Gulf Oil Corporation, Bennie Pierre Federal No. 1, McKenzie County, North Dakota. Location: C NW SW, Section 28, T. 148 N., R. 104 W. Elevation: 2326 grd., 2339 K.B.

The Gulf Oil Corporation, Bennie Pierre Federal No. 1 was spudded September 5, 1955, drilled to a total depth of 13,503, found dry, and plugged April 16, 1956. Electrical logs, micro logs, microlaterologs, laterologs, radioactivity logs were run in a series of three runs, Sept. 20 and Nov. 11, 1955, and Feb. 21, 1956.

Coring Record
9,240- 9,469
10,080-10,732
12,795-13,006

Testing Record
DST 1, interval 9230 to 9290', 1800' water cushion. Recovered water cushion and 90' drilling mud with slight trace oil specks, no odor, no taste, slight trace fluorescence. Pressures: ISI 30 minutes, 4050 psi, IF 830 psi, FF 880 psi, FSI 4050 psi, IH 5620 psi, FH 5560 psi.

DST #2, interval 9230 to 9340', 1800' water cushion. Recovered water cushion, 120' drilling mud, no odor, no gas, very slight trace fluorescence, very slight oil flecks. Pressures: 45 minutes ISI 4245 psi, IF 855 psi, FF 910 psi, FSI 4210 psi, IH 5630 psi, FH 5590 psi.

DST #3, interval 9355 to 9440', 1800' water cushion. No gas to surface, no gas above water cushion. Recovered water cushion 270' very slightly oil cut and heavily gas cut drilling mud, 730' gas out muddy salt water, 600' gas cut salt water. Pressures: 45 minutes, ISI 5300 psi, IF 970 psi, FF 1600 psi, FSI 4500 psi, IH 5510 psi, FH 5470 psi.

DST #4, interval 9684 to 9765', Recovered 360' drilling mud, 1125' black salty sulphur water. Pressures: IF - zero, FF 650 psi, SI 4420 psi, IH 4860 psi, FH 4770 psi.

DST #5, interval 10,618 to 10,680', mis-run, packers failed. Recovered 3320' drilling mud.

DST #6, interval, 10,598 to 10,680', mis-run, disc failed to rupture when dropped bar.

DST #7, interval, 10,587 to 10,680', mis-run, packer failed. Recovered 990' drilling mud.
DST #8, interval 10,554 to 10,680', open 4 hours, gas to surface 2 hour, 5 minutes, too small to measure. Shut in 1 hour. Recovered 90' oil and gas cut drilling mud, 90' mud cut oil, 90' oil and gas cut drilling mud. No water. Pressures: IF 55 psi, FF 80 psi, SI 1010 psi, IH 5660 psi, FH 5325 psi.

DST #9, interval 12,016 to 12,061', packers failed, recovered 3870' drilling mud.

DST #10, interval 11,960 to 12,061', mis-run, recovered 720' gas cut drilling mud.

DST #11, interval 11,962 to 11,969', mis-run, packers failed. Recovered 30' drilling mud, 360' black, brackish sulphur water, 670' slightly gas cut drilling mud.

DST #12, interval 21,905 to 12,950', 1000' water cushion. Recovered 1000' water cushion, 540' salt water, Pressures: ISI 5950 psi, FSI 5200 psi, IF 600 psi, FF 800 psi, IH 7100 psi, FH 6950 psi.

DST #13, interval 12,961 to 13,006', 1000' water cushion. Recovered 1000' water cushions 1030, salt water. Pressures: ISI 6080 psi, FSI 5450 psi, IF 500 psi, FF 980 psi, IH 7050 psi, FH 6770 psi.

Casing Record
42 feet of 24" conductor with 50 sacks at 42'.
612 feet of 13 3/8" surface casing with 800 sacks at 629'.
9,451 feet of 7 5/8" intermediate casing with 1100 sacks at 9,466'.
10,748 feet of 5 ‰" production casing with 75 sacks at 10,762'.

