

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 184

Summary of the Lowell J. Williamson Company - A. O. Knudtson #1
Ward County, North Dakota
Well No. 1337 - Permit No. 1349

by Jay Garske
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Lowell J. Williamson Company - A. O. Knudtson #1. Location: 1983 feet from S section line and 660 feet from E Section line in the NE 1/4 SE 1/4 Section 7 T. 157N. - R. 87W. Elevation: 2281 G.L. 2288 K.B., Total Depth: 6797 feet.

The Lowell J. Williamson Company - A. O. Knudtson No. 1 was spudded December 27, 1956 and completed as a producing well April 17, 1957.

Logs: Electric, laterolog, and microlaterolog.

Cores: None.

Tests:

DST 6732-6795 (corrected to S.L.M. 6734-6797); open 1 hour, shut in 30 minutes; Gas to surface in 25 minutes, burned 4' to 5' flare, Recovered: 10 feet of black sulfurous mud, 180 feet of heavily oil and gas cut mud, 180 feet of heavily gas and mud cut oil and 270 feet of heavily gas cut oil. Pressures: IFP 115#, FFP 310#, SIP 2635#, IHP 3790#, FHP 3775#.

Perforations:

Acidized with 1000 gallons, from 6732 to 6797. Swabbed and recovered 22 barrels of oil per hour decreasing to 10 barrels of oil per hour.

Completion Data:

Initial production, 288 barrels of oil per day; no water, gas oil ratio 860/1, API gravity 36.7.

Casing Record:

8 5/8" surface casing set at 327 feet with 175 sacks of cement.
5 1/2" casing set at 6732 with 150 sacks of cement.

Formation tops were determined from samples and electric logs, corrected to the electric logs. Doubtful or obscure formations were not picked. Colors and descriptive numbers taken from the Goddard, et.al., 1951 Rock-Color chart distributed by the Geological Society of America, New York, New York.

FORMATION TOPS

| | |
|----------------------|------|
| Cretaceous System | |
| Pierre formation | 1643 |
| Niobrara formation | 3319 |
| Greenhorn formation | 3754 |
| Basal Cretaceous ss. | 4403 |
| Jurassic System | 4700 |
| Piper limestone | 5425 |

Triassic System

Spearfish formation 5690

Mississippian System

Kibbey sandstone 6002

Kibbey lime 6130

Charles formation 6292

0-30 Glacial sand, mostly very coarse grained quartz, some granular and few pebbles, varicolored.

30-60 Glacial sand, much coarse grained quartz, also very coarse with some granules and a few glacial pebbles, varicolored.

60-90 Glacial till, with some very coarse sand and numerous glacial granules and pebbles.

90-120 Glacial sand, very coarse to granular quartz, few glacial pebbles, varicolored.

120-150 Glacial sand as above.

150-180 Glacial sand, as above but mostly very coarse grained.

180-210 Glacial sand as above with some granules of quartz and other glacial rock along with a few pebbles.

210-240 Missing.

240-270 Glacial sand, mostly medium to coarse grained quartz, some very coarse quartz and granules of other glacial rock, varicolored.

270-500 Missing.

500-560 Siltstone, lumpy, with included very coarse sand grains, pale yellowish brown, 10YR6/2.

560-580 Siltstone, shale and little sandstone, lumpy, light gray to light brownish gray, some lignite.

580-600 Siltstone and shale, as above, little lignite.

600-640 Siltstone and shale, as above, little lignite, mostly light gray.

640-900 Siltstone, shale and lignite as above, mostly siltstone.

900-920 Siltstone, shale and much lignite as above.

920-940 As above.

940-960 Siltstone and much lignite as above, little shale as above.

960-980 Lignite, brownish black to black, dull and woody to shiny and hard, lumpy siltstone and shale, light gray to light brownish gray.

980-1000 Lignite, siltstone and shale as above.

1000-1020 Siltstone, shale and some lignite as above.

1020-1040 Siltstone, shale and more lignite as above.

1040-1060 Siltstone, and shale some to brownish gray and some lignite as above.

1060-1080 Siltstone, shale and lignite as above, some medium grained sand included in the siltstone.

1080-1420 Siltstone, shale and lignite as above.

1420-1440 Lignite, woody to resinous, brownish black to black.

1440-1460 Lignite as above.

1460-1480 Missing.

1480-1500 Siltstone, lumpy, pale yellowish brown, little lignite as above.

1500-1520 Siltstone as above.

1520-1560 Lignite as above (1420-1440).

1560-1780 Siltstone as above.

1780-1800 Siltstone, as above and few pieces of dark gray shale.

1800-1820 Siltstone as above and little shale as above.

1820-1940 Siltstone and shale as above.

