

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 131

Summary of the Cardinal - Union Central Life Insurance #1  
Bottineau County, North Dakota  
Well #874 - Permit #886

By Clarence Carlson  
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Cardinal - Union Central Life Insurance #1, Bottineau County, North Dakota. SE SW Section 1, T. 163N., R. 81W., Elevation 1498 G.L.

The Cardinal - Union Central Life Insurance #1 was spudded May 21, 1955 and 8 5/8 inch casing was set at 240 feet with 175 sacks of cement. The well was drilled to a total depth of 3900 feet, dry and abandoned June 8, 1955.

CORES: 3381-3420

TESTS:

DST 1 - open 2 hours, recovered 29 feet of oil and gas cut mud, 200 feet of free oil. FP 46# SIP 1580# HP 1805#.

PERFORATIONS:

3776-84 with 4 per foot, gas in 57 minutes, acidized with 2000 gallons. Flowed oil and acid salt water, 10 barrels per hour. Shut in 8 hours, flowed salt water at 10 barrels per hour.

LOGS: Electric, Gamma Ray and Microlog.

CEMENT PLUGS;

3490 feet - 30 sacks

5 1/2 casing set at 3430' - 170 sacks.

Shot casing off at 2420 feet

Set plug at: 2400' - 20 sacks  
2225' - 20 sacks  
275' - 25 sacks  
surface - 5 sacks

Formation tops were determined from samples and electric log. Colors determined from rock color chart. Not all tops determined.

FORMATION TOPS

Cretaceous System	
Niobrara Formation	1435
Greenhorn Formation	1733
Dakota Sand	2192
Jurassic System	
Jurassic Shale	2585
Piper Lime	2946

Triassic System	
Spearfish Formation	3242
Mississippian System	
Charles Formation	3375
Mission Canyon Formation	3525
Lodgepole Formation	3862
Total depth	3900

260-380	Shale, medium light gray, lumpy, compact.
380-460	Shale, light gray to medium gray, lumpy, compact.
460-480	Shale, medium light gray, bentonitic, lumpy, spongy.
480-540	Shale, medium light gray and medium gray, lumpy to foliated, compact.
540-620	Shale, medium light gray, lumpy, compact.
620-660	Shale, medium dark gray, flaky, compact. Some white bentonite.
660-690	Shale, medium light gray, lumpy, compact.
690-750	Shale, medium gray, lumpy to foliated, compact, some white bentonite.
750-770	Shale, medium light gray, lumpy, compact.
780-820	Shale, medium light gray, lumpy, compact.
820-870	Shale, medium dark gray, lumpy, spongy to compact. Some white bentonite.
870-1020	Shale, medium light gray, lumpy, compact.
1020-1060	Shale, medium dark gray, lumpy, compact. A little white bentonite.
1060-1080	Shale, medium light gray, lumpy, compact.
1080-1110	Shale, medium dark gray, foliated, spongy to compact, some medium light gray, as above.
1110-1130	Shale, medium light gray, lumpy, compact.
1130-1180	Shale, medium gray, medium light gray, foliated to lumpy, compact.
1180-1450	Shale, medium gray, platy to lumpy, compact.
1450-1460	Shale, medium gray, platy to lumpy, compact. Some very light gray bentonite.
1460-1700	Shale, as above.
1700-1730	Shale, medium dark gray and medium gray, lumpy to platy, compact.
1730-1820	Shale, medium dark gray, flaky, spongy, calcareous, with white specks.
1820-2010	Shale, medium gray, platy, compact.
2010-2200	Shale, medium dark gray, platy to splintery, compact to spongy.
2200-2220	Sandstone, fine to coarse grained, rounded, clear quartz with some pyrite cement. Shale, as above.
2220-2250	Sandstone, colorless, fine to medium grained, some coarse grained, rounded quartz with some pyrite cement.
2250-2280	Sandstone, colorless, medium to very coarse, rounded to subangular quartz, some pyrite cement, some shale, medium gray, medium dark gray, splintery, compact to spongy.
2280-2380	Shale, medium gray and medium dark gray, splintery, compact.
2380-2390	Shale, as above. Some sandstone, colorless, fine to medium grained quartz and some siltstone, very light gray.
2390-2440	Sandstone, very light gray to white, fine to medium grained calcareous. Some shale, medium gray, platy, compact.
2440-2460	Shale, medium gray to medium dark gray, platy, compact. Some sandstone as above.
2460-2510	Shale, medium gray, platy, compact. Some sandstone, fine to medium grained, colorless quartz with pyrite cement.

2510-2550 Shale, medium gray, platy, compact.

2550-2560 Shale, as above and a few pieces of shale, mottled dusky yellow and grayish red, lumpy, compact. Some sandstone, fine to coarse grained, clear, rounded, quartz, pyrite cement.

2560-2570 Shale, medium gray, platy to lumpy, compact.

2570-2590 Shale, as above. A little sandstone, light gray, very fine grained, slightly calcareous.

2590-2620 Shale, medium gray and medium dark gray, platy, compact.

2620-2630 Shale, as above and a little shale, greenish gray and pale red, lumpy, compact, waxy luster.

2630-2690 Shale, greenish gray, lumpy to splintery, compact, some pale red, as above, slightly calcareous.

2600-2740 Shale, greenish gray and medium gray, platy to splintery, compact, slightly calcareous.

2740-2780 Shale, greenish gray, platy, splintery, compact, slightly calcareous with a few sand stringers, very fine grained.

2780-2810 Shale, moderate reddish brown, calcareous, platy to splintery, compact, some greenish gray as above.

2810-2900 Shale, greenish gray, platy to lumpy, compact, calcareous. Some sandstone, white to very light gray, fine grained, calcareous.

