

Geological Report

WELL FILE

OXY USA, INC.
 Hegberg "A" No. 199
 1780' FSL, 1745' FEL
 Sec. 28-T25S-R5E
 Butler Co., Kansas
 El Dorado Field
 API#15-015-23414

Contractor: Allen Drilling Co., Rig #3.
 Commenced: 3:45 PM August 15, 1994. Reached R.T.D. 2456' at
 10:00 PM August 19, 1994.

Completed:

Elevations: K.B. 1376', G.L. 1371'.

Casing: Surface-8 5/8" at 236' with 200 sacks cement.

Production-5 1/2" at 2450' with 375 sacks cement.

Logging Program: Western Atlas-Dual Induction with Gamma Ray,
 Compensated Density-Neutron with Gamma Ray,
 Microlog with Gamma Ray.

Testing Program: Two Drill Stem Tests: D.S.T. No. 1 583-650'
 (Admire); D.S.T. No. 2 2422-2448' (Straddle,
 Viola).

Samples: 10' wet and dry from 500-700'; 10' dry from 700' to
 1200'; 10' wet and dry from 1200-1400'; 10' dry from
 1400-1650'; 10' wet and dry from 1650-2400'; 5' wet and
 dry from 2400-2456'.

Drilling Time: One foot from 500' to 2456'.

Total Depth: 2456' -1080

Geologist: Herbert R. Johnson

Vertical Deviation Surveys

3/4	degree at	237'
1/2	" "	650'
1/4	" "	1166'
3/4	" "	1688'
1/2	" "	2179'
1/4	" "	2456'

Log Formation Tops

1st. Admire Sand	512 + 864
2nd. Admire Sand	592 + 784
Burlingame	782 + 594
White Cloud	859 + 517
Topeka	1048 + 328
Oread	1364 + 12
Heebner	1401 - 25
Toronto	1416 - 40
Iatan	1585 - 209
Lansing	1660 - 284
Base Lansing	1806 - 430
Kansas City	1962 - 586
Base Kansas City	2124 - 748
Checkerboard	2198 - 822

Hepler	2212 - 836
Altamont	2248 - 872
Pawnee	2288 - 912
Cherokee	2330 - 954
Viola Chert	2436 -1060
Simpson	2448 -1072
L.T.D.	2452 -1076
R.T.D.	2456 -1080

Sample Description

506-509 Limestone, tan, fine crystalline, dense.
 509-514 Shale, light green, pyritic.

1st Admire Sand 514 +862

514-526 Sandstone, white, gray, fine grained, friable, mica-
 ceous, fair porosity, light stain, fluorescence, fair
 show free oil.
 526-530 Shale, dark gray.
 530-538 Limestone, white, tan, fine crystalline, dense.
 538-544 Shale, gray, green.
 544-552 Limestone, tan, fine crystalline, dense.
 552-558 Shale, gray, green.
 558-560 Limestone, gray, fine crystalline, dense.

Circulated for samples 10 minutes at 560'.

560-564 Limestone, AA.
 564-567 Shale, red, green, gray.
 567-576 Limestone, white, fine crystalline, very fine sandy,
 grading to sandstone, poor porosity, trace stain and
 fluorescence.
 576-581 Shale, gray, green, red.
 581-584 Limestone, white, gray, fine crystalline, dense.
 584-600 Shale, gray, grayish green, pyritic.

Circulated for samples 10 minutes at 600'
 Sand indicated by log from 592' to 608' did not show
 in samples.

600-613 Shale, gray, grayish green, reddish brown. Trace sand-
 stone, gray, very fine grained, poor to fair porosity,
 stain and fluorescence, trace free oil.
 613-624 Shale, gray, green.

Admire Sand 624 +752

624-645 Sandstone, gray, very fine grained, friable, micaceous,
 fair porosity, well stained, fluorescence.
 645-650 Shale, gray, silty.

Circulated for samples 20 minutes at 650'.

D.S.T. NO. 1 583-650' 15 30 45 90
 1st. Flow-Strong blow, bottom of bucket in 2 min.
 2nd. Flow- " " " " " " 6 "

decreased to $\frac{1}{4}$ " by end.