1940-2060 Shale, greenish gray, lumpy, spongy, 5GY6/1.
 2060-2080 Shale, greenish gray, compact.
 2080-2240 Shale, greenish gray, little light brownish gray, compact.
 2240-2260 Missing.
 2260-2400 Shale greenish gray, lumpy, soft
 2400-2780 Shale, as above, to compact.
 2780-2960 Shale, greenish gray, compact.
 2960-3000 Shale, greenish gray, lumpy.
 3000-3020 Missing.
 3020-3180 Shale, greenish gray, compact.
 3180-3200 Shale, greenish gray, lumpy.
 3200-3220 Shale, greenish gray, lumpy to medium, gray compact, Inoceramus prisms.
 3220-3300 Shale, greenish gray, compact, and medium gray compact.
 3300-3340 Shale as above, with few pieces of dark gray shale.
 3340-3360 Shale, greenish gray, compact, and medium gray compact.
 3360-3380 Shale, medium gray to dark gray, few pieces have soft, white, calcareous specks, and greenish gray shale as above.
 3380-3420 Shale as above.
 3420-3440 Shale, light gray to medium gray, compact, little dark gray, some white calcareous specks.
 3440-3500 Shale, light gray, lumpy, some medium gray compact.
 3500-3660 Shale, light gray to medium gray, compact to brittle, and some dark gray compact shale.
 3660-3720 Missing.
 3720-3760 Shale as above.
 3760-3820 Shale, as above, with a little of the dark gray shale containing white calcareous specks.
 3820-3840 Shale, medium gray to dark gray, little medium light gray, compact to brittle, some of medium gray shale contains white "specks".
 3840-3920 Shale, light gray, compact, some medium to dark gray as above.
 3920-3940 Shale, medium to dark gray, brittle, little light gray as above.
 3940-3980 Shale, light gray and medium to dark gray as above.
 3980-4180 Shale, medium gray to dark gray, brittle, little light gray.
 4180-4200 Missing.
 4200-4400 Shale as above.
 4400-4420 Shale, light gray to very light olive gray 5Y7/1, soft, compact and some medium to dark gray harder, compact shale.
 4420-4480 Shale as above and few pieces of very fine grained white sandstone.
 4480-4490 Shale as above.
 4490-4500 Shale, as above and few pieces of fine grained friable white to brownish sandstone.
 4500-4580 Shale, dark gray to medium light gray, soft, compact, few pieces of fine grained, friable white to brownish sandstone.
 4580-4610 Shale, medium light gray to light gray, soft, compact and some medium to dark gray shale.
 4610-4620 Shale as above, and few very coarse, to granular sized grains of quartz and chert.
 4620-4640 Shale as above and little light brown, soft, compact siltstone. Few pieces of ferruginous rock.
 4640-4700 Shale as above.
 4700-4710 Shale as above, and numerous; very coarse free quartz grains.

4710-4720 Shale, dark gray and light brown, some light brown siltstone, and little quartz as above, clear to moderate reddish orange 10R6/6.

4720-4750 Shale, medium dark to medium gray and light gray, soft, compact.

4750-4760 Shale as above, and some moderate yellowish brown to grayish orange 10YR7/4 shale.

4760-4790 Shale, dark gray to medium gray, little medium light gray.

4790-4820 Shale as above, some light olive gray, shale.

4820-4840 Shale as above and little fine grained, friable, white sandstone.

4840-4860 Shale as above.

4860-4870 Shale as above, and little light gray.

4870-4890 Shale, medium gray to dark gray, little light gray, some light brownish gray 5YR6/1 and pale yellowish brown 10YR6/2 shale.

4890-4910 Shale, medium to dark gray, little light gray, some pale yellowish brown and grayish orange 10YR7/4 shale.

4910-4930 Shale, medium to dark gray and light gray compact soft, some to yellowish gray, 5Y8/1.

4930-4950 Shale, medium to dark gray and light gray, compact soft, little fine grained, white sandstone.

4950-4960 Shale as above, some pale yellowish brown, and some sandstone as above to pale brown 5YR5/2, some pale reddish brown 10R5/4 to grayish red 10R4/2 shale.

4960-4990 Shale, medium gray to dark gray, some light gray, little fine grained, white sandstone, numerous Inoceramus prisms.

4990-5000 Shale as above, little sandstone as above.

5000-5110 Shale, dark to medium gray, some light gray, greenish gray, and pale yellowish brown and little fine grained white to pale yellowish brown sandstone.

5110-5140 Shale, greenish gray to light greenish gray, some medium to dark gray.

5140-5150 Shale, greenish gray to light greenish gray and pale brown, little dark to medium gray shale.

5150-5160 Shale, greenish gray, soft, compact.

5160-5200 Shale, greenish gray, light olive gray, and pale brown 5YR5/2.

5200-5210 Shale, moderate reddish orange 10R6/6, pale brown 5YR5/2, dark gray to medium light gray, little grayish red, 5R4/2 and little fine grained sandstone, white to brownish.

