

15-131-20010

14-5s-12E

Geological Report  
Gary R. Shaffer

Cities Service Oil Company

Beck "A" 1

SW SE SE Section 14, T5S R12E

Nemaha County, Kansas

Elevation: KB 1278 GL 1274

Drilling Contractor: Mendenhall Drilling Company

Tool Pusher: Al Potter Rig #1

Drilling Commenced: 12/26/77

Drilling Completed: 1/10/78

Surface Casing 8 5/8 Set at 260'

Mud Logging Company: Analytical Logging, Inc.

Mud Logger: Lance Linton

Logging Company: Schlumberger Engineer: Charles Jackson

Survey's Run: Dual Induction Laterolog, Compensated Neutron-  
Formation Density, Gamma Ray & Caliper, Borehole Compensated  
Integrated Sonic, Corban Program.

Formation Tops

Formation	Sample Top	E. Log Top
Lansing	975 (+303)	982 (+296)
Base Kansas City	1298 (-20)	1294 (-16)
Mississippi	1600 (-322)	1604 (-326)
Kinderhook	1652 (-374)	1653 (-375) ? 1638
Hunton	1829 (-551)	1832 (-554)
Maquoketa	2399 (-1121)	2399 (-1121)
Viola	2455 (-1177)	2448 (-1170)
Simpson Sand	2636 (-1358)	2642 (-1364) ✓ ? 2630 - 1352
Granite	2705 (-1427)	2708 (-1430)
TD.	2755 (-1477)	2758 (-1480)

Correction factor: All sample tops and DST's should be lowered three feet to correspond to E. Log.

## Sample Descriptions

- 520- Lime & Shale, poor samples.  
550- Sandstone, white, fine grained, minor gilsonite, fair inter-granular porosity, no show.  
580- Limestone, white, finely crystalline, fossiliferous, minor poor porosity, no show.  
640- Limestone, white, finely crystalline, minor poor porosity, no show. Also Shale green, and Shale black, fissile, carbonaceous.  
680- Shale, black, fissile, carbonaceous.  
690- Limestone, white, finely crystalline, minor poor porosity, no show.  
720- Lime & Shale, black, carbonaceous.  
750- Coal, & Shale, black, fissile, carbonaceous.  
755-80 Drilling break, no sample porosity, Sandstone?  
780- Limestone, white to gray, fossiliferous, no porosity, no show.  
800- Limestone, buff, finely crystalline, no porosity, no show.  
830-990 No samples.  
990- Limestone, white, finely crystalline, no porosity, no show, minor Shale, gray.  
1000- Shale, black, carbonaceous.  
1010- Limestone, white, finely crystalline, no porosity, no show.  
1020- Limestone, gray, finely crystalline, no porosity, no show.  
1055- Limestone, white, finely crystalline, no porosity. Shale, gray to black.  
1060- Limestone, tan, finely crystalline, no porosity, Shale, gray.  
1082-90 Limestone, white, finely crystalline, good oolitic and minor vugular porosity, no show of oil or gas.  
1090-95 Shale, gray.  
1095- Limestone, white, finely crystalline, no porosity, no show.  
1110-15 Shale, black, fissile, carbonaceous.  
1115- Limestone, white to buff, finely crystalline, no porosity, no show.  
1122-34 Shale, gray & black, carbonaceous.  
1134-42 Limestone, white to buff, finely crystalline, fossiliferous, no porosity, no show.  
1142-50 Shale, gray.  
1150- Limestone, white to buff, finely crystalline, highly fossiliferous, no porosity, no show.  
1162-64 Limestone, white, finely crystalline, good oolitic porosity, no show.  
1164-72 Limestone, as above, no porosity.  
1172- Shale, gray, & Limestone intermixed.