Recovered 90' drilling mud, 120' muddy water.

IHMP 233 psi, IFP 55-64 psi, ICIP 93 psi, FFP 82-87 psi,

FCIP 90 psi, FHMP 210 psi. BHT 90 degrees.

650-778 Interbedded limestone and shale, NS.

Burlingame 778 +598

778-825 Limestone, white, tan, fine crystalline, partly chalky, dense.

825-836 Shale, gray, green.

836-840 Limestone, tan, fine crystalline, dense.

840-868 Shale, gray.

White Cloud 868 +508

868-878 Sandstone, gray, white, very fine grained, friable, poor porosity, trace stain and fluorescence, trace with bleeding oil.

878-1053 Interbedded limestone and shale, NS.

Topeka 1053 +323

1053-1058 Limestone, off white, tan, fine crystalline, partly chalky, dense.

1058-1244 Interbedded limestone and shale, NS.

1244-1247 Limestone, white, tan, fine crystalline, poor porosity, trace fluorescence.

1247-1264 Limestone, white, fine to coarse crystalline, vugular, fair to good porosity, yellow fluorescence (20%), NSFO.

1264-1285 Limestone, white, tan, fine crystalline, dense.

1285-1312 Limestone, white, fine crystalline, partly chalky, vugular, trace stain and fluorescence, abundant clear, coarse calcite crystals.

1312-1369 Shale, gray, grayish green.

Oread 1369 +7

1369-1388 Limestone, tan, fine crystalline, dense.

1388-1408 Limestone, tan, fine crystalline, chalky, some clear, coarse, calcite crystals, possible fracture fill.

Heebner 1408 -32

1408-1410 Shale, black, carbonaceous.

1410-1414 Limestone, tan, fine crystalline, dense.

1414-1420 Shale, gray.

Toronto 1420 -44

1420-1444 Limestone, white, fine crystalline, chalky, dense, NS.

1442-1464 Shale, gray.

1464-1466 Limestone, white, fine crystalline, dense.

1466-1497 Shale, gray.

1497-1501 Limestone, tan, fine crystalline, dense.

1501-1520 Shale, gray, trace interbedded gray, very fine grained sandstone, NS.

Circulated for samples 15 minutes at 1520', began losing mud.

1520-1594 Shale, gray, silty with interbedded sandstone.

Iatan 1594 -218

- 1594-1604 Limestone, tan, reddish tan, coarse crystalline, fossiliferous, vugular, good porosity, spotted fluorescence, slight show light free oil.
- 1604-1620 Shale, gray.
- 1620-1630 Limestone, brown, fine crystalline, oolitic, dense.
- 1630-1667 Shale, gray, silty.

Lansing 1667 -291

- 1667-1680 Limestone, white, fine crystalline, poor porosity, light stain, 30% fluorescence.
- 1680-1692 Limestone, white, fine crystalline, dense.
- 1692-1698 Limestone, white, tan, fine crystalline, poor porosity, bright fluorescence.
- 1698-1710 Limestone, white, cream, fine crystalline, partly chalky, poor porosity, 30% fluorescence.
- 1710-1718 Limestone, tan, fine crystalline, dense.
- 1718-1740 Limestone, cream, tan, fine crystalline, very chalky, poor to fair porosity, light stain, fluorescence, trace free oil.
- 1740-1750 Limestone, AA, trace stain and fluorescence.
- 1750-1790 Limestone, white, tan, buff, fine crystalline, dense, trace S & F.
- 1790-1800 Limestone, off white, tan, fine crystalline, fossiliferous, dense.
- 1800-1811 Limestone, gray, tan, fine crystalline, pyritic, dense.

Base Lansing 1811 -435

- 1811-1830 Interbedded gray limestone and shale.
- 1830-1850 Shale, gray, silty.
- 1850-1968 Shale, gray.

