NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 156

Summary of the Amerada Petroleum Corporation - Lacey-Norby No. 1
Well No. 1111 - Permit No. 1123

By Clarence Carlson

The Amerada Petroleum Corporation - Lacey-Norby #1, McKenzie County, North Dakota, Location: C of Lot 10, Section 1, T. 152N., R. 95W. Elevation: 2148 K.B. Total Depth: 9118 feet.

The Amerada Petroleum Corporation - Lacey-Norby #1 was spudded April 2, 1956; drilled to a total depth of 9118 feet; completed as a producing well May 12, 1956.

Casing Record:
Set 9 5/8" surface casing at 618 feet with 450 sacks of cement.
Set 7 1/2" casing at 9116 feet with 1200 sacks of cement.

Completion Data:
Perforations: 9057 to 9088 with 4 shots per foot; acidized with 2000 gallons. Initial production 386 barrels of oil per day through a 14/64 inch choke, flowing pressure 800 lbs. per square inch. Gas-oil ratio 874 -1, 37.6 gravity, no water.

Tests:
DST. 1 - 7693-7766; open 4 1/2 hours, shut in 30 minutes, 1000 feet of water cushion; very strong blow at once decreasing to no blow in 1 1/2 hours; recovered 1000 feet of slightly muddy water cushion 6,450 feet of salt water. IHP 4275#; FHP 4250#; IFP 2835#; FFP 3750#; BHP 3790#.

DST. 2 - 8654-8716; open 5 hours, shut in 30 minutes; 2000 feet water cushion; air immediately weak to strong blow in 1 hour and 20 minutes, gas to the surface in 2 hours and 43 minutes, strong gas blow continuing for remainder of test. Recovered 360 feet of free oil, 450 feet of oil and gas cut water cushion (est. 75% oil) 550 feet of oil and gas cut water cushion (est. 50% oil), 1000 feet of oil and gas cut water cushion (est. 20% oil), 450 feet of fluffy oil and gas cut drilling mud (est. 30% oil), IFP 950#; FFP 1175#; IHP 4710#; FHP 4710#; BHP 4025#.

DST. 3 - 8733-8767; open 5 hours, shut in 30 minutes, 2000 feet water cushion; light blow immediately, increasing to strong blow in 15 minutes, gas to surface in 1 hour and 30 minutes, strong blow continued for the remainder of test. Recovered 800 feet of free oil, 3900 feet of highly gas and oil cut water cushion (est. 50% oil) 30 feet of highly gas and oil cut drilling mud (est. 50% oil). IHP 4825#; FHP 4825#; IFP 950#; FFP 1750#; BHP 4150#.

Logs: Microlaterolog-Gamma Ray
Laterolog-Gamma Ray

Cores: None

Formation tops were determined from samples and electric logs. Doubtful or obscure formations were not picked. Color names and identifying numbers are
taken from the 1948 Rock-Color Chart, distributed by the National Research Council.

### FORMATION TOPS

**Cretaceous System**
- Pierre Formation 1387
- Niobrara Formation 3545
- Greenhorn Formation 3985
- Dakota Group 4400
- Muddy Sandstone 4495
- Dakota Group Sandstone 4780

**Jurassic System**
- Piper Limestone 5153

**Triassic System**
- Spearfish Formation 6210

**Permian System**
- Opeche Formation 6505

**Pennsylvanian System**
- Minnelusa Formation 6980

**Mississippian System**
- Amsden Formation 7180
- Big Snowy Group 7265
- Kibbey Limestone 7790
- Charles Formation 7930
- Mission Canyon (base of last salt) 8550