5210-5220 Shale, light greenish gray to greenish gray, some medium gray and pale yellowish brown, little olive gray.

5220-5270 Shale as above and some pale brown 5YR5/2, little grayish red 5R4/2 and moderate reddish orange.

5270-5370 Shale, as above and little very fine grained, well cemented, white, grayish orange 10YR7/4, and pale yellowish brown sandstone.

5370-5390 Shale, dark gray, little shale and sandstone as above.

5390-5420 Shale as above and few pieces of white, to yellowish gray, and pale yellowish brown fine crystalline limestone.

5420-5430 Shale as above and little pale yellowish brown, pale brown, and grayish red 10R4/2 to moderate red 5R5/4 very fine crystalline to subcrystalline limestone.

5430-5440 Shale, moderate, reddish orange to grayish red 5R4/2, greenish gray 5GY6/1 and medium gray to dark gray, little very fine to fine grained sandstone, white to light greenish gray 5GY8/1 and little very fine crystalline to subcrystalline, greenish gray, light olive gray and pale yellowish brown limestone.

5440-5450 Shale, and limestone as above and sandstone to moderate reddish orange as above.

5450-5460 Shale, limestone and little sandstone as above, some clear calcite crystals, some pyrite.

5460-5470 Shale, medium gray, moderate olive brown, 5Y4/4, greenish gray, light olive gray, grayish red, and moderate yellowish brown 10YR5/4, little siltstone, dark yellowish orange 10YR6/6, little sandstone fine grained, white, and some limestone, fine crystalline, dense, light olive gray, and light gray.

5470-5490 Limestone, fine crystalline, dense, shaly, medium brownish gray 5YR5/1, grayish red and medium gray, some shale, medium gray, light olive gray and brownish gray.

5490-5500 Limestone, fine crystalline, dense, shaly, greenish gray, dark yellowish brown, some fine granular to fine crystalline, dense, white and very light gray to yellowish gray 5Y8/1 limestone and some greenish gray and medium to dark gray shale.

5500-5510 Limestone as above and shale as above with some pale reddish brown, 10R5/4 and grayish black shale.

5510-5550 Limestone and shale as above with little moderate olive brown 5Y4/4 shaly limestone and shale.

5550-5560 Limestone as above to pale yellowish brown and shale as above.

5560-5580 Limestone, fine crystalline, dense, pale yellowish brown to very pale orange 10YR8/2, greenish gray 5GY6/1, white, and shale, greenish gray 5G6/1, brownish gray, moderate olive brown, dark reddish brown 10R3/4 and medium to dark gray.

5580-5600 Limestone as above to fine granular and shale as above.

5600-5630 Shale, compact, greenish gray 5GY6/1, pale yellowish brown to dark yellow brown, and medium gray to dark gray, some limestone, fine crystalline, yellowish gray to pale yellowish brown, and fine granular greenish gray.

5630-5690 Shale as above and limestone, fine crystalline, dense, greenish gray, yellowish gray to pale yellowish brown, some dark to dusky yellowish brown, 10YR2/2, little moderate reddish brown 10R4/6 and grayish red 5R4/2.

5690-5700 Shale as above, to grayish red, and limestone, fine crystalline, dense, pale yellowish brown 10YR6/2 to dark yellowish brown, greenish gray, and moderate reddish brown 10R4/6, little siltstone, fairly well cemented, moderate reddish orange 10R6/6.

5700-5740 Siltstone, friable to moderately well cemented, moderate reddish orange, some dark reddish brown shale, poor samples, mostly cavings.

5740-5760 Siltstone as above and sandstone, very fine grained, friable to moderately well cemented, moderate reddish orange, some shale, dark reddish brown and much caved material as above.

5760-5770 Siltstone, sandstone and shale as above, little caving as above.

5770-5800 Sandstone, siltstone and shale as above, some well rounded to globular, medium grained, frosted, white to moderate reddish brown, free quartz grains.

5800-5890 Sandstone, siltstone and shale as above, some cavings.

5890-5980 Sandstone, siltstone and shale as above, little medium dark gray shale, mostly cavings.

5980-6030 Sandstone as above, some dark reddish brown shale as above, and much medium to dark gray shale.

6030-6080 Sandstone, very fine to fine grained, friable to moderately well cemented, moderate reddish orange 10R6/6, and light red 5R6/6 to grayish pink 5R8/2, some shale as above, and some well rounded medium to coarse grained, frosted, white to moderate reddish orange, free quartz.

6080-6160 Sandstone, shale and free quartz as above and some greenish gray shale.

6160-6190 Limestone, fine crystalline, to fine granular, dense, dark yellowish brown to dusky yellowish brown 10YR2/2, little moderate yellowish brown, poor samples, mostly cavings.