Kansas City 1968 -592

- 1968-1978 Limestone, gray, tan, fine crystalline, dense.
- 1978-1986 Limestone, tan, fine crystalline, poor to fair porosity, light stain, fluorescence, fair odor.
- 1986-1994 Limestone, white, fine crystalline, dense.
- 1994-2016 Limestone, white, fine crystalline, poor porosity, light stain, fluorescence and odor; 5% Chert, white.
- 2016-2071 Limestone, white, buff, fine crystalline, dense, trace stain and fluorescence.
- 2071-2074 Shale, black, carbonaceous.
- 2074-2094 Limestone, white, fine crystalline, chalky, dense, NS. 10% Chert, white,
- 2094-2096 Shale, black, carbonaceous.
- 2096-2102 Limestone, white, tan, fine crystalline, poor porosity, trace stain and fluorescence.
- 2104-2112 Limestone, white, tan, fine crystalline, dense.
- 2112-2120 Siltstone, gray.
- 2120-2125 Limestone, tan, fine crystalline, oolitic, dense.

Base Kansas City 2125 -749

2125-2202 Shale, dark gray, silty.
2202-2206 Shale, black, carbonaceous.

Checkerboard 2206 -830

2206-2214 Limestone, tan, buff, fine crystalline, dense.
2214-2216 Shale, gray, green, silty.

Hepler Sand 2216 -840

2216-2240 Sandstone, gray, very fine grained, calcareous cement,
dense, 5% poor to fair porosity with stain, fair odor,
slight show free oil. Sample catcher saw considerable
free oil when washing sample.
2240-2254 Shale, gray, silty.

Altamont 2254 -878

2254-2259 Limestone, off white, buff, fine crystalline, dense.

Circulated for samples 45 minutes at 2259'

2259-2264 Limestone, AA.
2264-2266 Shale, black, carbonaceous.
2466-2471 Limestone, white, tan, fine crystalline, dense.
2471-2492 Shale, reddish brown, gray, green.

Pawnee 2292 -916

2292-2318 Limestone, white, tan, gray, fine crystalline, dense.
2318-2320 Shale, black, carbonaceous.
2320-2323 Shale, greenish gray.
2323-2338 Limestone, tan, fine crystalline, dense.

Cherokee 2338 -962

2338-2340 Shale, black, carbonaceous.
2340-2343 Limestone, tan, fine crystalline, dense.
2343-2345 Shale, black, carbonaceous.
2345-2378 Shale, grayish green, reddish brown, gray.
2378-2383 Siltstone, gray, micaceous, firm.
2383-2406 Shale, dark gray, silty.
2406-2414 Limestone, tan, fine crystalline, dense.
2414-2417 Shale, black, carbonaceous.
2417-2425 Sandstone, gray, very fine grained, micaceous, poor
porosity, NS.
2425-2433 Shale, gray, green.

Circulated for samples 30 minutes at 2433'.

2433-2440 Shale, gray, green, reddish brown, pyritic, sandy.

Circulated for samples 45 minutes at 2440'.

2440-2441 Shale, gray, grayish green, loose sand grains.

Viola Chert 2441 -1065

2441-2445 Chert, white, slightly weathered, trace poor porosity
with stain and fluorescence, good show free oil.
2445-2447 Limestone, tan, dolomitic, fine crystalline, pyritic,
dense, NS.

2447-2450 Limestone, AA.

Circulated for samples 45 minutes at 2447'

Simpson 2450 -1074

2450-2452 Sandstone, tan, fine grained, cemented, in part, completely with silica, dense, stain and fluorescence.

2452-2456 Sandstone, white, tan, fine to medium grained, well rounded to angular (quartz overgrowths), loose, with nodules of pyrite, probably good porosity, few clusters found had good porosity, stain and fluorescence.

Circulated for samples 45 minutes at 2456'.

R.T.D. 2456' reached 10 PM August 19, 1994.

D.S.T. No. 2 (Straddle) 2422-2448' 15-30-30-60

1st. Flow: Weak blow died in 12 minutes.

2nd. Flow: No blow.

Recovered 1 foot mud.

IHMP 1174 psi, IFP 24-24 psi, ICIP 462 psi, FFP 27-27 psi, FCIP 595 psi, FHMP 1150 psi. BHT 98 degrees.

Pipe Strap:

Board	2456.89'
Strap	2455.18'
Strap short to board	<u>1.71'</u>