<table>
<thead>
<tr>
<th>Interval</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>3900-4020</td>
<td>Shale, medium dark gray, foliated.</td>
</tr>
<tr>
<td>4020-4140</td>
<td>Shale, medium dark gray, foliated, compact, calcareous, some white specks.</td>
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<tr>
<td>4140-4530</td>
<td>Shale medium dark gray, foliated, compact.</td>
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<tr>
<td>4530-4560</td>
<td>Shale, as above, a little sandstone very light gray, fine grained, calcareous.</td>
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<tr>
<td>4560-4680</td>
<td>Shale, medium gray and medium dark gray.</td>
</tr>
<tr>
<td>4680-4740</td>
<td>Shale, medium dark gray.</td>
</tr>
<tr>
<td>4740-4820</td>
<td>Shale, medium gray and medium dark gray, a little sandstone very light gray, fine grained, calcareous.</td>
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<tr>
<td>4820-4880</td>
<td>Sandstone very light gray, fine grained, shale, as above.</td>
</tr>
<tr>
<td>4880-4900</td>
<td>Shale, medium gray, some sandstone as above and siltstone, light gray.</td>
</tr>
<tr>
<td>4900-4920</td>
<td>Sandstone, very light gray, very fine to fine grained, some shale, very light gray, compact, waxy.</td>
</tr>
<tr>
<td>4920-4950</td>
<td>Shale, very light gray, waxy, compact and medium dark gray, platy, compact.</td>
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<tr>
<td>4950-5010</td>
<td>Shale, very light gray, and grayish orange pink 5YR7/2, compact, waxy, a little sandstone, very light gray, fine grained.</td>
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<tr>
<td>5010-5070</td>
<td>Sandstone, very light gray, fine grained, some shale, light gray to light olive gray, waxy, compact.</td>
</tr>
<tr>
<td>5070-5180</td>
<td>Shale, light gray and medium gray, waxy, compact.</td>
</tr>
<tr>
<td>5180-5240</td>
<td>Shale, light gray, light olive gray and moderate reddish brown, waxy, compact.</td>
</tr>
<tr>
<td>5240-5340</td>
<td>Shale, as above and medium dark gray.</td>
</tr>
</tbody>
</table>
5340-5370 Shale, light olive gray and moderate reddish brown, platy, compact.
5370-5440 Shale, light olive gray, platy, compact.
5440-5490 Shale, as above, some sandstone, very light gray, very fine to fine grained, calcareous.
5490-5580 Shale, light olive gray, platy, compact.
5580-5600 Shale, as above, a little sandstone, white to very light gray, very fine grained, calcareous.
5600-5640 Shale, light olive gray, platy, compact, slightly calcareous.
5640-5650 Shale, light olive gray to greenish gray, 5GY6/1, flaky to platy, slightly calcareous, traces of siltstone, light greenish gray, calcareous.
5650-5660 Shale, as above, some sandstone, very light gray, fine grained, calcareous, siltstone, as above.
5660-5670 Shale, as above and moderate reddish brown, siltstone, light greenish gray, sandy, slightly calcareous.
5700-5730 Shale, light olive gray and greenish gray, slightly calcareous, sandstone light greenish gray, fine grained, calcareous.
5730-5750 Shale, as above, sandstone, colorless to very light gray, fine grained, traces of limestone, very light gray, fine grained, fragmental.
5750-5760 Shale, light olive gray and greenish gray, flaky to platy, calcareous, traces of sandstone, very light gray to light greenish gray, very fine grained, calcareous.
5760-5840 Shale, as above.
5840-5860 Shale, as above, some sandstone, white to very light gray, fine grained.
5860-5880 Shale, greenish gray, flaky to platy, calcareous, sandstone, white, fine grained, calcareous.
5880-5910 Shale, as above, sandstone white, fine, grained, very calcareous.
5910-5930 Sandstone, white to very light gray, fine grained, very calcareous, shale, as above.
5930-5950 Shale, greenish gray, platy to lumpy, compact, calcareous, some sandstone, as above.
5950-5970 Sandstone, white, fine grained, calcareous, shale, as above.
5970-5980 Limestone, yellowish gray, very finely crystalline.
5980-5990 Limestone, yellowish gray and pinkish gray, very finely crystalline.
5990-6020 Limestone, as above, some sandstone, white, fine grained, calcareous.
6020-6050 Limestone, very light gray, finely crystalline.
6050-6140 Limestone, very light gray and pinkish gray, very finely crystalline, a little chert, pinkish gray.
6140-6160 Limestone, as above, some chert and a little sandstone, grayish orange pink, fine grained.
6160-6200 Shale, pale reddish brown, lumpy, some gypsum, colorless to white.
6200-6230 Shale, as above, some gypsum and siltstone, pale reddish brown.
6230-6240 Shale, pale reddish brown to moderate reddish orange, siltstone, moderate reddish orange, slightly calcareous.
6240-6320 Siltstone, moderate reddish orange, slightly calcareous, a little gypsum.
6320-6420 Siltstone, moderate reddish orange, slightly calcareous, sandy.
6420-6450 Siltstone, as above, some sandstone, moderate reddish orange, fine to medium, rounded grains, silty.
6450-6500 Salt, and siltstone, as above.
6500-6630 Shale, pale reddish brown, siltstone, moderate reddish orange, sandy.
6630-6680 Salt.
6680-6840 Siltstone, moderate reddish orange, calcareous, sandy.
6840-6990 Shale, pale reddish brown, calcareous, some siltstone, as above.
6990-7030 Sandstone, grayish pink to white, very fine grained, calcareous, much siltstone, as above.
7030-7050 Sandstone, as above, some dolomite, grayish pink, finely crystalline.
7050-7080 Sandstone, grayish pink, fine grained, calcareous.
