

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 107

Summary of the Cardinal Drilling Company - Lawrence Bell #1
Pierce County, North Dakota
Permit No. 614 - Well No. 600

By Clarence Carlson

Lawrence Bell No. 1, Pierce County, North Dakota. SW NW Section 27, T. 158N., R. 72W. (660 feet from the west line and 660 feet from south line). Elevation 1638 K.B., 1628 G.L.

The Cardinal Drilling Company, Lawrence Bell #1 was spudded May 25, 1954. 10 3/4" casing was set at 188 feet with 96 sacks of cement. The well was drilled to a total depth of 3051 feet. The well was plugged and abandoned June 1, 1954.

Plugging record:

2740 feet - 20 sacks
2100 feet - 20 sacks
210 feet - 15 sacks
surface - 5 sacks

Formation tops were determined from electric loge and sample; samples corrected to electric log depths. Colors were determined from the rock color chart. Not all lithologic units called in following list.

Cretaceous System

Pierre Formation	190
Niobrara Formation	1145
Greenhorn Formation	1568
Dakota Formation	2010

Jurassic System

Sundance Formation	2130
Piper Formation	2490

Mississippian System

Mission Canyon Formation	2693
Lodgepole Formation	2740

110-140	Sand, fine to medium, angular to subrounded quartz grains.
140-170	Sand, medium to coarse, subangular quartz and subangular to subrounded limestone, medium to coarse grains.
170-180	Sand as above, shale, light gray, silty.
190-210	Shale, very light gray, pale yellowish brown.
210-260	Shale, light gray, bentonitic, silty, some pale yellowish brown.
260-280	Shale, light gray, bentonitic.
280-290	Shale, light gray, pale yellowish brown, bentonitic.
290-310	Shale as above, some white bentonite with biotite.
310-340	Shale, light to medium dark gray, some white bentonite.
340-360	Shale, light gray, bentonitic and medium dark gray.
370-420	Shale, light gray, bentonitic and medium dark gray.
420-620	Shale, light gray.

630-680	Shale, light to medium gray, some pale yellowish brown.
690-930	Shale, medium light gray, earthy, massive, compact.
930-950	Shale, medium light gray, earthy, massive, compact, slightly calcareous.
950-990	Shale, medium light to medium dark gray, earthy, massive, compact, slightly calcareous.
1000-1030	Shale, medium light gray, resinous, massive, compact, slightly calcareous.
1030-1040	Shale as above, some white bentonite.
1050-1140	Shale, medium light gray, resinous, massive, compact.
1140-1170	Shale, medium light gray, pale yellowish brown, resinous, massive, compact.
1170-1200	Shale, medium light gray, resinous, massive, compact.
1200-1240	Shale, medium gray, white specks, resinous, massive, compact, calcareous, some dark gray shale.
1240-1260	Shale, medium light gray, resinous, massive, compact.
1260-1310	Shale, dark gray, earthy, fissile, spongy, some medium gray white speckled shale.
1310-1330	Shale as above, light gray bentonite.
1330-1380	Shale, dark gray as above, some medium gray, white speckled.
1380-1410	Shale, medium gray, earthy, fissile, spongy, bentonitic.
1410-1470	Shale, dark gray, resinous, massive, spongy, some medium gray as above.
1470-1530	Shale, dark gray, resinous, fissile, spongy.
1530-1570	Shale, medium gray, slightly bentonitic, earthy, massive, spongy, many inoceramus prisms.
1570-1620	Shale, dark gray, resinous, fissile, spongy, inoceramus prisms plentiful.
1620-1670	Shale, medium to dark gray, calcareous, some white specks, resinous, fissile, spongy, many inoceramus prisms and globigerina.
1670-1750	Shale, medium to dark gray, calcareous, resinous, fissile, spongy, inoceramus prisms.
1750-1840	Shale, dark gray, resinous, fissile, spongy.
1840-1980	Shale, dark gray, resinous, fissile, spongy.
1980-2030	Shale, medium to dark gray, resinous, fissile, spongy.
2030-2060	Shale as above, sandstone, light gray to white, fine grained, calcareous.
2060-2110	Shale, medium to dark gray, resinous, fissile, spongy, some medium sand grains.
2110-2130	Shale, medium and dark gray as above, some shale, light greenish gray 5G6/1, earthy, fissile, spongy, slightly calcareous.
2130-2150	Shale, medium and dark gray, some greenish gray, as above, some pale yellowish brown, earthy, compact, calcareous.
2150-2170	Shales as above, some sandstone, light gray, very fine grained.
2170-2220	Shale, light greenish gray, pale yellowish brown, earthy to resinous, platy and foliated, compact.
2220-2260	Shale, light greenish gray, as above, light olive gray, resinous, foliated, compact, calcareous.
2260-2270	Shale, dark gray, resinous, foliated, compact, light greenish gray as above.
2270-2300	Shale, light greenish gray, resinous, foliated, compact, calcareous, some dark gray as above.
2300-2330	Shale, dark gray, resinous, foliated, spongy.

