestone, fragmental with some fine grained matrix.

3310-3322 Limestone, pale red to grayish orange pink, fine grained, microsucrosic to fine and medium grained, fragmental, fossiliferous, fair porosity.

3322-3327 Limestone, yellowish gray to pinkish gray, very fine to medium grained, fragmental, fossiliferous, dense.

3327-3331 Limestone, pale red, thinly laminated, fine grained, argillaceous.

3331-3335 Limestone, pale red, fine grained, microsucrosic with some shell fragments.

3335-3347 Limestone as above and very light gray, crinoidal limestone.

3347-3348 Limestone, grayish pink, fine grained, granular.

3348-3350 Limestone, yellowish gray, finely crystalline to fine grained, fossiliferous, fragments.

3350-3364 Limestone, grayish pink, fine grained, granular.

3364-3365 Limestone, yellowish gray, finely crystalline dense with a few shell fragments.

3365-3366 Limestone, grayish pink, fine grained, granular, fossiliferous.

3366-3428 Limestone, white, fragmental, fossiliferous, fine to medium grained.

#### Samples

3440-3450 Limestone, white, fine to medium grained, fragmental, fossiliferous.

3450-3455 Limestone, white, as above and fine grained, chalky.

3455-3460 Limestone, light gray to yellowish gray, fine to medium grained, fragmental, fossiliferous.

3460-3485 Shale, medium gray, foliated, spongy, much other shale, various colors, probably cave.

3485-3495 Limestone, medium gray, fine grained, very argillaceous with a few streaks of white, fragmental limestone, some medium gray shale, as above.

3495-3510 Shale, medium gray to medium dark gray, foliated, spongy, a few pieces of limestone as above.

3510-3515 Shale, medium dark gray, foliated, spongy to compact.

3515-3520 Limestone, medium gray, fine grained, very argillaceous, much shale as above.

3520-3525 Shale, medium gray to medium dark gray, foliated spongy to compact, resinous luster, some shale, dark brownish gray, foliated, compact calcareous.

3525-3535 Shale, dusky brown, lumpy to foliated, compact, calcareous.

3535-3555 Some shale as above.

3555-3560 Shale, greenish gray, compact, calcareous, some pyrite, shale, pale reddish brown, compact, very slightly calcareous.

3560-3580 Siltstone, light gray, dolomitic, a little shale, pale reddish brown and greenish gray.

3580-3585 Shale, pale reddish brown, lumpy, compact, shale, medium gray, foliated, spongy.

3585-3605 Shale, medium gray, foliated, spongy to compact, also shale, greenish gray and yellowish gray, compact.

3605-3610 Shale, medium to medium dark gray as above, some anhydrite, white to light pink.

3610-3620 Dolomite, grayish orange pink, fine grained, limey.

3620-3625 Limestone, yellowish gray, fine grained, fragmental to finely crystalline with coarse crystals of pale brown anhydrite.

3625-3630 Anhydrite, white, sugary to dense, some limestone as above.

3630-3635 Dolomite, light gray, fine grained, silty, limey, some anhydrite.

3635-3660 Limestone, yellowish gray, fine to medium grained, granular, good intergranular porosity, some white anhydrite.