Shell Oil Company - Gifford Marchus No. 1, Pierce County, North Dakota. Location: 2090 feet from north line and 510 feet from east line of Section 23 - Twp. 157N. - Rge. 70W. Elevation: 1641 Grd., 1652 K.B. Total depth - 4997 ft.

The Shell Oil Company - Gifford Marchus No. 1 was spudded September 13, 1954, drilled to a total depth of 4997 feet, found dry and plugged September 27, 1954. No drill stem tests or cores were taken. Electrical, Micro, and Gamma Ray-Neutron logs were run by Schlumberger September 27, 1954.

Casing Record
Set - 8 5/8" surface casing at 236' with 175 sacks construction cement.

Plugging Record
Cement plugs of 10 sacks each were set at the following depths: 4940'; 4215'; 3810'; 3000'; 2570'; 2350'; 1980'; 1890'; and 248'. A plug of 5 sacks was set at the surface.

Formation tops were determined from samples and electric logs. Doubtful or obscure formation tops were not picked. Color names and identifying numbers are from the 1948 Rock-Color Chart (second printing, 1951) distributed by the Geological Society of America, New York, N. Y.

FORMATION TOPS

Cretaceous system
Niobrara formation 1066
Greenhorn formation 1472
Dakota group sands 1877

Jurassic system
Piper Limestone 2344

Mississippian system
Lodgepole formation 2550
Englewood formation 2957

Devonian system
Lyleton formation 2983
"Nisku" formation 2990
Duperow formation 3055
Ashern formation 3677

Silurian system
Interlake group 3720

Ordovician system
Stony Mountain formation
   upper member 4050
   lower member 4115
Red River formation 4205
Winnipeg formation

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<th>Depth Interval</th>
<th>Description</th>
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<td>4760</td>
<td>Sandstone member</td>
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<tr>
<td>4930</td>
<td>Shale member</td>
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<tr>
<td>4997</td>
<td>Total Depth</td>
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</table>

0-270  Missing.
270-370 Shale, medium gray, soft, massive, spongy to compact. Traces light brownish gray silt. Blue gray bentonite.
370-410 Missing.
410-900 Shale, medium gray, massive, compact to soft. Traces massive, spongy and trace of light green gray bentonite at 410-460. Traces light brownish gray shale, massive, compact at 540-610.
900-1030 Shale, medium gray soft, massive, spongy, traces of white to light gray bentonite.
1030-1100 Shale, medium gray to dark gray, soft, compact, spongy, lumpy. Traces of light blue gray, light green gray, and light gray bentonite flakes.
1100-1250 Shale, medium gray, massive, soft, compact, calcareous, "white specks" disaggregated.
1250-1410 Shale, medium dark gray to dark gray, soft, lumpy, spongy, with traces of pyrite. Slightly calcareous.
1410-1490 Shale, dark gray, soft, lumpy, spongy. With traces of light bentonite.
1490-1610 Shale, medium gray to dark gray, calcareous, massive, spongy to compact, "white specks". Calcite prisms and traces of pyrite. Few chunks of shaly, fine crystalline, light gray, limestone. Traces Globigerina.
1870-1910 Shale, as above, with traces medium grained, clear, subangular to rounded quartz grains.
1910-1990 Sandstone, fine to coarse grained, clear white pink, subangular to rounded, loose quartz grains. Traces of light reddish brown, fine grained, calcareous cemented quartzose sandstone pyrite.
1990-2050 Shale, medium gray, massive, soft. With loose quartz grains as above, pyrite and traces of light brownish gray shale.
2050-2080 Shale, greenish gray, soft, massive to flaky. Traces of light brownish gray, massive shale. Gray shale, as above, loose quartz grains, as above.
2080-2100 Sandstone, light gray to light greenish gray, calcareous, fine grained, quartzose, sandstone. Quartz and shale as above.
2100-2170 Shale, medium gray, soft, flaky to massive, spongy, with much light red brown massive, soft shale, slightly calcareous. Traces of fine grained, light gray to white calcareous quartzose sandstone. Small amount of anhydrite. Traces green gray, waxy, shale.
2170-2190 Limestone, fine to coarse, crystalline, white, light gray, with carbonaceous streaks. Massive to disaggregated, dark reddish brown and green gray shales, slightly calcareous. Traces anhydrite, pyrite, and fine-grained, calcareous, white, quartzose sandstone.
2190-2270 Shale, medium gray, flaky to massive. With much red brown and green gray shale as above. Trace anhydrite, limestone, and sandstones as above.
2270-2280 Limestone, yellowish gray, very fine grained to sublithographic. Much medium gray, lumpy and flaky, soft shale. With green gray and red brown massive and flaky shales. Traces of pyrite.

