

NORTH DAKOTA GEOLOGICAL SURVEY CIRCULAR NO. 193

Summary of the Carter Oil Company - Lewis L. Johnson No. 1  
Bowman County, North Dakota  
Well No. 1575 - Permit No. 1587

by Robert M. Eisenhard  
April 1958

The Carter Oil Company-Lewis L. Johnson #1 is located 1830 feet from the south section line and 360 feet from the west section line, in the NW of the SW of section 9, T. 129N., R. 106W., Bowman County, North Dakota. The elevation is 29.53 feet K.B.

The Carter Oil Company-Lewis L. Johnson #1 was spudded October 27, 1957, drilled, to a total depth of 8980 feet, plugged back to 8270 feet and completed as a new oil discovery (Red River Pool in the Little Missouri Field) January 6, 1958.

Logs:

Electric, Microlaterolog, Laterolog, Gamma Ray-Newtron, Temperature.

Cores:

6622' - 6649'  
6869' - 6879'  
8211' - 8221'  
8226' - 8244'  
8305' - 8318'  
8318' - 8332'

Tests:

DST #1, 6855'-6569'. Tested with straddle packers. Open 4 hours, clock stopped when tool opened, no pressures recorded, shut in 30 minutes. Recovered 5550' total fluid: 360' slightly mud cut water, 3690' water with slight sulfur odor, 1500' brackish sulfur water with slight oil scum. Tool opened with a faint blow, increased to fair blow in 5 minutes, increased to good blow for 2 hours, fairly good blow remainder of test.

DST #2, 7073'-7099'. Open 2 hours, 50 minutes, shut in 30 minutes. 8" packer set at 7073', 9" hole, 3/4" choke, top and bottom. No water cushion. Strong blow immediately, continuing until water to surface in 2 hours. Flowed 14 barrels per hour, slightly salty, brackish sulfur odor, 10,000 ppm. salt content. IFP 1800#, FFP 3235#, 30 minutes, SIP 3285#, 1 HMP 3880#, FHMP 3905#.

DST #3, 7992'-8012'. Open 4 hours, 5/8" BC x 1/4" TC, no water cushion. Open with faint blow for 30 minutes, increased to weak blow in 2 hours, increased to fair blow remainder of test. Recovered 180' muddy water with scum of oil, 900' of slightly salty water. IFP 40#, FFP 430#, 1 SIP in 30 minutes 3570#, FSIP in 30 minutes 3190#, IHMP 4440#, FHMP 4400#.

DST #4, 8189'-8211'. Open 4 hours, 1050' water cushion 5/8" BC x 1/4" TC. Weak blow 45 minutes, dead remainder of test. Recovered, 1050' water cushion, 10' free black oil, 34° API corrected no gas, no water no H<sub>2</sub>S odor. ISIP 0# in 30 minutes, IFP 480#, FFP 480#, FSIP 1180# in 30 minutes, FHMP 4450#.

DST # 5, 8229'-8244'. Open 4 hours, 5/8" BC x 1/4" TC, no water cushion. Weak steady blow throughout, recovered 800' gas, 240' heavily oil and gas cut mud, no water, ISIP 2810# in 30 minutes, IFP 50#, FFP 100#, FSIP 1490#, FHMP 4480#.

DST #6, 8290'-8332'. Tool open for 4 hours, weak blow decreasing to very weak intermittent blow after 1 hour. No water cushion. 5/8" BC x 1/4" TC. Recovered 660' slightly oil and gas cut muddy water. IFP 0#, FFP 300#, ISIP in 1 hour 3550#, FSIP 2570#, HMP 4440#, bottom hole temperature 195° F.

DST #7, 8360'-8410'. Open 4 hours, no water cushion, 5/8" BC x 1/4" TC. Strong blow throughout test. Recovered. 4750' water, slightly mud and gas cut with trace of oil. ISIP 3830# in 30 minutes, IFP 120#, FFP 2090#, FSIP 3440# in 30 minutes, FHMP 4550#, bottom hole temperature 195° F.

Casing Record:

Set 10 3/4" casing at 1806' with 1,100 sacks of cement and 5 1/2" casing at 8311' with 1,180 sacks of cement.

Completion test data:

Test commenced January 5, 1958 and completed January 6, 1958. Produced by swabbing with 8257' of 2 1/2" tubing. Perforated with 4 holes per foot from 8206'-8221' and from 8231'-8248'. Acidized with 600 gallons of Dowell mud acid and 5,000 gallons of Dowell XFW 15% regular acid.

Result of Test:

Swabbed 195 barrels of oil and 19 barrels in 24 hours. Gas volume too small to measure. Gravity of oil (corrected to 60° F A.P.I.) 30.5°.

Transporter: Northern Tank Lines, Miles City, Montana.

Formation tops were picked from samples and electric and gamma ray-neutron logs; corrected to these logs. Not all formation tops are called. Colors are from the rock color chart distributed by the Geological Society of America.

FORMATION TOPS

|                            |      |
|----------------------------|------|
| Cretaceous System          |      |
| Niobrara formation         | 2184 |
| Greenhorn formation        | 2762 |
| Dakota group               | 3290 |
| Newcastle sandstone        | 3455 |
| basal Cretaceous sandstone | 3812 |
| Jurassic System            |      |
| Morrison formation         | 4017 |
| Swift formation            | 4083 |
| Rierdon formation          | 4577 |
| Piper limestone            | 4668 |
| Triassic System            |      |
| Spearfish formation        | 4888 |
| Permian System             |      |
| Minnekahta formation       | 5605 |
| Opeche formation           | 5650 |

|                          |      |
|--------------------------|------|
| Pennsylvanian System     |      |
| Minnelusa formation      | 5805 |
| Mississippian System     |      |
| Amsden formation         | 5900 |
| Big Snowy group          | 6110 |
| Kibbey sandstone         | 6215 |
| Kibbey limestone         | 6285 |
| Charles formation        | 6392 |
| Lodgepole formation      | 7185 |
| Englewood formation      | 7655 |
| Silurian System          |      |
| Interlake group          | 7733 |
| Ordovician System        |      |
| Stony Mountain formation | 8040 |
| Red River formation      | 8196 |
| Winnipeg formation       | 8732 |
| Cambrian System          |      |
| Deadwood formation       | 8840 |