Plugging Record:
13,503-13,385 with 25 sacks; 13,050-12,820 with 50 sacks;
12,100-11,870 with 50 sacks; 10,762-10,714 with 25 sacks;
9,300- 9,200 with 25 sacks; 5,500- 5,450 with 25 sacks;
5,230- 5,168 with 30 sacks; 3,540- 3,500 with 20 sacks;
644- 610 with 30 sacks; 15 sacks at top

Formation tops were determined from samples and electric logs. Doubtful or obscure formation tops were not picked. Color names and identifying numbers are taken from the 1948 Rock-Color Chart which is distributed by the National Research Council, Washington, D.C.

FORMATION TOPS

Cretaceous System
Pierre formation 1790
Niobrara formation 4090
Greenhorn formation 4585
Muddy formation 5180
Basal Cretaceous sands 5455
Jurassic System
Morrison formation 5935
Sundance group 6260
Piper formation 6665
Triassic System
Spearfish formation 6830

Permian System
  Minnekata formation 7405
  Opeche formation 7445

Pennsylvanian System
  Minnelusa formation 7655

Mississippian System
  Amsden formation 7875
  Heath formation 7930
  Kibbey formation 8260
  Kibbey lime 8410
  Charles formation 8537
  Mission Canyon formation
    (base of last salt) 9160
  Lodgepole formation 9850
  Englewood 10,612

Devonian System
  Lyleton formation 10,640
  Nisku formation 10,850
  Duperow formation 10,930
  Souris River formation 11,310
  Dawson Bay formation 11,530
  Prairie Evaporite 11,610
  Ashern formation 11,760

Silurian System
  Interlake formation 11,840

Ordovician System
  Stony Mountain, Upper 12,580
  Stony Mountain, Lower 12,710
  Red River formation 12,760
  Winnipeg Shale 13,315
  Winnipeg Sand 13,460

Total Depth 13,478

1080-1320 Lignite, brownish black (5YR2/1), resinous to sooty, brittle, shale, light brownish gray (5YR6/1), carbonaceous, compact.
1320-1590 Shale, light brownish gray, platy and compact, bentonitic, calcarceous to slightly calcareous, scattered fragments of lignite, from 1410-1470 largely lignitic.
1590-1650 Shale as above, with scattered shell fragments.
1650-1700 Sandstone, subangular, fine to medium grained, calcareous, composed of quartz and light to dark greenish grains with a white cementing material, fairly well cemented, shale and lignitic fragments as above.
1700-1800 Shale, light brownish gray as above, carbonaceous, small fragments of white bentonite, some pyrite, fragments of sandstone from above.
1800-1830 Sandstone, argillaceous, fine to medium grained, as above.
1830-1860 Missing.
1860-1890 Shale, light brownish gray, as above.
1920-1950 Missing.
1950-2010 Shale and sandstone as above, poor samples.
2010-2130 Shale, light olive gray (5Y6/1), platy, compact, some stringers of pyrite.
2130-2190 Missing.
2190-2250 Shale, medium gray, thinly laminated, brittle, some scattered shell fragments, also lignite fragments, caving?
2250-2290 Missing.
2300-2350 Shale, medium light gray, splintery, brittle, scattered shell fragments, scattered lignite fragments.
2350-2390 Missing.
2390-2430 Shale, light gray, lumpy and spongy, bentonitic, scattered shell fragments, Inoceramus prisms, and lignite fragments.
2430-2460 Missing.
2460-2500 Shale, medium dark gray, splinters into tabular fragments, biotitic and calcareous, fragments of medium gray shale with interbedded calcareous “white specks”.
2500-2550 Shale, light olive gray (5Y6/1), relatively structureless, with disseminated pyrite, scattered Inoceramus prisms, from 4920-40 shale is bentonitic.
2550-2590 Shale, dark gray, foliated and compact.
2590-2630 Shale, light olive gray, massive and compact, some dark gray shale, possibly cavings.
2630-2670 Shale, medium dark gray, foliated, compact to brittle.
2670-2710 Shale as above, lignite, black, hard, brittle, probably cavings.
2710-2740 Shale as above.
2740-2780 Sandstone, fine grained, composed of semi-angular quartz grains with scattered dark green grains, well cemented with calcareous cement, shale, as above, cavings.
2780-2820 Shale, medium gray, platy and compact.
2820-2860 Shale, medium dark gray, fissile, compact, with brown plant fragments on parting surfaces.
2860-2900 Shale as above, shale medium light gray, compact, laminated, scattered fragments of very fine grained sandstone, biotitic, interlaminated with shale.
2900-2940 Shale as above, sandstone, fine grained sub-angular quartz grains, fairly well cemented.
2940-2980 Shale as above, sandstone as above, scattered coarse quartz grains, angular.
2980-3020 Sandstone, scattered angular to sub-angular, medium to coarse grained quartz grains, shale as above, cavings.
3020-3060 Shale, medium dark gray, fissile, splintery luster.
3060-3100 Shale as above, sandstone, medium grained, semi-angular quartz grains, friable.
3100-3140 Shale, medium light gray, spongy, lumpy.
3140-3180 Shale, medium gray, thinly laminated, sandstone, fine grained, sub-angular quartz grains, fairly well cemented.
3180-3220 Shale as above, shale, greenish gray, waxy luster, scattered.
3220-3260 Shale, medium dark gray, finely laminated to fissile, shale, medium light gray, finely laminated, sandstone, fine grained, well cemented, greenish color.
3260-3300 Shale as above with scattered fragments of greenish gray shale with a waxy luster, sandstone, white, fine grained, friable, in scattered fragments, scattered shell and Inoceramus fragments.

