

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 102

Summary of the Shell Oil Co. - Rudolph Gigstad No. 1
Benson County, North Dakota
Well No. 663 - Permit No. 677

By LaVerne B. Nelson
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Shell Oil Co. - Rudolph Gigstad #1, Benson County, North Dakota, NE NW Section 10, T. 151N., R. 70W. (660 feet from N line and 660 feet from E Line). Elevation 1560 K.B.

The Shell Oil Co. - Gigstad #1 was spudded July 31, 1954 and 8 5/8 inch casing was set to a depth of 229 feet and cemented with 140 sacks of cement. The well was drilled to a total depth of 3173 feet and completed as a dry hole and abandoned August 7, 1954.

DST

DST #1 2510-50 Tool open 1 1/2 hours, recovered 240 feet of watery mud, 1040 feet slightly muddy salt water; FP 305-570#, 3/4 hour SIP 980#, HP 1315-1250#.

Plugging Record

Cement plugs were set at the following depths:

Surface with 5 sacks
229 with 10 sacks
1875 with 10 sacks
2150 with 10 sacks
2370 with 10 sacks
2520 with 10 sacks
3140 with 10 sacks

Formation tops were determined from sample, electric, and radioactivity logs and were corrected to electric log depths. Not all lithologic formation tops were called in following list. Colors were determined from rock color chart.

FORMATION TOPS

| | |
|--------------------------|------|
| Cretaceous System | |
| Niobrara Formation | 855 |
| Greenhorn Formation | 1415 |
| Dakota Formation | 1855 |
| Jurassic System | |
| Morrison Formation | 2135 |
| Sundance Formation | 2190 |
| Piper Formation | 2355 |
| Mississippian System | |
| Mission Canyon Formation | 250 |

| | |
|---------------------|------|
| Lodgepole Formation | 2605 |
| Devonian System | |
| Nisku Formation | 3120 |

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|-----------|---|
| 600-830 | Shale, light gray to medium light gray, compact, massive. Traces of brown calcareous siltstone fragments, fine grained, very dense. |
| 830-860 | Shale, light gray, lumpy, disaggregated, pyritic, traces of brown calcareous siltstone fragments, very dense. |
| 860-890 | Shale, light to medium light gray, lumpy in part, compact and firm in part, Inoceramus fragment inclusions. Traces of brown dolomitic, dense siltstone. |
| 890-920 | Shale, grayish black, organic, lumpy, disaggregated. Traces of brown siltstone. Shale, medium light to light gray, lumpy. Traces of medium gray, white speckled shale, very calcareous. |
| 930-1110 | Medium gray, white speckled, calcareous, lumpy, firm. Traces of brown siltstone fragment inclusions. |
| 1110-1130 | Shale, medium gray, firm, compact, massive. Some white speckled shale as above |
| 1130-1190 | Shale, medium gray, compact, firm. Some siltstone and dolomite fragment inclusions in shale. Much very fine, well rounded, well sorted sandstone, biotite flakes included in sandstone. Traces of medium to coarse, subangular, frosted and pitted quartz grains. |
| 1190-1230 | Shale, medium gray, compact, massive, calcareous slightly speckled. |
| 1230-1330 | Shale, medium light gray, compact, massive. Traces of pyrite and limestone fragments well rounded pebbles, and subangular, slightly frosted, medium quartz grains. |
| 1330-1370 | Shale, medium light gray and medium dark gray, earthy, massive compact. Some very fine granular subangular fragment inclusions of limestone and angular to well rounded, medium to coarse, in part pitted, clear quartz grains, traces of pyrite. |
| 1370-1420 | Shale, as above. Increase in amount of quartz grains. |
| 1420-1440 | Shale, medium light gray, earthy, massive, compact. Many Inoceramus fragments present. Some quartz grains as above and traces of pyrite. |
| 1440-1450 | Shale, medium gray, earthy, massive, compact, speckled, quartz grains, limestone fragments and pyrite as above. |
| 1450-1470 | Shale, becoming dark gray, speckled, very calcareous, compact, massive. Decrease in fragmental material. |
| 1470-1530 | Shale, dark gray, speckled, earthy, foliated, compact, calcareous. Numerous Inoceramus fragments. Traces of pyrite. |
| 1530-1550 | Shale, dark gray, earthy, foliated, disaggregated calcareous, slightly speckled. Decrease in number of Inoceramus fragments. |
| 1550-1670 | Shale, medium dark gray, earthy, foliated, calcareous, compact, increase in Inoceramus fragments, traces of pyrite. |
| 1670-1720 | Shale, medium gray to medium dark gray, earthy, foliated, compact, speckled in part. Few Inoceramus fragments. |
| 1720-1730 | Siltstone, very fine, friable, glauconitic, loosely cemented, well sorted. Shale as above. |
| 1730-1780 | Shale, medium gray and medium dark gray, earthy, massive, fissile in part, compact. Traces of Inoceramus fragments. |
| 1780-1820 | Shale, dark gray, earthy, flaky, disaggregated organic. |

1820-1860 Shale, medium dark to medium gray, flaky disaggregated, traces of brown silt.

1860-1930 Sand, medium (70%) coarse, rounded to subangular, frosted and pitted, uncemented, white, trace of pyrite cemented grains.

1930-2020 Sand, as above, Becoming very shaly. Numerous brown, globular siderite pellets.

2020-2040 Shale, medium gray, earthy, lumpy and flay, disaggregated, few coarse, subangular, frosted quartz grains. Little reddish brown siltstone and siderite pellets.

2040-2130 Sand, medium to coarse, subangular, frosted, unconsolidated, very shaly, many siderite pellets. Trace of fine, friable sandstone.