|           |                                                                                                                         |
|-----------|-------------------------------------------------------------------------------------------------------------------------|
| 130-162   | Shale, medium dark gray, lumpy.                                                                                         |
| 162-194   | Shale, medium dark gray and medium gray, lumpy.                                                                         |
| 194-224   | Shale, medium light gray, lumpy.                                                                                        |
| 224-284   | Shale, medium dark gray and medium gray, lumpy.                                                                         |
| 234-465   | Shale, medium light gray, lumpy.                                                                                        |
| 465-525   | Shale, brownish medium light gray, lumpy.                                                                               |
| 525-555   | Shale, medium light gray, compact.                                                                                      |
| 555-585   | Shale, brownish medium light gray, some lumpy and some compact.                                                         |
| 585-615   | Shale, brownish medium gray and very light olive gray (5Y7/1).                                                          |
| 615-675   | Shale, medium light gray compact.                                                                                       |
| 675-705   | Shale, medium light gray some compact and some lumpy.                                                                   |
| 705-735   | Shale, medium light gray, compact.                                                                                      |
| 735-765   | Shale, medium light gray, lumpy.                                                                                        |
| 765-795   | Shale, medium light gray compact.                                                                                       |
| 795-825   | Shale, medium gray and medium light gray, compact.                                                                      |
| 825-885   | Shale, medium gray and medium light gray, some lumpy and some compact.                                                  |
| 885-915   | Shale, medium light gray, compact.                                                                                      |
| 915-945   | Shale, medium light gray to pale yellowish brown.                                                                       |
| 945-1035  | Shale, medium gray.                                                                                                     |
| 1035-1215 | Shale, medium gray to medium light gray.                                                                                |
| 1215-1365 | Shale, medium light gray.                                                                                               |
| 1365-1755 | Shale, medium gray to medium light gray.                                                                                |
| 1755-1905 | Shale, medium gray, lumpy.                                                                                              |
| 1905-1935 | Shale, medium light gray, lumpy, a few pieces calcareous with abundant white specks; minor light bluish gray bentonite. |
| 1935-1965 | Shale, medium dark gray and brownish medium gray.                                                                       |
| 1965-1995 | Shale, medium gray; lumpy; minor very pale blue bentonite.                                                              |
| 1995-2050 | Shale, medium gray to medium light gray, some lumpy, minor bentonite as above.                                          |
| 2050-2080 | Granules and very small pebbles, miscellaneous nature, probably cavings from gravels.                                   |
| 2080-2110 | Shale, medium light gray; minor light blue bentonite.                                                                   |
| 2110-2140 | Shale, medium gray.                                                                                                     |

2140-2210 Shale, brownish medium light gray.  
 2210-2240 Shale, dark gray, calcareous, with abundant white specks.  
 2240-2250 Shale, medium light gray and pale yellowish brown.  
 2250-2280 Shale, dark gray and medium dark gray minor very pale blue bentonite.  
 2280-2310 Shale, medium gray to medium light gray, minor medium gray calcareous shale with white specks; minor bluish white bentonite with mica specks.  
 2310-2490 Shale, medium dark gray to medium gray, minor calcareous shale with white pecks; bentonite as above.  
 2490-2540 Shale, medium dark gray.  
 2540-2640 Shale, medium dark gray to medium gray.  
 2640-2660 Shale, medium dark gray; minor very pale blue bentonite.  
 2660-2700 Shale, medium dark gray.  
 2700-2760 Shale, medium dark gray, lumpy.  
 2760-2780 Shale, medium dark gray lumpy and dark gray fissile.  
 2780-2800 Shale as above, a few calcareous dark gray shale cuttings with white specks.  
 2800-2880 Shale, dark gray, some calcareous with abundant white specks.  
 2880-2920 Shale, dark gray and medium dark gray; few cuttings with abundant white specks.  
 2920-2940 Shale, dark gray.  
 2940-3060 Shale, medium dark gray to medium gray, some lumpy.  
 3060-3160 Shale, dark gray and medium dark gray, some lumpy.  
 3160-3240 Shale, dark gray to medium gray.  
 3240-3360 Shale, dark gray.  
 3360-3440 Shale, dark gray to medium dark gray.  
 3440-3460 Shale, as above; minor white very fine, grained sandstone.  
 3460-3580 Shale as above; sandstone as above, some with calcareous cement.  
 3580-3620 Shale, dark gray and medium dark gray, some white very fine grained, subangular quartz sandstone, calcareous cement.  
 3620-3800 Shale, medium dark gray; minor white and bluish white bentonite.  
 3800-3890 Shale, medium dark gray; minor very light, gray siltstone.  
 3890-3910 Shale medium dark gray; minor white siltstone and fine sandstone.  
 3910-4020 Shale, medium dark gray fissile.  
 4020-4030 Shale, as above, minor white siltstone and fine grained quartz sandstone.  
 4030-4080 Shale, medium dark gray.  
 4080-4220 Shale, dark gray to medium dark gray.  
 4220-4230 Shale, as above; minor light gray argillaceous siltstone.  
 4230-4270 Shale, dark gray, medium dark gray and minor light dusky red (5R4/4) grayish green (10GY5/2) and greenish gray (5G6/1).  
 4270-4310 Shale, as above, also minor yellowish gray (5Y7/2) shale, some very light gray calcareous argillaceous siltstone.  
 4310-4370 Shale, as above; calcareous white and very pale green very fine grained quartz sandstone.  
 4370-4410 Shale, medium dark gray, minor grayish green (10GY5/2) yellowish gray (5Y7/2) and dusky red; calcareous white very fine grained quartz sandstone.  
 4410-4420 Shale, and sandstone as above; light olive gray (5Y6/1) very well cemented very fine grained quartz sandstone.  
 4420-4430 Shale, medium dark gray; calcareous very fine crystalline quartz sandstone.