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6280-6300 Sandstone, fine grained, fairly well cemented with calcareous cement, composed essentially of sub-angular grains of quartz, very light gray color, shale cavings.

6300-6360 Shale, medium gray, thinly laminated, brittle, sandstone, medium light gray, fine grained, slightly calcareous.

6360-6370 Limestone, light gray, oolitic, dense.

6370-6450 Shale, medium light gray, brittle, flaky, numerous scattered blackish red (5R2/2) calcareous oolites.

6450-6580 Argillaceous limestone, medium light gray, dense.

6580-6590 Shale, brownish gray, calcareous, limestone as above.

6590-6630 Shale as above and shale, medium gray, non-calcareous.

6630-6650 Limestone, light gray, very finely crystalline.

6650-6705 Limestone as above, but medium gray to light gray.

6705-6710 Limestone, medium gray, micro-fossiliferous, dense.

6710-6770 Shale, medium gray, thinly laminated, brittle.

6770-6840 Dolomite, very light gray, very finely crystalline.

6840-6900 Shale, medium light gray, thinly laminated, brittle.

6900-6960 Shale, grayish red (10R4/2), structureless, dense, fragments of sucrosic anhydrite, according to microlaterolog salt from 6920-6970, shale as above, cavings.

6960-7150 Shale, medium to medium dark gray, broken into tabular fragments, brittle, also grayish red shale and pale reddish brown siltstone fragments.

7150-7240 Shale as above, fragments of anhydrite, according to the microlaterolog salt is from 7150-7250, however, there is no recognizable salt in samples.

7240-7270 Dolomite, pinkish gray, very fine grained, fragments are rounded, shale as above, cavings.

7270-7410 Shale, medium gray, as above, fragments of grayish red shale, and pale reddish brown siltstone, and some scattered anhydrite, some scattered salt crystals.

7410-7460 Argillaceous limestone, moderate orange pink (10R7/4), fine grained texture grading to a microsucrosic texture, and grading from no pore spaces to many pore spaces, shale as above, caving.

7460-7510 According to the microlaterolog there is salt from 7460-7480 and there are some salt crystals in the samples.

7510-7670 Argillaceous, very fine grained, sandstone, moderate red (5R5/4), friable, shale, medium gray, caving.

7670-7730 Dolomite, grayish orange pink (5YR7/2), very finely crystalline, angular to sub-angular fragments.

7730-7750 Shale, medium dark gray, thinly laminated, compact, dolomite as above.

7750-7820 Dolomite as above, the texture becoming more sublithographic.

7820-7890 Dolomite, as above, dolomite, pale red (5R6/2), microsucrosic texture.

7890-7930 Limestone, grayish red (10R4/2), very fine grained, dense, angular fragments.

7930-8080 Shale, dark gray, fissile, brittle, thinly laminated shale and calcareous layers, fragments of argillaceous fine grained, moderate reddish brown sandstone.