6190-6290 Sandstone, very fine to fine grained, angular, calcareous, friable to well cemented, light red to grayish pink 5R8/2, moderate reddish orange and shale greenish gray and dark gray.

6290-6310 Sandstone and shale as above, and little fine granular greenish gray limestone.

6310-6340 Sandstone, shale and limestone as above, and little white to pinkish gray anhydrite.

6340-6370 Anhydrite, (Electric log) poor sample, mostly cavings.

6370-6380 Limestone, anhydritic, soft, very fine granular, yellowish gray 5Y8/1, pinpoint porosity, and cavings.

6378 Circulation 1 1/4 hour; limestone as above and cavings.

6380-6390 Limestone as above and cavings.

6390-6400 Limestone as above and cavings, some yellowish gray anhydrite and little light brown gypsum.

6407 Circulation sample. Limestone, sublithographic, dense, very pale orange, and fine granular with pinpoint to tubular porosity, very pale orange 10YR8/2, no cut.

6400-6410 Limestone as above.

6410-6430 Anhydrite, (Electric log) poor samples, mostly cavings.

6430-6440 Anhydrite, dense, pearly, brittle, white to very pale yellowish brown 10YR7/2, shale cavings.

6440-6450 Anhydrite, as above and some amorphous and softer, and medium to dark gray shale.

6450-6460 Limestone, fine oolitic, moderately soft but dense, very pale orange 10YR8/2 to dark yellowish brown, shale cavings.

6460-6480 Shale, brownish gray, greenish gray and medium dark gray to dark gray.

6480 Limestone, sublithographic, moderately soft, very pale orange to pale yellowish brown, non-porous, shale cavings.

6495 Circulation 1 1/4 hours; limestone, chalky little oolitic, soft to moderately hard, some dense, little with very good tubular or interstitial porosity, very pale yellowish brown 10YR7/2 to very pale orange, no cut.

6490-6500 Limestone as above.

6500-6520 Limestone, very fine crystalline, dense, very pale yellowish brown, 10YR7/2 and very pale orange, shale, sandstone and pyrite cavings.

6520-6540 Anhydrite, brittle, translucent, white, poor sample, mostly shale cavings.

6540-6550 Limestone, anhydritic, soft to moderately hard, pale yellowish brown to dark yellowish brown, good pinpoint porosity.

6550-6570 Limestone, very fine crystalline, anhydritic, dense, very pale orange 10YR8/2 little limestone as above and some white to pale yellowish brown, brittle anhydrite.

6570-6580 Dolomite, fine crystalline, dense, medium light gray, to white, little anhydritic dolomite and some anhydrite as above.

6580-6590 Anhydrite, brittle, white to medium light gray, shale cavings and little very fine grained, friable sandstone with brownish black possible carbon residue.

6590-6600 Anhydrite, soft to moderately hard and brittle, white to very pale yellowish brown, some very fine crystalline, dense, very pale yellowish brown to pale yellowish brown 10YR6/2, dolomite.

6600-6610 Anhydrite, and dolomite as above and shale cavings.

6610-6620 Limestone, very fine granular, dense, very pale yellowish brown, 10YR7/2.

6620-6660 Limestone, fine crystalline and fragmental, dense, dusky yellow brown to very pale orange, some shale greenish gray and dark gray.

6660-6670 Anhydrite, brittle, white to medium light gray, mostly shale cavings.

6676 Circulation 1 1/2 hour; limestone, fine crystalline, to fine granular mostly dense, some with pinpoint porosity, no visible cut, dusky yellow brown to very pale orange, and shale cavings.

6670-6690 Limestone, and shale cavings as above.

6690-6710 Limestone, fine granular, fine crystalline, and sublithographic, dense, white, pale green 10G6/2, and dark yellowish brown to very pale orange, and shale cavings.

6710-6730 Limestone as above, little anhydrite, poor samples, most shale cavings.

6730-6740 Limestone, fine crystalline to fine granular, brownish gray to brownish black, some dense, little pinpoint porosity, no cut, poor sample, mostly shale cavings.

6740-6750 Limestone and shale cavings as above.

6750-6760 Limestone, oolitic, fine to medium, well cemented, some fine crystalline, dense, brownish gray to dark brownish gray 5YR3/1, little staining, slight cut, shale cavings.

6760-6770 Limestone, fine crystalline to medium oolitic, mostly dense, little with pinpoint porosity, very pale orange 10YR8/2, to dark yellowish brown 10YR4/2, no cut.

6770-6790 Limestone as above to very dark yellowish brown 10YR3/2.

6795 Circulation 1 1/2 hours. Limestone, fine crystalline, fine oolitic and little fragmental, mostly dense, little pinpoint porosity, very pale orange to very dark yellowish brown 10YR3/2, no cut.

6795 Total depth.