2280-2305 Shale, red brown, silty, slightly calcareous, and green gray, waxy, flaky to splintery. Small amounts of medium coarse, loose, rounded and angular quartz grains and pyrite fragments. Traces of anhydrite, very fine grained, calcareous, light gray quartzose and yellowish gray fine grained sublithographic limestone.

2305-2355 Shale, red brown, silty, slightly calcareous, massive. Much green gray, slightly calcareous, flaky, splintery shale, mottled by red and medium gray, soft, spongy shale. Small amounts of anhydrite, pyritized fossil fragments, and calcareous, fine grained, white, quartzose sandstone.

2355-2370 Limestone, pinkish gray, fine grained, sublithographic with rounded medium grained quartz grading into quartzose sandstone. A few fragments have vuggy porosity.

2370-2380 Limestone, as above, much green-gray, medium gray, platy shale. Traces of above samples.

2380-2460 Limestone, yellowish gray, very fine grained to sublithographic, dense. Much medium gray shale, green gray, fissile, compact and red brown fissile to massive.

2460-2545 Anhydrite, white, crystalline, dense. Much medium gray shale, massive, calcareous. Traces above limestone. 2510-2525 contains much red-brown massive, blocky shale.

2545-2560 Shale, red brown, slightly calcareous, massive to flaky and disaggregated soft. Much green-gray, soft, flaky, compact shale. Traces above anhydrite.

2560-2575 Limestone, grayish orange pink, fine grained, microsucrosic, to coarse grained, crystalline. Mottled by red coloring. Intergranular and vuggy porosity. Some inclusions of anhydrite. Trace of white pink chert.

2575-2645 Limestone, grayish-orange pink, fragmental crystalline, no visible porosity. Traces of brachiopod fragments. Medium grained.

2645-2655 Shale, dark red brown, massive, blocky, much microscopic mica. With soft medium dark gray flaky shale.

2655-2675 Limestone, grayish orange pink, very fine grained to sublithographic with some fragmental chunks.

2675-2775 Limestone, light gray, argillaceous, medium to coarse, fragmental, recemented with no visible porosity, subangular to rounded. Fragments of crinoid stems and brachiopod shells. Medium gray, massive, calcareous shale, compact. Traces light gray to clear chert from 2740-2755. Much red brown, massive shale at 2770-2775.

2775-2805 Limestone, light gray, very fine to medium grained, grainy. Light gray to white chert present.

2805-2905 Limestone, pinkish gray, very fine grained, crystalline, grainy to sublithographic. Much light brownish gray and white chert. From 2875-2905 the chert is white pinkish gray.

2905-2960 Limestone, pinkish gray, fine to medium grained, crystalline, fragmental grainy. Small vuggy porosity in some fragments. White pink chert.

2960-2975 Shale, olive gray, flaky, compact, calcareous velvety.

2975-3050 Dolomite, light brownish gray, fine medium grained, grainy. Trace intergranular porosity.
Shale, green gray, splintery, calcareous, massive, waxy with much medium gray, massive, compact shale. From 3055-3060 much red-brown silty, massive shale, and pink crystalline anhydrite.

Limestone, grayish orange pink, fine medium grained, granular. Traces of anhydrite and anhydrite filling in intergranular pores from 3080-3090. Interval 3110-3115 contains traces of oolites.

Limestone, grayish orange pink, fine grained, grainy and sub-lithographic to medium coarse fragmental. Fossil fragments.

Limestone, dolomitic, medium light gray, fine medium grained, granular with intergranular and vuggy porosity.

Limestone, dolomitic, light brownish gray, medium grained, granular with intergranular and vuggy porosity. Some white anhydrite and anhydrite filling.

Limestone, pinkish gray, fine grained to sublithographic, some purple mottling, dolomitic.

Limestone, dolomitic, yellowish gray, very fine grained to sub-lithographic, microsucrosic. Much red and green shales, and white anhydrite.

Dolomite, pale yellowish brown, fine medium grained, granular with some fragmental. Trace white pink anhydrite and few traces light gray chert. Medium gray flaky, shales.