4430-4470 Shale, medium dark gray; grayish green (5G5/2) and moderate red (5R4/6) sandstone as above.

4470-4530 Sandstone, yellowish gray, calcareous, very fine to fine grained, quartzose; some shale as above.

4530-4550 Shale, medium dark gray grayish green (5G5/2), minor moderate red (5R4/6); some sandstone as above.

4550-4580 Shale as above; minor sandstone as above.

4580-4660 Shale, medium dark gray very light brownish gray (5YR7/1), and grayish green (5G5/2) minor yellowish gray calcareous fine grained quartz sandstone; some yellowish gray argillaceous limestone.

4660-4670 Shale, as above, and minor dark moderate red (5R3/6) shale very pale orange, very fine crystalline limestone.

4670-4690 Limestone, very pale orange very fine crystalline and micro-sucrosic some shale as above.

4690-4710 Limestone very pale orange and yellowish gray (5Y7/2) very fine crystalline and microsucrosic, some shale as above.

4710-4720 Limestone as above; greenish gray (5G6/1) and medium dark gray shale.

4720-4730 Limestone and shale as above, minor moderate reddish orange.

4730-4770 Limestone, very pale orange very light gray moderate pink and moderate orange pink, very fine crystalline and some argillaceous grayish green (5G5/2) medium dark gray and moderate red (5R4/6) shale.

4770-4790 Limestone, very pale yellowish brown very fine crystalline; minor shale as above.

4790-4800 Shale, dark gray; minor limestone as above.

4800-4810 Shale, dark gray; minor limestone as above; minor moderate red soft, argillaceous limestone.

4810-4820 Shale, dark gray; yellowish gray (5Y7/2) to very pale orange microsucrosic and fine crystalline limestone.

4820-4840 Shale dark gray and minor dark moderate red (5R3/6); limestone as above.

4840-4880 Shale, dark gray moderate red (5R4/6) minor white fine crystalline limestone; minor white gypsum.

4880-4950 Shale as above, moderate reddish orange siltstone.

4950-4970 Shale, dark gray moderate reddish orange siltstone; minor fine crystalline gypsum and minor selenite.

4970-5030 Shale, dark gray moderate reddish orange siltstone.

5030-5100 Siltstone, argillaceous moderate reddish orange slightly calcareous; minor dark gray shale.

5100-5120 Siltstone as above.

5120-5160 Siltstone as above; some dark gray light gray and moderate reddish brown shale.

5160-5190 Siltstone, moderate reddish orange, slightly calcareous; darkn gray and greenish gray (5GY6/1) shale. Salt bed, 5177-5182.

5190-5250 Shale, dark gray greenish gray and medium light gray; some siltstone as above minor white crystalline gypsum, salt bed 5236-5240 by logs. Salt in sample. 5240-5250

5250-5280 Salt; some moderate reddish orange siltstone, minor dark gray shale.

5280-5310 Salt.

5310-5330 Salt, some medium dark gray shale and minor moderate reddish orange siltstone.

5330-5380 Salt.

5380-5440 Salt; minor dark gray shale and moderate reddish orange siltstone.

5440-5450 Shale, medium dark gray minor greenish gray (10GY5/2) some moderate reddish orange siltstone, salt.

5450-5460 Shale, medium dark gray greenish gray (5GY6/1) minor moderate reddish orange siltstone and minor salt.

5460-5490 Shale, medium dark gray to medium light gray and minor grayish green (5G5/2); some moderate reddish orange siltstone.

5490-5520 Shale, dark gray to medium dark gray; minor moderate reddish orange siltstone.

5520-5605 Shale, dark gray to very light gray, and moderate reddish brown; minor moderate reddish orange siltstone; some pyrite.

5605-5620 Shale, medium dark gray and greenish gray (5GY6/1) some white gypsum and moderate reddish orange siltstone.

5620-5623 Gypsum, grayish orange pink microsucrosic calcareous minor shale as above. Gypsum probably from interval 5605-5616.

5620-5625 Shale, medium dark gray and gypsum as above.

5625-5635 Limestone, grayish orange pink, microsucrosic some gypsiferous.

5635-5650 Limestone, pale red (5R6/2) and grayish orange pink, microsucrosic and fine crystalline; some medium dark gray shale.

5650-5655 Limestone as above, some with much gypsum.

5655-5660 Shale, pale reddish brown some cuttings very calcareous; minor gypsum.

5660-5670 Shale, pale reddish brown and moderate reddish brown calcareous.

5670-5750 Shale, as above and minor medium dark gray shale.

5750-5765 Shale, medium dark gray and minor grayish green (5G5/2) much pale reddish brown slightly calcareous silty shale.

5765-5780 Shale, pale reddish brown and moderate reddish brown slightly calcareous some cuttings silty, minor medium dark gray shale.

5780-5790 Shale as above, many of reddish brown cuttings contain much silt.

5790-5795 Shale and sandstone, pale reddish brown, slightly calcareous silty shale siltstone and argillaceous very fine grained quartz sandstone; medium dark gray to light gray shale.

5795-5800 Shale and sandstone, as above; very minor white slightly calcareous very fine crystalline anhydrite.

5800-5815 Shale and sandstone as above, some grains up to medium size, frosted and rounded some white, slightly calcareous very fine crystalline, anhydrite.

5815-5820 Dolomite, medium light gray fine crystalline, shale and sandstone as above.

5820-5830 Shale, medium dark gray some pinkish gray to yellowish gray (5Y7/2) fine crystalline to microsucrosic dolomite and limestone.

5830-5835 Shale, medium dark gray, some bentonite and micaceous; minor bluish white bentonite minor dolomite as above; sandstone indicated by logs samples probably cavings.

5835-5855 Shale, medium dark gray to medium light gray, minor dolomite as above, minor fine to medium grained white quartz sandstone; shale probably cavings.

5855-5870 Dolomite, pinkish gray to white, very fine crystalline with some included fine quartz grains; shale cavings.