2130-2140 Sandstone, very fine, angular to subangular, friable, slightly iron stained, white to light brown. Numerous siderite pellets.

2140-2170 Sandstone, as above, increase in medium to coarse, subangular, frosted and pitted, poorly sorted quartz grains.

2170-2190 Shale, medium gray, lumpy, disaggregated, earthy, some sand grains and siderite pellets as above.

2190-2210 Sandstone, very fine, globular, frosted to silky luster, calcite cemented, friable, white. Traces of shale and siderite pellets.

2210-2220 Sandstone as above, increase in amount of shaly material.

2220-2250 Shale, medium gray, earthy, lumpy, disaggregated, traces of reddish brown silt, quartz grains and very fine grained sandstone.

2250-2280 Shale as above, trace reddish brown, soapy luster, massive, spongy shale.

2280-2370 Shale, greenish gray, pale reddish brown, waxy luster massive, brittle. Traces of white massive anhydrite and very fine grained sandstone.

2370-2385 Limestone, very fine to sublithographic, white to very pale orange, dense, some fair porosity.

2385-2415 Limestone, sublithographic, very pale orange dense, medium gray shale streaks.

2415-2425 Limestone, sublithographic, very pale orange, dense, some moderate reddish brown shale.

2425-2435 Limestone, sublithographic, dense, white to very pale orange, much white milky chert.

2435-2445 Limestone as above, becoming very shaly.

2445-2450 Limestone as above, much white massive, friable anhydrite.

2450-2460 Limestone as above, anhydrite (60%) white, crystalline, friable, much medium gray shale.

2460-2480 Shale, medium gray, earthy, massive, compact, silty, traces of moderate reddish brown shale, little anhydrite and limestone as above.

2480-2490 Anhydrite white, friable, crystalline, shaly, traces of limestone.

2490-2515 Shale, medium gray and moderate reddish brown, earthy, massive, compact, silty traces of quartz grains, fine to medium angular, clear, some white anhydrite.

2515-2520 Limestone, fine grained, dense, white to light yellowish brown, intergranular porosity. Red and gray shales and anhydrite as above.

2520-2550 Limestone, fine to very fine grained, good tubular and vuggy porosity, very pale orange dolomite.

2550-2560 Limestone, medium grained, good vuggy porosity, dolomitic.

2560-2565 Limestone, sublithographic, dense, very pale orange to grayish orange pink.

2565-2575 Limestone, medium, spheroidal oolitic, and subangular fragmental and medium grained crystalline, good tubular and vuggy porosity.

2575-2580 Limestone, fine to medium crystalline, pinpoint porosity in part medium rounded fragmental and spheroidal oolitic, good vuggy porosity, white to pale red.

2580-2590 Limestone, medium, spheroidal oolitic, good vuggy porosity, very pale orange. Some medium to coarse, rounded fragmental, good vuggy porosity, white. Some fine grained, crystalline, pinpoint porosity, pale red limestone.

2590-2605 Limestone, fine crystalline, microsucrosic, intergranular porosity, grayish orange pink. Some coarse, subangular fragmental, vuggy porosity, very pale orange.

2605-2630 Limestone, very fine crystalline to sublithographic, dense, argillaceous, pale reddish purple and grayish orange pink. Traces of fragmental limestone as above.

2630-2660 Limestone, fine crystalline and medium, subangular fragmental, very pale orange and pale red purple mottling, slight traces of porosity, much medium gray shale.

2660-2665 Limestone, fine granular, good intergranular porosity, friable, grayish orange pink.

2665-2670 Limestone, coarse to medium, globular fragmental, very pale orange, some fine granular as above, good porosity.

2670-2685 Shale, medium gray, medium dark gray, and moderate reddish brown, earthy, massive, some limestone as above.

2685-2730 Limestone, fine granular and medium to fine subangular fragmental, fair to good intergranular porosity, very pale orange to pale red purple. Some shale as above, much medium gray shale and moderate reddish brown shale.

2730-2745 Shale, medium gray, earthy, lumpy, compact some moderate reddish brown, massive earthy, compact shale. Little limestone as above.

2745-2760 Limestone, medium, subangular fragmental, red mottling in very pale orange matrix much gray and red brown shale.

2760-2865 Limestone, fine to medium, subangular fragmental, and fine granular, argillaceous, medium light gray, some red brown light gray shale.

2865-2875 Limestone, very fine crystalline to sublithographic, argillaceous, dense, very light gray.

2875-2890 Limestone, fine granular, good intergranular porosity, pale yellowish brown some limestone as above.

2890-2930 Limestone, fine to medium, rounded, fossiliferous fragmental, dense, yellowish gray.

2930-2950 Limestone, fine to medium granular, good intergranular porosity, pale yellowish brown, some yellowish gray limestone as above.

2950-2960 Shale, medium dark gray, massive compact, earthy, some limestone as above, much pale reddish brown, massive, compact shale.

2960-2970 Limestone, fine granular and sublithographic, dense, yellowish gray and very pale orange.

2970-3000 Limestone, fine granular, good intergranular porosity, very pale orange to yellowish gray, some very fine to sublithographic, dense, very pale orange limestone.

3000-3070 Limestone, lithographic, dense, very pale orange and grayish orange pink. Streaks of fine granular limestone with good intergranular porosity.

3070-3120 Limestone, very fine crystalline to sublithographic dense, very pale orange and yellowish gray, trace of coarse rounded, pitted quartz grains.

3120-3172 Dolomite, fine to medium sucrosic, good vuggy porosity, yellowish brown.

3172 Total depth.