7080-7140 Sandstone, as above, some dolomite, grayish pink finely crystalline.
7140-7160 Dolomite, grayish pink, finely crystalline, some sandstone, as above.
7160-7170 Sandstone, grayish pink, fine grained, calcareous, some dolomite, as above.
7170-7180 Sandstone, as above, some shale, moderate red, slightly calcareous.
7190-7200 Sandstone, grayish pink, fine grained, calcareous.
7200-7210 Sandstone, as above, dolomite, grayish pink, finely crystalline.
7210-7240 Dolomite, grayish pink to pale red, finely crystalline, some sandstone as above.
7240-7280 Dolomite, as above.
7280-7320 Shale, medium dark gray and moderate red, platy, compact, some dolomite, pinkish gray, finely crystalline.
7320-7340 Shale, moderate red, light olive gray 5Y5/2, platy, compact.
7340-7390 Shale, as above and medium dark gray, flaky to platy.
7390-7410 Shale, medium dark gray, platy, compact.
7410-7450 Shale, as above, a little shale, moderate red, platy, compact.
7450-7460 Shale, variegated, medium dark gray, moderate red, and light olive gray.
7460-7490 Shale, variegated, a little dolomite, pinkish gray, finely crystalline.
7490-7550 Shale, variegated, platy, compact.
7550-7580 Shale, as above, some dolomite, light gray, fine grained and grayish orange pink, fine grained.
7580-7600 Shale, variegated as above.
7600-7640 Shale, as above, a little limestone, light gray, fine grained.
7640-7660 Limestone, light gray to medium gray, very finely crystalline, and shale, variegated.
7660-7690 Shale, variegated.
7690-7710 Sandstone light gray and pinkish gray, fine grained, calcareous.
7710-7740 Sandstone, grayish orange pink 5YR7/2, fine to very fine grained, calcareous.
7740-7790 Sandstone, as above, some siltstone, pale red, calcareous.
7790-7830 Limestone, light gray, very finely crystalline, and light brownish gray, very finely crystalline.
7830-7870 Sandstone, grayish pink, very fine to fine grained, calcareous, some shale, variegated.
7870-7910 Sandstone, light gray to pinkish gray, very fine to fine grained, calcareous.
7910-7930 Sandstone, grayish orange pink 5YR7/2, very fine grained, calcareous.
7930-8000 Salt.
8000-8040 Salt, some shale, light gray, compact and pale red, compact.
8040-8100 Salt.
8100-8180 Salt and siltstone, moderate reddish orange, shaly, calcareous.
8180-8230 Poor samples, mostly cavings.
8230-8290 Salt.
8290-8320 Poor samples, mostly cavings, should be salt and shale or siltstone.
8320-8340 Poor samples, mostly shale, with a little white anhydrite and light brownish gray finely crystalline limestone.
8340-8360 Salt and anhydrite, white to light gray, a little limestone, light brownish gray, very finely crystalline.
8360-8380 Salt and shale, light gray, some limestone, light brownish gray, very finely crystalline, and anhydrite, white, dense.
8380-8400 Limestone, light brownish gray, very finely crystalline and fine to medium grained, silty with good intergranular porosity.
8400-8470 Limestone as above, some anhydrite, white.
8470-8490 Anhydrite, white, some limestone, light brownish gray, very finely crystalline.
8490-8510 Limestone, light yellowish gray, fine grained? sandy, fine grained, rounded quartz, some limestone, light brownish gray, finely crystalline.
8510-8520 Limestone, light brownish gray, finely crystalline and some shale, medium dark gray.
8520-8540 Anhydrite, white.
8550-8590 Limestone, light brownish grey, fine grained, slightly argillaceous to finely crystalline.
8590-8610 Anhydrite.
8610-8615 Limestone, light brownish gray, finely crystalline.
8615-8625 Limestone, light brownish gray, fine grained to finely crystalline.
8625-8640 Limestone, as above, some white anhydrite.
8640-8665 Limestone, light brownish gray, fine grained in part, finely crystalline in part.
8665-8675 Limestone, as above, some anhydrite, light gray to white.
8675-8685 Limestone, light brownish gray, very finely crystalline in part, fine grained in part.
8685-8690 Limestone, light brownish gray, fine grained, slight fluorescence and cut with ccl, some limestone, light brownish gray, finely crystalline.
8690-8710 Limestone, light brownish gray, fine grained, oil stained.
8710-8725 Limestone, light brownish gray, fine grained to finely crystalline, a few pieces are oil stained.
8725-8735 Limestone, light brownish gray, finely crystalline to fine grained, a few pieces are oil stained.
8735-8750 Limestone, light brownish gray, fine grained, slightly argillaceous, some oil staining.
8750-8800 Limestone, light brownish gray, fine grained to finely crystalline.
8800-8880 Limestone, light brownish gray, finely crystalline with a little secondary calcite, colorless, medium crystals. (8850-8880)
8880-8900 Limestone, light brownish gray, finely crystalline, some oolitic, mostly recrystallized to dense limestone.
8900-8915 Limestone, light brownish gray, fine grained, micro-granular, oil stained, some limestone as above.
8915-8925 Limestone, light brownish gray, oolitic, mostly recrystallized to finely crystalline.
8925-8945 Limestone, as above and some fine grained, micro-granular, oil stained.
8945-8950 Limestone, light brownish gray, oolitic, mostly recrystallized to finely crystalline.
8950-9060 Limestone, light brownish gray, fine grained, to finely crystalline, some oil staining.
9060-9080 Limestone, light brownish gray, finely crystalline to fine grained, slightly argillaceous fragmental in part.
9080-9118 Limestone, light gray to light brownish gray, fine grained to finely crystalline, fragmental, containing some shell fragments.