5870-5900 Sandstone by logs, white fine to medium grained slightly calcareous subrounded quartz grains; dolomite as above and much shale cavings in sample.

5900-5910 Dolomite, pale pink to pinkish gray, very fine crystalline; medium dark gray to medium light gray shale.

5910-5920 Shale, dark gray and medium dark gray; minor soft white gypsum.

5920-5925 Dolomite, very pale orange and yellowish gray very fine crystalline and microsucrosic; medium dark gray to medium light gray shale.

5925-5930 Dolomite, as above and pale red purple; shale as above.

5930-5940 Dolomite, pinkish gray yellowish gray (5Y8/1) and pale red purple, very fine crystalline; medium dark gray shale.

5940-5955 Sandstone, white fine grained dolomitic cement subrounded, quartzose; some shale and dolomite as above.

5955-5975 Dolomite, white to pinkish gray, very fine crystalline and micro-sucrosic some sandstone, as above, some medium dark gray shale.

5975-5985 Dolomite, white to pinkish gray very fine crystalline and micro-sucrosic some included quartz grains.

5985-5990 Sandstone, white to pale pink fine grained, dolomitic cement, subrounded grains quartzose; dolomite as above.

5990-6010 Dolomite as above, medium dark gray and minor pale reddish brown shale.

6010-6015 Shale, medium dark gray and minor pale reddish brown; some white to pinkish gray very fine crystalline and microsucrosic dolomite.

6015-6020 Shale and dolomite as above; much dolomite contains very fine dolomitic.

6020-6030 Dolomite, pale red (5R6/2) very fine crystalline some medium dark gray shale.

6030-6040 Dolomite, white to pale red (5R6/2) very fine crystalline medium dark gray, pale reddish brown, and greenish gray (5GY6/1) shale.

6040-6060 Dolomite, white and pale pink to yellowish gray (5Y8/1), fine crystalline and microsucrosic; minor shale as above.

6060-6070 Dolomite, pale pink, very fine crystalline and microsucrosic.

6070-6075 Dolomite, pale pink to light red, very fine crystalline and microsucrosic.

6075-6085 Dolomite, yellowish gray and pale pink to moderate pink, medium crystalline to very fine crystalline.

6085-6100 Dolomite as above; some yellowish gray (5Y8/2) fine crystalline limestone.

6100-6105 Limestone, yellowish gray (5Y8/1) and grayish orange pink, fine crystalline and microsucrosic; some dolomite as above, minor moderate red (5R5/4) shale.

6105-6120 Limestone, white, very fine crystalline and fine crystalline minor moderate red, medium dark gray and pale yellowish orange shale.

6120-6135 Limestone as above, much moderate red (5R5/4) shale.

6135 Circulation 1 1/4 hours - Limestone white to pinkish gray, fine crystalline; light red and moderate red (5R5/4) shale.

6135-6140 Shale, dusky red, moderate red (5R5/4) and medium dark gray.

6140-6150 Shale as above, white fine crystalline to pale red (5R6/2) argillaceous and dolomitic limestone, probably cavings.

6150-6180 Shale, medium dark gray, grayish red (10R4/2) and soft calcareous moderate orange pink, pinkish gray and white fine crystalline dolomite, mostly cavings.

6180-6195 Shale, dark gray, dusky red and light gray continued dolomite and limestone cavings.

6195-6215 Shale, dark gray, moderate red (5R5/4) and silty moderate reddish orange grayish pink and white, fine crystalline and microsucrosic dolomite cavings.

6215-6230 Shale as above, grayish orange pink very fine crystalline limestone, some with quartz grains; minor dolomite cemented quartz sandstone.

6230-6235 Sandstone, moderate reddish orange and white, subrounded very fine to fine grains, quartzose, dolomitic cement, minor shale as above.

6235-6240 Sandstone as above; medium dark gray shale.

6240-6285 Shale, medium dark gray and moderate, reddish orange, some yellowish white and grayish pink fine crystalline dolomite, some sandstone as above.

6285-6290 Shale, medium dark gray, moderate red (5R4/6) and medium light gray; soft white lumpy anhydrite; minor yellowish gray (5Y7/2) dolomite.

6290-6296 Limestone, pinkish gray to yellowish gray (5Y8/1) very fine crystalline.

6296-6305 Limestone, pinkish gray, oolitic and fine crystalline.

6305-6325 Dolomite, yellowish gray (5Y7/2) and mixed moderate red (5Y4/6) and yellowish gray; silty.

6325-6330 Shale, medium dark gray and moderate reddish brown; dolomite as above.

6330-6340 Shale, moderate reddish brown, calcareous, minor yellowish gray dolomite.

6340-6360 Shale, moderate reddish orange dolomitic, medium dark gray and minor moderate red (5R4/6).

6360-6380 Shale as above, minor white soft, lumpy calcareous anhydrite.

6380-6385 Shale, moderate red (5R4/6) medium dark gray to medium light gray, and moderate reddish orange, silty and dolomitic.

6385-6395 Dolomite, pinkish gray, microsucrosic; shale as above.

6395-6400 Dolomite and shale, as above, soft white lumpy anhydrite.

6400-6405 Limestone, pale red purple, oolitic and light brownish gray sublithographic.

6405-6410 Limestone, light brownish gray and very pale red purple (5RP7/2) sublithographic.

6410-6415 Limestone as above, and yellowish gray (5Y8/1) oolitic.

6415-6420 Dolomite, grayish pink, to yellowish, gray (5Y8/1), microsucrosic.

6420-6425 Anhydrite, soft white lumpy.

6425-6430 Limestone, pinkish gray microsucrosic.

6430-6435 Limestone, very pale yellowish brown (10YR7/2) very fine crystalline and some oolitic.

6435-6440 Limestone, yellowish gray (5Y7/2) very fine crystalline.

6440-6450 Limestone, white very fine crystalline.

6450-6460 Limestone, white to yellowish gray (5Y7/2), very fine crystalline to sublithographic.

6460-6472 Limestone as above, much soft white lumpy calcareous anhydrite.

6472-6480 Limestone and anhydrite as above, some medium dark gray and moderate red shale.