8080-8130 Dolomitic limestone, medium dark gray, very finely crystalline, dense.
8130-8280 Dolomite, light brownish gray, finely crystalline, limestone, very light gray, micro-fossiliferous.
8250-8280 Shale, pale reddish brown (10R5/4), platy, silty.
8280-8415 Sandstone, light brownish gray, fine grained, friable.
8415-8440 Shale, dark gray, fissile, splinters into slender fragments, probably due to caving (?), fragments of white anhydrite, and fine grained sandstone.
8440-8475 Limestone, light gray mottled, subangular fragments, anhydrite fragments, scattered as above, shale fragments as above.
8475-8625 Shale, dark gray, fissile, as above, less limestone than in above samples, shale, light brown (5YR6/4), slightly calcareous.
8625-8750 Shale, dusky brown (5YR2/2), platy, brittle.
8750-8790 Shale, medium dark gray, fissile.
8790-8850 Shale as above, with a scattering of white anhydrite fragments.
8850-8900 Shale as above, limestone in scattered fragments, variegated medium gray, micro-fossiliferous, dense, scattered white anhydrite fragments, as above.
8900-8970 Limestone, light brownish gray, dense to soft, finely crystalline to a microsucrosic texture, shale as above.
8970-8990 Limestone, very light gray, very porous, soft and crumbly, shale, cavings, as above.
8990-9050 Anhydrite, white, microsucrosic texture, hard to soft, in scattered fragments, shale caving, as above, limestone as above.
9050-9180 Limestone, light brownish gray, very finely crystalline to microsucrosic texture, dense to soft and spongy, scattered white anhydrite fragments.
9180-9185 Salt, white, fine to large crystals, clear to semi-transparent.
9185-9210 Limestone, light brownish gray to very light gray, dense to soft, some fragments are porous with microsucrosic texture.
9210-9235 Anhydrite, white to light gray, dense, very fine grained texture, limestone as above.
9235 Limestone, variegated light gray, dense, some of it appears oolitic.

Core Chip Description
9240-9245 Limestone, brownish gray (5YR4/1), micro-crystalline texture with scattered authigenic calcite crystals, very dense, styolitic.
9245-9248 Limestone, pale brown (5YR5/2), dense, grainy texture, micro-fossiliferous.
9248-9260 Limestone, light brownish gray, micro-crystalline, dense, styolitic.
9260-9265 Limestone as above, but brownish gray.
9265-9274 Limestone, light brownish gray, finely crystalline, grainy texture, dense, styolitic.
9274-9281 Limestone, medium dark gray, as above, some fossil cup corals.
9281-9287 Limestone, light brownish gray, finely crystalline, scattered microfossils and shell fragments which are replaced by calcite, dense.
9287-9293 Limestone, medium dark gray, finely crystalline, scattered authigenic calcite prisms, very dense.
9293-9296 Limestone as above, light brownish gray.
9296-9313 Limestone, medium light gray, finely crystalline, shell fragments replaced by calcite, dense.
9313-9334 Limestone, medium dark gray, fine to medium grain size, thinly laminated structure, dense, with scattered fossil fragments, some thin intervals highly recrystallized, composed largely of calcite rhombohedrons.
9334-9347 Limestone, medium dark gray, very fine grained, dense, largely structureless, some scattered fossil fragments.
9347-9358 Anhydrite, light bluish gray, microsucrosic texture, very dense.
9358-9363 Limestone, the first foot of which is coarsely crystalline and has fissures filled with above anhydrite, but below grading into pale yellowish brown, fine grained limestone.
9363-9380 Limestone, brownish gray, sublithographic texture, very dense and hard.
9380-9388 Limestone, pale yellowish brown (10YR6/2), microsucrosic texture, scattered small fossil fragments, dense.
9388-9391 Limestone, medium dark gray, fine textured, shaly.
9391-9394 Limestone, medium dark gray, medium sized grains, abundant small fossil shells, dense.
9394-9400 Limestone as above, but finer grained, and fewer fossils.
9400-9418 Limestone, dark gray, very fine grained texture with scattered larger authigenic calcite crystals, very dense.
9418-9445 Limestone, as above, but medium gray.
9445-9464 Limestone as above, but light brownish gray, with occasional fossils.