- 1200- Limestone, white, finely crystalline, no porosity, no show.
- 1206- Shale, black, carbonaceous, fissile.
- 1218- Limestone, white to gray, finely crystalline, no porosity, no show.
- 1242- Shale, gray to black, fissile, carbonaceous.
- 1250- Limestone, gray, finely crystalline, fossiliferous, no porosity, no show.
- 1258-62 Shale, black, carbonaceous, fissile.
- 1262-64 Limestone, gray, finely crystalline, no porosity, no show.
- 1264- Shale, gray, & black, carbonaceous, fissile.
- 1284-94 Limestone, white, finely crystalline, fossiliferous, no porosity, no show.
- Base Kansas City 1294 (-16)
- 1294- Shale, red & gray.
- 1318-22 Limestone, white, finely crystalline, no porosity, no show.
- 1322- Shale, red & gray.
- 1352- Sandstone, coarse, angular, unsorted, no porosity, no show.
- 1358-60 Limestone, white, finely crystalline, fossiliferous, no porosity, no show.
- 1360-68 Shale, red & gray.
- 1368 Sandstone, coarse grained, angular, unsorted, arkosic (abundant orange feldspar), lime cement, no porosity, no show.
- 1376- Shale, red & gray.
- 1388- Sandstone, coarse, angular, lime cement, questionable porosity, no show.
- 1398- Shale, red & gray.
- 1416-20 Sandstone, white, medium to fine grained, dolomitic cement, no porosity, no show.
- 1424-34 Sandstone, medium grained, round to angular clear grains, slightly arkosic, friable, mainly single grains.
- 1438-48 Sandstone, white, fine grained, angular, well sorted, dolomitic cement, some inter-granular porosity, & Sandstone, coarse, angular, arkosic, dolomitic cement, questionable porosity.
- 1448- Shale, gray & red.
- 1456- Sandstone, white, coarse, unsorted angular grains, some poor intergranular porosity, no show, dolomitic cement.
- 1464-68 Shale, green & gray, splintery.
- 1468- Sandstone, angular, minor Chert, yellow & orange, opaque.
- 1480- Shale, gray & green, splintery, & Sandstone.
- 1490- Shale, gray & vari-colored.
- 1503- Dolomitic lime, light gray to buff, fossiliferous, very fine grained, no porosity, no show.

- 1510-14 Shale, light gray to green, splintery.  
 1514-17 Shale, black, fissile, carbonaceous.  
 1517-20 Sandstone, coarse grained, angular, hard, dolomitic cement, pyrite.  
 1520- Shale, gray, green, & red, splintery.  
 1544- Dolomite, tan, fine grained, some gas bubbles in wet sample, no porosity.  
 1550- Sandstone, fine grained, abundant tary dead oil & glisonite, questionable porosity, dolomitic to lime cement.  
 1562- Shale, gray & red.  
 1575- Shale, black, & Sandstone, coarse, dolomitic cement.  
 1580- Shale, gray & black.  
 1590- Sandstone, coarse, angular.
- Mississippi 1600 (-322)
- 1600- Limestone, red-orange, oolitic, iron rich.  
 1602- Limestone, tan, sucrosic, no porosity, no show.  
 1610- Dolomite, gray, sucrosic, no porosity, no show.  
 1618- Shale, gray, & Dolomite, no porosity, no show.  
 1630-37 Limestone, buff, finely crystalline, no porosity, no show.  
 1637-52 Dolomite, dirty gray, sucrosic to finely crystalline, no porosity, no show.
- Kinderhook 1652 (-374)
- 1652- Shale, pale green & gray, with streaks of dark organic matter.  
 1700-40 No sample returns.  
 1750- Shale, gray & green, soft.
- Hunton 1829 (-551)
- 1829- Dolomite, white to gray, finely sucrosic, very minor poor porosity, no show.  
 1844-48 Shale, gray & green, waxy.  
 1848- Dolomite, finely sucrosic, no porosity, no show.  
 1860- Dolomite, fine granular, no porosity, no show.  
 1892-94 Chert, white, translucent.  
 1894- Dolomite, granular, spotted fair vugular porosity in part, no show.  
 1902- Dolomite, buff, finely crystalline, no porosity, no show.  
 1926- Dolomite, gray, finely crystalline, no porosity, no show.  
 1946- Dolomite, buff, finely crystalline, no porosity, no show.  
 1976- Dolomite, buff to gray, finely crystalline to granular, some fair to good intergranular & vugular porosity, no show.  
 1982- Dolomite, gray, finely crystalline, some fair to good vugular porosity, no show.  
 2008- Dolomite, good granular & vuggy porosity, no show, minor pyrite.