6480-6495 Dolomite, pinkish gray and yellowish gray microsucrosic and very fine crystalline; minor shale as above, minor anhydrite as above.

6495-6500 Limestone, very fine crystalline, white dolomite, shale and anhydrite as above.

6500-6510 Limestone, white to pinkish gray microsucrosic and sublithographic; minor medium dark gray to medium light gray and moderate reddish orange shale.

6510-6525 Limestone, yellowish gray very fine crystalline to sublithographic.

6525-6540 Limestone as above; minor medium dark gray and moderate reddish orange shale.

6540-6545 Limestone and shale as above; soft white, lumpy anhydrite.

6545-6550 Shale, medium dark gray and silty moderate reddish orange; yellowish gray and very pale yellowish brown (10YR7/2) very fine crystalline, limestone.

6550-6575 Shale and limestone as above; minor white soft lumpy anhydrite.

6575-6580 Shale and limestone, as above; minor grayish red purple very fine crystalline, argillaceous dolomite.

6580-6585 Dolomite, grayish red purple, very fine crystalline argillaceous, minor medium dark gray shale, minor fine crystalline yellowish gray (5Y8/1) limestone.

6585-6595 Dolomite, yellowish gray (5Y7/2) and very pale yellowish brown (10YR 7/2) microsugrosic and very fine crystalline, argillaceous.

6595-6600 Limestone, yellowish gray (5Y8/1) and very pale yellowish brown (10YR7/2) very fine crystalline to sublithographic some very dolomitic.

6600-6605 Dolomite, grayish red (10R4/2) very fine crystalline; minor yellowish gray (5Y8/1) very fine crystalline anhydrite; minor soft white crystallized anhydrite.

6605-6615 Dolomite and anhydrite as above; medium dark gray and moderate reddish orange shale, some yellowish gray (5Y8/1) fine crystalline limestone.

6615-6618 Shale, medium dark gray and moderate reddish orange; limestone as above.

6618-6620 Dolomite, yellowish gray (5Y8/1) microsugrosic, very fine crystalline shale and limestone as above.

6620-6622 Limestone, yellowish gray (5Y7/2) very fine crystalline and microsugrosic medium dark gray, dusky red and moderate reddish orange shale.

CORE #1

6622-6623 Limestone, yellowish gray (5Y7/2) fine fragmental.

6623-6624 Dolomite, very pale yellowish brown (10YR6/2) microsugrosic white crystallized anhydrite in fractures and vugs.

6624-6625 Limestone, yellowish gray (5Y7/2) microsugrosic, good pinpoint porosity; medium brownish gray (5YR5/1) crystallized anhydrite.

6625-6626 Limestone, yellowish gray (5Y7/2) microsugrosic, some pinpoint porosity clear crystallized anhydrite.

6626-6629 Limestone, yellowish gray (5Y7/2) microsugrosic fine fragmental some pinpoint porosity; medium brownish gray (5YR5/1) crystallized anhydrite.

6629-6630 Limestone, as above; clear crystallized anhydrite.

6630-6632 Limestone, very pale yellowish brown (10YR7/2) microsugrosic and fine fragmental, slight pinpoint porosity.

6632-6633 Limestone, very pale yellowish brown (10YR7/2) very fine fragmental, stylolites with dead oil and slight cut.

6633-6635 Limestone, very pale yellowish brown (10YR7/2) fine fragmental; moderate brown crystallized anhydrite.

6635-6636 Limestone, very pale yellowish brown (10YR7/2) fine fragmental, clear crystallized anhydrite.

6636-6637 Limestone, very pale yellowish brown (10YR7/2) very fine crystalline, minor clear crystallized anhydrite.

6637-6640 Limestone, very pale yellowish brown (10YR7/2) fine fragmental slight porosity.

6640-6642 Limestone as above, good pinpoint porosity, some cut.

6642-6643 Limestone, very pale yellowish brown (10YR7/2), fine fragmental, good pinpoint porosity.

6644-6645 Limestone, very pale yellowish brown (10YR7/2) fine fragmental.

6645-6649 Limestone, as above, slight porosity.

6650-6700 Limestone, very pale yellowish brown (10YR7/2) microsucrosic fine fragmental scattered pinpoint porosity; shale cavings.

6700-6705 Limestone, as above, some medium dark gray and moderate reddish orange shale.

6705-6720 Limestone, white to yellowish gray (5Y7/2) very fine crystalline and microsucrosic.

6720-6725 Limestone, as above; moderate reddish orange silty shale.

6725-6736 Limestone, white to yellowish gray (5Y7/2) sublithographic and microsucrosic.

6736-6755 Limestone, white to very pale yellowish brown (10YR7/2) sub-lithographic.

6755-6760 Limestone, as above; minor moderate reddish orange silty shale and minor soft white anhydrite.

6760-6770 Dolomite, yellowish gray (5Y7/2) microsucrosic; medium dark gray shale.

6770-6775 Limestone, light gray very fine crystalline, minor medium dark gray shale and minor very light brownish gray (5YR7/1) anhydrite.

6775-6785 Limestone, as above; soft white lumpy anhydrite.

6785-6790 Limestone, very light olive gray (5Y6/2) very fine crystalline.

6790-6795 Limestone, as above and some very light olive gray microsucrosic dolomitic limestone.

6795-6805 Dolomite, very light olive gray, microsucrosic; soft white lumpy anhydrite some very fine crystalline medium brownish gray (5YR5/1) anhydrite.

6805-6815 Anhydrite, very light gray to medium light gray, sublithographic shale cavings.

6815-6825 Anhydrite as above; very pale yellowish brown (10YR7/2) microsucrosic dolomite.

6825-6830 Anhydrite and dolomite as above; minor soft lumpy white anhydrite.

6830-6835 Dolomite, very pale yellowish brown (10YR7/2) very fine crystalline and microsucrosic.

6835-6840 Dolomite, as above; bluish white to yellowish gray very fine crystalline anhydrite.

6840-6845 Anhydrite and minor dolomite as above.