Sample Description
4970-9520 Limestone, pale brown (5YR5/2), fine grained, dense.
9520-9625 Limestone, light brownish gray, medium to fine grained, quite fossiliferous with microfossils which are largely replaced by large calcite crystals, dense.
9625-9670 Limestone, medium gray, fine grained, grainy texture, dense, some scattered fossil fragments, with some fossils replaced by pyrite.
9670-9700 Limestone, light brownish gray, fine grained, grainy to microsucrosic texture, interbedded microfossils.
9700-9770 Limestone, pinkish gray, coarse angular grains, rhombic texture, very fragmental, small interbedded microfossils.
9770-10620 Limestone, medium dark gray, fine grained, subcrystalline texture, thin angular platy fragments, no noticeable structure.
10620-10645 Shale, dark gray, sooty luster, shows fair cleavage, in platy fragments, slightly calcareous, compact, limestone fragments from above.
10645-10655 Shale, as above, oolitic limestone, medium dark gray oolites imbedded a lighter calcareous matrix.
10655-10680 Limestone, light brownish gray, fine sized grains, granular texture, thin angular platy fragments.

Core Chip Description
10680-10690 Interbedded shale and dolomite, wide layers of very light gray finely crystalline dolomite with narrower wavey layers of greenish gray shale, with pyrite scattered through both the dolomite and shale.
As above, but more shale.

Dolomite, grayish orange pink (5YR7/2), fine grained, subcrystalline texture, dense, some of above shale interbedded in dolomite.

Shale, pale brown (5YR5/2), massive structure, compact.

Dolomite, grayish orange pink and greenish gray mottled texture, very finely crystalline, dense.

Sample Description

Dolomite, mottled grayish orange pink and greenish gray, very finely crystalline, shale and limestone caving, various shades of gray.

Argillaceous dolomite, pale brown (5YR5/2), fine grained size, not too compact.

Argillaceous dolomite, as above, anhydrite, white, micro-sucrosic texture.

Argillaceous dolomite, as above.

Limestone, pale brown, very fine grained, subcrystalline texture, limestone, grayish brown, as above.

Dolomite, brownish gray, microsucrosic texture, some fossil fragments.

Dolomitic limestone, grayish orange pink, very fine sized grains, subcrystalline texture.

Limestone, grayish brown, very fine grained, subcrystalline, to microcrystalline texture.

Limestone as above, anhydrite, pinkish gray, microsucrosic texture.

Dolomite, pale brown, very fine grained, with some imbedded well rounded quartz grains.

Anhydrite, pinkish gray.

Limestone, light brownish gray, fine grained, granular texture, microfossiliferous.

Limestone, brownish gray, very fine grained, microcrystalline texture, anhydrite from 11080-11090.

Limestone, light brownish gray, fine grained, granular texture.

Limestone, medium to medium dark gray, very fine grain size, microcrystalline texture.

Anhydrite, light gray, very finely crystalline, limestone, as above, mostly due to caving.

Limestone, grayish brown (5YR3/2), very fine grained, subcrystalline texture.

Anhydrite, very light gray, very finely crystalline, limestone as above.

Limestone, brownish gray, fine to very fine grained, microcrystalline, dense, angular fragments, some scattered anhydrite fragments.

Limestone, medium dark gray, very fine grained, scattered microfossils.

Dolomitic limestone, very light gray, fine grained, microsucrosic texture, scattered pore openings.

Limestone, brownish gray, sUBLithographic texture, sharp angular fragments.

Limestone, light brownish gray, micro-sucrosic texture.