2900-2940 Shale, as above. Some sandstone, fine to medium grained, colorless quartz, slightly calcareous.

2940-2970 Shale, as above. Some limestone, very light gray to yellowish gray, fine grained, slightly argillaceous, some shale, moderate reddish brown and pale brown.

2970-2980 Shale, light olive gray, pale yellowish brown and greenish gray, calcareous, lumpy to platy, compact.

2980-3020 Sandstone, very light gray, fine to medium grained, calcareous, some limestone very light gray, sublithographic.

3020-3030 Limestone, very light gray, sublithographic, some shale, greenish gray, moderate reddish brown lumpy, compact.

3030-3050 Shale, greenish gray, some moderate reddish brown, splintery, compact.

3050-3070 Limestone, very light gray, sublithographic, shale as above.

3070-3140 Shale, greenish gray and moderate reddish brown, calcareous, splintery, compact, some medium dark gray, splintery compact.

3140-3170 Shale, greenish gray and moderate reddish brown, platy, splintery, compact, a little white to colorless anhydrite.

3170-3210 Anhydrite, white, sugary. Some shale as above.

3210-3240 Shale, medium gray, greenish gray, moderate reddish brown, splintery to platy, compact, a little anhydrite, as above.

3240-3250 Shale, moderate reddish brown, lumpy, compact, some medium gray, as above.

3250-3270 Siltstone, moderate reddish orange, some shale, as above and white anhydrite.

3270-3280 Siltstone, moderate reddish orange.

3280-3310 Sandstone, moderate reddish orange, very fine grained with some medium grains, well rounded.

3310-3330 Sandstone, as above, a little white anhydrite.

3330-3350 Sandstone, moderate reddish orange, very fine grained with some well rounded, medium grains, some sandstone medium to coarse, well rounded frosted quartz with gypsum cement.

3350-3370 Sandstone, moderate reddish orange and very light gray, fine grained, with some medium, rounded, frosted grains.

- 3370-3380 Limestone, yellowish gray to very light gray, argillaceous, fine grained, some staining fluorescence and cut, some very light gray sandstone, as above.
- 3380- Limestone, yellowish gray to light gray, fine grained with some staining, fluorescence and cut.

#### Circulation

#### Cores

- 3380-3382 Limestone, light gray, finely crystalline, fractured, fractures filled with anhydrite.
- 3382-3383 Limestone, yellowish gray, finely, crystalline, some staining, fluorescence and cut.
- 3383-3384 Limestone, yellowish gray, fine grained to finely crystalline, some staining, fluorescence and cut, some medium crystals of pale brown anhydrite.
- 3384-3385 Limestone, yellowish gray, very finely crystalline, dense with some medium to coarse, pale brown anhydrite filled fractures.
- 3385-3389 Limestone, yellowish gray, very finely crystalline, dense with white to colorless dense anhydrite.
- 3389-3300 Limestone, yellowish gray, finely crystalline with some pale brown medium crystals of anhydrite, some staining along fractures.
- 3390-3391 Yellowish gray, finely crystalline to fine grained, good fluorescence, stain and cut.
- 3391-3393 Limestone, very light gray, fine grained and light greenish gray shale interbedded with grayish red limestone containing inclusions of anhydrite and shale.
- 3393-3400 Anhydrite, pale red, dense with light greenish gray shale inclusions and stringers.
- 3400-3401 Anhydrite, white to colorless, dense.
- 3401-3407 Anhydrite, colorless to white with grayish red shale stringers and inclusions.
- 3407-3409 Anhydrite, white to colorless and limestone yellowish gray, fine grained and interbedded.
- 3409-3412 Limestone, yellowish gray, finely crystalline to fine grained and anhydrite, pale brown, medium to coarse crystals.
- 3412-3413 Limestone, pale red, fine grained, argillaceous.
- 3413-3415 Limestone, yellowish gray, microsucrosic.
- 3415-3419 Limestone, light gray, fine grained.

#### Samples

- 3420-3440 Anhydrite, pale red to white, dense.
- 3440-3500 Anhydrite, white dense.
- 3500-3525 Anhydrite, white and pinkish gray, dense.
- 3525-3545 Limestone, yellowish gray, microsucrosic and very light gray, sublithographic with a little white anhydrite.
- 3545-3560 Limestone, yellowish gray to light gray, very fine grained.
- 3560-3570 Limestone, yellowish gray, very fine grained with a few oolitics to pisolite.
- 3570-3615 Limestone, yellowish gray, very fine grained, oolitic in part.
- 3615-3625 Limestone, yellowish gray to light gray, fine grained.
- 3625-3640 Limestone, yellowish gray, fine grained, oolitic in part.
- 3640-3680 Limestone, yellowish gray, fine grained to finely crystalline.

3680-3690 Limestone, as above, some pale brown, medium to coarse crystals of anhydrite and white anhydrite.

3690-3705 Limestone, pale red, finely crystalline, dolomitic, some white, anhydrite.

3705-3715 Anhydrite, white to pinkish gray, some limestone yellowish gray, fine grained with some medium crystals of pale brown anhydrite.

3715-3740 Limestone, yellowish gray as above.

3740-3760 Limestone, yellowish gray, fine grained, oolitic in part.

3760-3775 Limestone, yellowish gray, fine to medium grained granular.

3775-3790 Limestone, yellowish gray, fine grained, oolitic in part.

3790-3820 Limestone, yellowish gray, microsucrosic.

3820-3855 Limestone, yellowish gray, fine to medium grained grainy, fragmental in part.

3855-3890 Limestone, yellowish gray, fine to medium grained, fragmental, fossiliferous.

3890-3900 Limestone, light gray, fine to medium grained, fossiliferous fragmental with a little light gray chert.