6845-6858 Anhydrite, bluish white and yellowish gray (5Y7/2) very fine crystalline dolomitic; minor very pale yellowish brown (10YR7/2) microsucrosic dolomite medium dark gray shale.

6858-6862 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic minor anhydrite and shale as above.

6862-6870 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic some pinpoint porosity.

Core #2

6869-6871 Limestone, very pale yellowish brown (10YR7/2) microsucrosic to very fine crystalline, dolomitic.

6871-6872 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic some pinpoint porosity minor clear crystallized anhydrite.

6872-6873 Dolomite as above.

6873-6874 Dolomite, as above, stylolites with oil residue.

6874-6876 Dolomite, very pale yellowish brown (10Y7/2) microsucrosic, calcareous.

6876-6878 Limestone, white to yellowish gray (5Y7/2) fragmental.

6878-6879 Limestone, yellowish gray (5Y7/2) and pale yellowish brown, microsucrosic.

6879-6880 Limestone, yellowish gray (5Y7/2) oolitic and fragmental; some yellowish gray (5Y7/2) microsucrosic dolomitic limestone.

6880-6895 Limestone, as above; pale yellowish brown microsucrosic dolomite.

6895-6900 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic slight porosity.

6900-6910 Limestone, yellowish gray (5Y7/2) to very pale yellowish brown (10YR7/2) microsucrosic, fragmental and oolitic.

6910-6925 Limestone, yellowish gray (5Y7/2) to very pale yellowish brown (10YR7/2) microsucrosic and very fine crystalline.

6925-6940 Limestone, yellowish gray (5Y7/2) very fine crystalline.

6940-6995 Limestone, yellowish gray (5Y7/2), microsucrosic and very fine crystalline.

6995-7050 Limestone, pinkish gray microsucrosic and very fine crystalline.

7050-7055 Limestone as above, slight scattered pinpoint porosity.

7055-7065 Limestone, pinkish gray very fine crystalline.

7065-7075 Anhydrite, soft white lumpy and yellowish gray very fine crystalline calcareous much limestone as above.

7075-7085 Dolomite, very pale orange microsucrosic.

7085-7090 Limestone, very pale orange fragmental and very fine crystalline some dolomite as above.

7090-7095 Limestone, very pale yellowish brown (10YR7/2) very fine crystalline; much very pale yellowish brown (10YR7/2) microsucrosic, dolomite, slight scattered porosity.

7095-7100 Dolomite, very pale yellowish brown (10YR7/2) microsucrosic and very fine crystalline, some calcareous.

7100-7130 Dolomite as above, pinkish gray oolitic limestone good porosity much lost circulation material.

7130-7160 Limestone, pinkish gray oolitic, good porosity much lost circulation material.

7160-7175 Limestone, pinkish gray, oolitic and very fine crystalline, some porosity.

7175-7190 Limestone, pinkish gray recrystallized fragmental, oolitic and fine crystalline; fine crystalline, very pale yellowish brown (10YR7/2) dolomite.

7190-7200 Dolomite, pale yellowish brown fine and medium crystalline.

7200-7210 Dolomite as above; pinkish gray fragmental and oolitic limestone.

7210-7225 Dolomite, pinkish gray, microsucrosic, fragmental.

7225-7234 Missing.

7234-7245 Dolomite, as above; minor pinkish gray oolitic limestone.

7245-7250 Limestone, pinkish gray, oolitic; minor dolomite as above.

7250-7265 Limestone, as above; pale yellowish brown fine crystalline, dolomite.

7265-7280 Dolomite, brownish light gray, fine crystalline; a few fossil fragments.

7280-7305 Dolomite, as above; minor pinkish gray oolitic limestone.

7305-7320 Dolomite, light gray, fine crystalline.

7320-7330 Dolomite as above; minor white oolitic and very fine crystalline limestone.

7330-7340 Dolomite, yellowish gray (5Y7/2) and very light gray, fine crystalline; white fragmental and oolitic limestone; medium dark gray shale.

7340-7350 Dolomite and limestone, as above.

7350-7360 Dolomite, light gray, fine crystalline; minor limestone, as above.

7360-7415 Dolomite, as above; white, fragmental and oolitic limestone with dusky red specks.

7415-7420 Dolomite and limestone as above; some grayish red, fine crystalline dolomite.

7420-7430 Limestone, white to yellowish gray (5Y7/2) and pale red (5R6/2) oolitic and fragmental; some pinkish gray fine crystalline dolomite.

7430-7460 Limestone as above; some very pale yellowish brown (10YR7/2) fine crystalline dolomite.

7460-7465 Limestone and dolomite, as above; some fossil fragments.

7465-7480 Limestone, white fine crystalline fossil fragments; pinkish gray to yellowish gray (5Y7/2) fine crystalline dolomite.

7480-7508 Limestone, pinkish gray fine crystalline, fossil fragments, some dolomitic.

7508-7515 Limestone, white to pinkish gray, very fine crystalline and oolitic, some fossil fragments; some very pale yellowish brown medium crystalline dolomitic limestone.

7515-7545 Limestone, pinkish gray oolitic some good porosity some fossil fragments some pinkish gray recrystallized dolomite.

7545-7575 Limestone, pinkish gray to white, oolitic and very fine crystalline some fossil fragments; pinkish gray to white recrystallized dolomite.

7575-7630 Dolomite, pinkish gray to white, recrystallized, some limestone as above.

7630-7635 Dolomite as above; greenish gray (5GY6/1) moderate red (5R4/6) and pale red purple, slightly calcareous shale.

7635-7655 Dolomite, as above; dark gray and pale reddish brown shale, minor white chert.

7655-7675 Shale, medium dark gray, moderate red (5R5/4) and greenish gray (5GY6/1) slightly calcareous; very pale yellowish brown, fine crystalline dolomite.

7675-7690 Anhydrite, pale red purple, fine crystalline, calcareous.

7690-7696 Anhydrite, grayish red (5R4/2) to pale red, purple, fine crystalline, calcareous.