Limestone, medium dark gray, very finely crystalline.
11610-11635 Limestone as above, with scattered anhydrite fragments.
11635-11650 Anhydrite, grayish red (10R4/2), very finely crystalline, dense, apparently somewhat limey.
11650-11680 Limestone, medium gray, fine grained.
11680-11705 Limestone as above, with some grayish orange pink, micro-sucrosic dolomitic limestone.
11705-11725 Limestone, medium dark gray, very fine grained.
11725-11850 Limestone as above, with scattered dark gray limestone fragments which are finely crystalline.
11850-11865 Dolomite, grayish orange pink, sucrosic texture, fine to medium sized grains.
11865-11985 Dolomite, very pale orange (10YR8/2), sublithographic, grain size.
11985-12000 Limestone, very pale orange, sublithographic to lithographic.
12000-12060 Dolomite, very pale orange, finely crystalline, some with a microsucrosic texture.
12060-12100 Dolomite, pinkish to light brownish gray, fine grained, micro-sucrosic to subcrystalline texture.
12100-12255 Dolomite, brownish gray, micro-sucrosic texture, fine grained.
12255-12400 Dolomite, light brownish gray, very fine, grained, subcrystalline texture.
12400-12435 Dolomite as above, and dolomite, brownish gray.
12435-12480 Dolomite, grayish orange pink, very fine grained, subcrystalline texture.
12480-12510 Dolomite as above, but light brownish gray.
12510-12525 Dolomite as above, but brownish gray.
12525-12545 Dolomite, light brownish gray, as above.
12545-12565 Dolomite, brownish gray as above.
12565-12575 Dolomite, light brownish gray, as above.
12575-12645 Limestone, medium dark gray, very fine grained, subcrystalline texture.
12645-12700 Dolomite, light brownish gray, very fine grained, subcrystalline texture, some fragments showing styolites.
12700-12795 Limestone, medium gray to medium dark gray, very fine grained, subcrystalline texture, microfossiliferous.

Core Chip Description
12795-12797 Limestone, medium gray, very fine grained, subcrystalline texture, fossiliferous.
12797-12800 Dolomite, light brownish gray, very fine grained, subcrystalline texture, shows a banded structure, microfossiliferous.
12800-12820 Limestone, very fine grained, subcrystalline texture, styolitic structure, fossiliferous.
12820-12822 Argillaceous limestone, medium gray, dense, massive structure.
12822-12835 Anhydrite, medium gray, fine grained, grainy to subcrystalline texture.
12835-12840 Dolomite, light brownish gray, very fine grained, shows a banded structure.
12840-12852 Dolomite as above, but without the banded structure.
12852-12858 Limestone, brownish gray, very fine grained, subcrystalline texture, fossiliferous.
<table>
<thead>
<tr>
<th>Sample</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>12858-12860</td>
<td>Dolomite, grayish orange pink, very fine grained, micro-sucrosic texture, with brownish gray secondary rhombic dolomite crystals filling what were apparently solution cavities.</td>
</tr>
<tr>
<td>12860-12893</td>
<td>Limestone, medium dark gray, very fine grained, micro-fossiliferous with the shells being replaced by secondary calcite crystals.</td>
</tr>
<tr>
<td>12893-12897</td>
<td>Dolomite, medium dark gray, fine grained, subcrystalline texture, apparently anhydritic.</td>
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<tr>
<td>12897-12906</td>
<td>Anhydrite, medium gray, fine grained, subcrystalline texture.</td>
</tr>
<tr>
<td>12906-12930</td>
<td>Dolomite, dark yellowish brown (10YR4/2), very fine grained, shows styolitic structure.</td>
</tr>
<tr>
<td>12930-12948</td>
<td>Dolomite, pale brown, fine grained, fossiliferous with some of it showing elongated tube-like structure which is filled with lighter colored secondary dolomite at 12933-34.</td>
</tr>
<tr>
<td>12948-12959</td>
<td>Limestone, pale brown, fine grained, some authigenic calcite crystals present.</td>
</tr>
<tr>
<td>12959-13006</td>
<td>Dolomite, pale yellowish brown (10YR6/2), very fine grained, relatively structureless.</td>
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</tbody>
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Sample Description

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<tbody>
<tr>
<td>13006-13200</td>
<td>Dolomite, light brownish gray, very fine grained with some fragments being sublithographic, some scattered fossil shell fragments.</td>
</tr>
<tr>
<td>13200-13320</td>
<td>Limestone, pale brown to brownish gray, very fine grained, some fragments being sublithographic, some imbedded microfossils.</td>
</tr>
<tr>
<td>13320-13355</td>
<td>Shale, dark gray, sooty luster, splintery, compact, limestone as above, cavings.</td>
</tr>
<tr>
<td>13355-13420</td>
<td>Shale as above, dark gray, in long splintery fragments, with small black spherical grains (?) imbedded in it.</td>
</tr>
<tr>
<td>13420-13478</td>
<td>Sandstone, few scattered fragments, fine grained, shale as above.</td>
</tr>
<tr>
<td>13478</td>
<td>Total Depth.</td>
</tr>
</tbody>
</table>