- 2016- Dolomite, buff to gray, finely crystalline, no porosity, no show.
- 2034- Dolomite, buff, granular, with some inter-granular & vuggy porosity, no show.
- 2062- Dolomite, gray, coarsely crystalline to granular, fossiliferous, abundant pyrite, good vugular porosity, no show.
- 2072- Dolomite, buff to gray, finely crystalline, some vugular porosity, minor pyrite, no show.
- 2136- Dolomite, tan, medium granular, good vugular porosity, no show.
- 2150- Dolomite, white, finely crystalline, some fair vugular porosity, minor pyrite.
- 2310- Dolomite, pale orange, finely crystalline, no porosity, no show, & Dolomite, white, finely crystalline, minor poor porosity, no show.
- 2326- Dolomite, white, finely crystalline, minor pyrite, minor poor porosity, no show.
- Maquoketa 2399 (-1121)
- 2399- Shale, green-blue, distinctive.
- 2420- Shale, light brown to gray, dolomitic.
- Viola 2455 (-1177)
- 2455- Limestone, white to gray, mottled texture, medium crystalline, no porosity, no show, & Dolomite, gray, fine to medium crystalline, poor to fair vugular porosity, good show of free oil and dark spotted stain.
- 2458- Limestone, white, medium crystalline, no porosity, slight show, minor gray chert.
- 2460- Dolomite, finely crystalline to granular, fair vuggy & pin point porosity, good show of free oil, good saturation to spotted stain.
- 2465- Dolomite, gray, dense, finely crystalline, no porosity, slight show of oil.
- 2468- Dolomite & Limestone, white, medium crystalline, minor spotted stain, poor to no porosity.
- 2474- Shale, black, fissile, sub-waxy.
- 2476- Limestone, white, fine to medium crystalline, minor spotted stain, no porosity, some dark shale streaks.
- 2572- Shale, dark gray, & Limestone, buff, finely crystalline, no porosity, no show.
- 2586- Limestone, buff, finely crystalline, minor white chalky lime, no porosity, no show.
- 2602- Shale, black & gray.
- 2608-14 Limestone, white, chalky.
- 2614- Shale, black, & Limestone, finely crystalline, no porosity, no show.
- 2620-28 Shale, green, waxy.
- 2628-36 Limestone, buff, finely crystalline, no porosity, no show.

Simpson Sand 2636 (-1358)

- 2636- Sandstone, medium grained, rounded, partially sorted, lime cement, no porosity, no show.
- 2640- Sandstone, as above, poor show of free oil and dead oil, poor fluorescence, fair cut, questionable porosity.
- 2646-50 Shale, gray & black.
- 2650-54 Sandstone, white, medium grained, well sorted, lime cement, friable, no show.
- 2654- Limestone, buff, finely crystalline, no porosity, no show.
- 2664-70 Sandstone, medium grained, angular, clean, fair to well sorted, excellent show of free oil & dark saturation staining, fair to good intergranular porosity, minor dolomitic cement, minor pyrite.
- 2670-72 Shale, black, carbonaceous.
- 2672-74 Sandstone, coarse, rounded grains, lime cement, fair to good intergranular porosity, slight show of oil, some pyrite cement.
- 2674-82 Shale, gray.
- 2682- Sandstone, white, fine grained, well sorted, friable, dolomitic cement, questionable porosity, very minor light spotted stain.
- 2694- Shale, gray & green.
- 2704- Granite Wash, white, quartz, Conglomerate.
- Granite 2705 (-1427)
- 2705-55 Granite, pink, fresh.

## Drillstem Tests

DST #1 1510-71 61' Anchor  
30-45-30-60  
Recovered: 240' Mud + 240' Water - Chlorides 9000  
FP<sub>1</sub> 20/134  
FP<sub>2</sub> 124/227  
BHP 433/433

DST #2 1831-85 54' Anchor  
45-60-30-60  
Recovered: 70' Thin Mud  
FP<sub>1</sub> 10/21  
FP<sub>2</sub> 21/31  
BHP 516/516

DST #3 2456-69 13' Anchor  
30-60-30-60  
Recovered: 5' Free Oil - 30 Gravity + 55' SOCM  
FP<sub>1</sub> 10/20  
FP<sub>2</sub> 20/31  
BHP 820/820

DST #4 2469-79 10' Anchor  
30-60-30-60  
Recovered: No recovery  
FP<sub>1</sub> 10/10  
FP<sub>2</sub> 10/10  
BHP 42/31

DST #5 2636-54 18' Anchor  
30-45-30-60  
Recovered: No recovery.  
FP<sub>1</sub> 6/6  
FP<sub>2</sub> 6/6  
BHP 6/6

DST #6 2662-72 10' Anchor  
15-45-15-45  
Recovered: 1160' Sulphur Water - Chlorides 5000  
FP<sub>1</sub> 31/275  
FP<sub>2</sub> 275/487  
BHP 948/938

Geological Recommendation

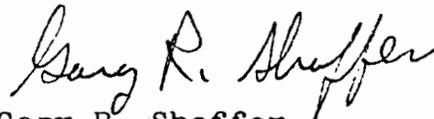
All significant shows were tested and any further decisions in regards to testing or completion should be based on detailed log analysis.

Show intervals on Dual Induction Log:

2448-2478      Viola, dolomite & lime.

2666-2672      Simpson Sand

Sincerely yours

A handwritten signature in cursive script that reads "Gary R. Shaffer".

Gary R. Shaffer  
Wellsite Geologist