7696-7700 Anhydrite, pinkish gray to dusky red with many shades of grayish red to pale red purple, fine crystalline, calcareous.

7700-7720 Dolomite, yellowish gray (5Y8/1) and medium gray; some dolomitic medium dark gray and light greenish gray (5G8/1) shale.

7720-7726 Dolomite, as above, minor medium dark gray and grayish green (10GY5/2) shale.

7726-7728 Dolomite, yellowish gray (5Y8/1), grayish green (10GY5/2), pale red purple to grayish red purple, and medium light gray, fine crystalline, shaly and slightly silty in part.

7728-7735 Dolomite, grayish orange pink to pale red (10R6/2), fine crystalline.

7735-7765 Dolomite, as above and pinkish gray, very fine crystalline.

7765-7770 Dolomite, yellowish gray (5Y8/1) fine crystalline; moderate orange pink, calcareous, soft shale.

7770-7778 Missing.

7778-7785 Dolomite, pinkish gray, yellowish gray (5Y8/1) and moderate orange pink, very fine crystalline.

7785-7795 Dolomite, as above, and pale red (5R6/2).

7795-7800 Dolomite, very pale orange, very fine crystalline and minor pale red (5R6/2) to moderate orange pink, recrystallized and fine crystalline.

7800-7815 Dolomite, very pale orange to yellowish gray (5Y8/1) very fine crystalline to sublithographic.

7815-7820 Dolomite, pinkish gray to yellowish gray (5G8/1), very fine crystalline to sublithographic; salt.

7820-7830 Dolomite as above; minor salt.

7830-7835 Dolomite, as above.

7835-7842 Dolomite, as above; moderate red (5R5/4) very soft shale.

7842-7845 Dolomite, yellowish gray (5Y8/1), very fine crystalline to sublithographic; moderate red (5R5/4) very soft shale.

7845-7855 Dolomite, very pale orange to pale yellowish brown, very fine crystalline; grayish red (5R4/2) and minor dark gray, shale.

7855-7860 Dolomite, as above; very minor shale as above.

7860-7905 Dolomite, pinkish gray and very pale orange, very fine crystalline.

7905-7955 Dolomite, very pale orange, very fine crystalline.

7955-7980 Dolomite, very pale orange, very fine crystalline to micro-sucrosic.

7980-8005 Dolomite, very pale orange and pale red (5R6/2) very fine crystalline.

8005-8010 Dolomite, very pale orange and minor pale red (5R6/2) very fine crystalline; minor dark gray shale.

8010-8015 Dolomite, very pale orange, very fine crystalline to micro-sucrosic; minor dark gray and pale reddish brown shale.

8015-8020 Dolomite and shale, as above; minor medium light gray shale and some light bluish gray bentonitic shale.

8020-8040 Dolomite, very pale orange and pale red (10R6/2), very fine crystalline.

8040-8045 Dolomite, very pale orange, pale red (10R6/2) and very light brownish gray (5YR7/1), very fine crystalline.

8045-8055 Dolomite, as above; moderate orange pink, very soft shale.

8055-8065 Dolomite, pinkish gray, very fine crystalline.

8065-8070 Dolomite, as above, minor moderate orange pink, gray, soft shale and minor salt.

8070-8090 Dolomite, pinkish gray and pale red purple, very fine crystalline.

8090-8100 Dolomite, pinkish gray, very fine crystalline.

8100-8105 Dolomite, pinkish gray, very fine crystalline; minor dark gray shale.

8105-8110 Dolomite, as above.

8110-8125 Dolomite, pinkish gray, very fine crystalline to micro-sucrosic.

8125-8130 Dolomite, pinkish gray to grayish orange pink, very fine crystalline and micro-sucrosic.

8130-8135 Dolomite, as above; dark gray shale and dusky red dolomitic shale.

8135-8145 Dolomite, as above; minor shale as above.

8145-8155 Limestone, grayish red (10R4/2) fine crystalline, dolomitic; yellowish gray (5Y8/1) very fine crystalline dolomite.

8155-8160 Dolomite, grayish red (10R4/2) and yellowish gray (5Y8/1), fine, crystalline and microsucrosic.  
8160-8165 Missing.  
8165-8175 Dolomite, as above; some dark gray shale.  
8175-8185 Dolomite, grayish red (10R4/2) to grayish red purple and yellowish gray (5GY8/1) fine crystalline; minor dark gray shale.  
8185-8190 Dolomite, as above.  
8190-8202 Dolomite, yellowish gray (5Y8/1) and light grayish red (10R5/2) to dark grayish red purple (5RP3/2), fine crystalline, some quite calcareous.  
8202-8211 Dolomite, as above; good stain and cut, slight pinpoint porosity.

Core #3

8211-8212 Anhydrite, clear crystallized; yellowish gray, very fine crystalline, dolomitic limestone, some stain.  
8212-8213 Dolomite, yellowish gray (5Y7/2) very fine crystalline, slight porosity, good saturation.  
8213-8214 Dolomite, very light gray, calcareous, very fine crystalline, slight stain, stylolites.  
8214-8215 Dolomite, very light gray, calcareous, very fine crystalline.  
8215-8216 Limestone, very light gray, very fine crystalline, stylolites.  
8216-8218 Limestone, very light gray, very fine crystalline.  
8218-8220 Limestone, very light brownish gray (5YR7/1), recrystallized fossils and fine crystalline.  
8220-8221 Limestone, very light brownish gray (5YR7/1), very fine crystalline; clear crystallized anhydrite.