Limestone, light gray, fine grained to sublithographic, microsucrosic, with pale yellow brown dolomite as above.

Dolomite, pale yellowish brown, fine medium grained, granular to sucrosic.

Shale, red brown, micro-micaceous, massive, compact with flaky, compact, waxy green shale and dolomite as above.

Limestone, pinkish gray, fine grained, crystalline, dense to medium grained, fragmental, vuggy porosity.

Dolomite, dark yellowish brown, fine medium grained, granular, vuggy, intergranular porosity.

Limestone, pale yellowish brown to yellowish gray, very fine grained, crystalline to coarse grained, fragmental. Brachiopod fragments.

Dolomite, pale yellowish brown, granular, fine medium grained, with limestone as above, and with small amount white, crystalline, anhydrite.

Silt and shale, moderate orange pink to pale red brown, calcareous, massive shale to loose silt.

Siltstone, pale reddish brown, dolomitic.

Dolomite, light brownish gray, fine grained, sucrosic. Interval from 3780 to 3790 is medium grained, granular, intergranular and vuggy porosity. With some coarse, fragmental dolomite.

Dolomite, pinkish gray to white, sublithographic to very fine grained, white and pink chert and cherty dolomite.

Dolomite, white to pinkish gray, very fine to medium grained, sucrosic, and fine grained crystalline. Somewhat cherty. Much soft, white, dense, limestone from 3820-3835.
3845-3920  Dolomite, pinkish gray to yellowish gray, very fine grained, microsucrosic to sublithographic. With traces of fine grained, chalky limestone. Traces medium gray, green gray, and red brown massive shales and white anhydrite at 3860-3875.

3920-4060  Dolomite, pinkish gray, fine grained, granular to crystalline and sublithographic. Cherty. From 4035-4055 red staining.

4060-4070  Shale, red brown, massive, calcareous. Mostly light brownish gray, fine grained crystalline dolomite. Fragments of fine grained, calcareous, quartzose sandstone and loose fine medium grained, rounded, frosted quartz grains.

4070-4125  Dolomite, yellowish gray, fine grained, granular.

4125-4205  Limestone, light gray, fine grained chalky to fragmental, coarse grained, carbonaceous, bryozoan and brachiopod fragments. Medium gray, flaky to massive shales. Trace of white, fine grained crystalline anhydrite. Traces red brown, massive, calcareous shale at 4195-4205.

4205-4215  Dolomite, limey, grayish pink, fine grained crystalline.

4215-4280  Limestone, slightly dolomitic, grayish orange pink, fine grained, crystalline. Becoming dolomitic and granular from 4245 to 4260.

4280-4310  Limestone, dolomitic, yellowish gray, very fine grained, fragments with cemented, non-porous, medium grained oolites. Vuggy porosity in small amounts.

4310-4340  Limestone, dolomitic, yellowish gray, very fine grained crystalline and granular. Fragments of light brownish gray cherty dolomite. Very cherty at 4335-4340.

4340-4425  Limestone, yellowish gray, fine grained, microsucrosic, some anhydrite filling and fine grained crystalline limestone as above.

4425-4445  Limestone, yellowish gray, fine grained crystalline to sub-lithographic.

4445-4515  Limestone, yellowish gray, fine grained, crystalline with small percentage of fragments microsucrosic and fragmental.

4515-4620  Limestone, light brownish gray, fine to medium grained, granular with medium grained, rounded, cemented, dense, fragmental, yellowish gray limestone at 4525-4535.

4620-4670  Limestone, light gray, fine grained, microsucrosic to very fine grained, crystalline.

4670-4730  Limestone, pinkish gray to light olive gray, fine grained, crystalline.

4730-4795  Limestone, light gray, fine to medium grained, crystalline and fragmental, traces red brown, green, splintery shale and pink anhydrite.

4795-4960  Shale, greenish gray, splintery, waxy, compact. Few red stains and red brown shale chips.

4960-4990  Sandstone, white medium coarse grained subangular to rounded, frosted. Some calcareous and anhydrite cemented, but generally loose. Shale as above.

4990-4997  Sandstone, as above, plus angular chunks of pale red feldspar, clear quartz with small amount of biotite. Fragments, white fine grained, calcareous cement, quartzose, angular, glauconitic, sandstone.

4997  Total Depth.