2330-2350 Shale, greenish gray 5GY6/1, resinous, foliated, spongy, calcareous, dark gray as above.

2350-2400 Shale, greenish gray as above, pale reddish brown, earthy, massive, compact, slightly calcareous.

2400-2430 Shale, pale red brown, light olive gray 5Y5/2, greenish gray, resinous, laminated compact, slightly calcareous, some limestone, light gray, fine grained.

2430-2440 Shale as above.

2440-2450 Shale as above, some light brownish gray, calcareous siltstone.

2455-2480 Shale, variegated as above.

2480-2500 Shale as above, some light gray, slightly calcareous siltstone.

2500-2515 Limestone, white to very light gray, fine grained, some shale as above.

2515-2525 Shale, light olive gray, pale reddish brown, greenish gray, light gray resinous, laminated, compact, calcareous, limestone as above.

2525-2540 Shale as above.

2540-2545 Shale as above, sandstone, light gray, fine grained, glauconitic, calcareous.

2545-2605 Limestone, white to very light gray, sublithographic.

2605-2615 Shale, moderate reddish brown, calcareous, gypsum, white.

2615-2670 Shale as above, gypsum, much shale, medium to dark gray, greenish gray.

2672 Circulation. 2/3 hour. Shale and gypsum as above.

Cores

2667-2683 Shale, greenish gray, 5GY6/1, waxy, massive, compact with many anhydrite fragments. Dolomite, light gray, fine grained, limey, thinly laminated with reddish stain along lamination surface and anhydrite fragments. Anhydrite, with dolomite inclusions, light yellowish gray, fine grained.

2683-2691 Shale, pale reddish brown, silty, resinous, compact with anhydrite and dolomite fragments.

2691-2696½ Dolomite, white, fine grained, with some anhydrite. Colorless to white, dense.

2699-2715 Dolomite, white, fine to medium crystalline, with some anhydrite layers.

Samples

2715-2725 Limestone, white, fine to medium crystalline, dolomitic, with some anhydrite.

2725-2730 Limestone, white, fine to medium crystalline.

2730-2735 Dolomite, light gray to light pinkish gray, very finely crystalline, dense with little red staining, also light brownish gray, fine grained, micro sucrosic, reddish stained.

2735-2745 Limestone, white, fine to coarsely crystalline, dolomite as above.

2745-2750 Limestone, white, fine to medium crystalline with a few brachiopod fragments.

2750-2765 Limestone, very light gray to light pinkish gray, very fine crystalline, dense.

2765-2790 Limestone, white to light pinkish gray, fine to medium crystalline, few shell fragments.

2790-2800 Limestone, white, oolitic, well cemented.

2800-2810 Limestone, white, fine to medium grained, some fragments.

2810-2845 Limestone as above and white to light pink, oolitic.

2845-2870 Limestone, white to light pinkish gray, fine grained, fragmental.

2870-2875 Dolomite, moderate pink, fine to medium grained, oolitic.

2875-2885	Limestone, light pinkish gray, fine to medium grain, fragmental and oolitic.
2885-2900	Limestone, light pinkish gray, fine to medium grain, fragmental.
2900-2930	Limestone, light pinkish gray to light gray, fine to medium grain, fragmental.
2930-2965	Limestone, light pinkish gray, fine to medium grain, fragmental, many brachiopod fragments.
2965-2985	Limestone, light gray, fine grained, fragmental.
2985-3000	Limestone, light pinkish gray, fine grained, oolitic to fragmental.
3000-3050	Limestone, light gray, fine grained, fragmental, brachiopod and crinoid fragments.