Core #4

8226-8228 Limestone, brownish medium gray, very fine crystalline.  
8228-8229 Limestone, very dark yellowish brown (10YR3/2) stylolitic fractures, very fine crystalline.  
8229-8230 Limestone, dark yellowish brown, (10YR4/2) very fine crystalline.  
8230-8231 Limestone, very fine crystalline, saturated with oil.  
8231-8232 Dolomite, pinkish gray, sublithographic.  
8232-8233 Dolomite, pinkish gray, very fine crystalline, some stain.  
8233-8234 Dolomite, fine crystalline, some crystallized anhydrite, saturated with oil.  
8234-8236 Dolomite, calcareous, microsucrosic, some porosity, saturated with oil.  
8236-8241 Dolomite, calcareous, very fine crystalline, saturated with oil.  
8241-8242 Dolomite, microsucrosic to fine crystalline, saturated with oil; minor crystallized anhydrite.  
8242-8244 Limestone, very light brownish gray (5YR7/1), very fine crystalline; minor crystallized anhydrite.  
8244-8255 Limestone, yellowish gray (5Y7/2) to light brownish gray, very fine crystalline, some stain.  
8255-8275 Limestone yellowish gray (5Y7/2) and very pale yellowish brown (10YR7/2) very fine crystalline and fragmental, slight stain.  
8275-8280 Limestone, yellowish gray (5Y7/2) and very light olive gray (5Y7/1) fine crystalline and fragmental.  
8280-8285 Limestone as above, very pale orange, very fine crystalline dolomite.  
8285-8290 Dolomite very pale orange, very fine crystalline, minor clear fine crystalline anhydrite.

8290-8298 Dolomite very pale orange and minor grayish pink very fine crystalline.  
 8298-8305 Dolomite as above, with some oil saturated cuttings.

Core #5  
 8305-8306 Dolomite white, very fine crystalline.  
 8306-8307 Dolomite very fine crystalline, saturated with oil.  
 8307-8308 Dolomite, sublithographic yellowish gray (5GY8/1) slight stain.  
 8308-8309 Dolomite, microsucrosic and very fine crystalline some porosity, saturated with oil.  
 8309-8310 Dolomite, yellowish gray (5Y8/1) very fine crystalline stylolites.  
 8310-8314 Dolomite, pinkish gray sublithographic.  
 8314-8317 Dolomite pinkish gray very fine crystalline some stain.

Core #6  
 8317-8320 Dolomite, microsucrosic, some saturation throughout.  
 8320-8323 Dolomite, pinkish gray very fine crystalline.  
 8323-8324 Dolomite, calcareous, pinkish gray very fine crystalline, slight scattered stain.  
 8324-8325 Limestone, pinkish gray, very fine crystalline fossil fragments.  
 8325-8326 Dolomite, microsucrosic, calcareous, saturated with oil.  
 8326-8327 Dolomite, very fine crystalline, very light brownish gray (5YR7/1).  
 8327-8328 Dolomite, as above; minor crystallized anhydrite.  
 8328-8329 Dolomite, calcareous, microsucrosic, saturated.  
 8329-8330 Dolomite, as above; good scattered stain.  
 8330-8333 Limestone, very light brownish gray (5YR7/1), very fine crystalline, with fossil fragments, some stain.  
 8333-8360 Limestone, very fine crystalline, pinkish tan; much lost circulation material.  
 8360-8375 Limestone, pinkish tan, very fine crystalline and microsucrosic with stain.  
 8375-8380 Limestone, very fine crystalline and microsucrosic; much lost circulation material.  
 8380-8390 Limestone, fine crystalline, saturated with oil, some porosity.  
 8390-8405 Limestone, as above; some pinkish gray, very fine crystalline dolomite with some stain.  
 8405-8420 Sample mostly lost circulation material.  
 8420-8435 Limestone, fine crystalline, yellowish gray, (5Y7/2) to pinkish gray, much heavy stain.  
 8435-8440 Limestone, very fine crystalline, pinkish gray and fine crystalline yellowish gray (5Y7/2) dolomitic limestone with some staining.  
 8440-8470 Limestone, pinkish gray, very fine crystalline and fine crystalline, some stain.  
 8470-8475 Limestone, fine crystalline containing some fossil fragment, light stain.  
 8475-8530 Limestone, pinkish gray to very light brownish gray (5YR7/1), fine crystalline with fossil fragments.  
 8530-8540 Limestone, as above, some scattered stain.  
 8540-8555 Limestone, pinkish gray to very light brownish gray (5GR7/1) fine crystalline and very fine crystalline.  
 8555-8600 Limestone, as above and pale red (10R6/2) fine crystalline limestone.

8600-8625 Limestone, pale red (10R6/2) fine crystalline and pinkish gray (5YR8/1) very fine crystalline.

8625-8645 Limestone, pale red (10R6/2) fine crystalline.

8645-8690 Limestone, pale red (10R6/2) fine crystalline and pinkish gray very fine crystalline.

8690-8710 Limestone, pale red (5R6/2) and pinkish gray, fine and very fine crystalline with crinoid stems.

8710-8730 Limestone, pale red (5R6/2) and grayish red (5R4/2) fine crystalline to very fine crystalline.

8730-8735 Shale, dark gray (brownish and greenish tinge).

8735-8740 Siltstone, medium dark gray to white, calcareous.

8740-8745 Shale, dark greenish gray, silty; some siltstone as above.

8745-8760 Shale, dark greenish gray (5GY4/1) waxy.

8760-8835 Shale, dark greenish gray (5GY4/1) to (5G4/1), waxy; some medium dark gray shale with greenish tinge (probably cavings).

8835-8840 Shale, as above; minor white, recrystallized fragmental, slightly glauconitic, limestone.

8840-8860 Limestone, white, recrystallized fragmental, glauconitic.

8860-8870 Limestone, as above; some medium dark gray shaly limestone.

8870-8875 Limestone, white, recrystallized fragmental, glauconitic.

8875-8900 Limestone, as above; some medium light gray recrystallized, fragmental limestone with some very fine quartz grains and glauconite.

8900-8915 Limestone, white, recrystallized fragmental and very fine crystalline.

8915-8925 Limestone, as above; some medium light gray recrystallized fragmental, limestone with very fine quartz grains.

8925-8955 Limestone, white recrystallized fragmental and very fine crystalline; very dusky red and pale red purple fine crystalline dolomite with very fine quartz grains.

8955-8980 Limestone, white and dusky red, fine crystalline and recrystallized fragmental, many very fine to fine quartz grains included, some glauconite; limestone as described grading to fine grained quartz sandstone with 10% calcareous cement.

8980 Total depth.