

**JAMES C. MUSGROVE**

Petroleum Geologist  
P.O. Box 1162  
Great Bend, KS 67530

**ORIGINAL**

Office (316) 792-7716

Res. Claflin (316) 587-3444

15-031-21990

Osage Resources  
Osage #5  
SE-SW-SW; Section 6-22s-14e  
Coffey County, Kansas  
Page No. 1

**CONFIDENTIAL****KCC**

MAY 21 2004

**CONFIDENTIAL****5 1/2" Disposal Casing Set****Contractor:** Three Rivers Exploration**Commenced:** April 2, 2004**Completed:** April 9, 2004**Elevation:** 1145' K.B.; 1140' G. L.**Casing Program:** Surface; 8 5/8" @ 200'  
Production; 5 1/2" @ 2210'**Samples:** Samples saved and examined 1000' to the Rotary Total Depth.**Drilling Time:** One (1) foot drilling time recorded and kept 1000' to the Rotary Total Depth.**Measurements:** All depths measured from Ground Level.**Formation Testing:** None**Electric Log:** By Rosel Company; Compensated Dual Induction, Compensated Neutron/Density Log and Micro Log.**Gas Detector:** By MBC Well Logging**RECEIVED****MAY 26 2004****KCC WICHITA**

<u>Formation</u>	<u>Log Depth</u>	<u>Sub-Sea Datum</u>
Stark Shale	1051	+89
Hushpuckney Shale	1083	+57
Base Kansas City	1100	+40
South Mound Coal	1235	-95
Altamont	1271	-31
Mulberry	1282	-142
Pawnee	1324	-184
Englevale	1350	-210
Summitt	1391	-251
Upper Squirrel Sand	1403	-263
Middle Squirrel Sand	1440	-300
Lower Squirrel Sand	1459	-319
Crowburg Coal	1504	-364
Fleming Coal	1514	-374
Scammin Coal	1564	-424
Weir-Pittsburg	1578	-438
Seville Coal	1612	-472
Drywood	1645	-505
Rowe Coal	1716	-576
Neutral Coal	1746	-606
AW Coal	1755	-615
CW Coal	1764	-624
Riverton Coal	1772	-632
Mississippian	1781	-641
Osage	1918	-778
Choteau	2011	-871

KCC

ORIGINAL

12/21/2021

CONFIDENTIAL

CONFIDENTIAL

Northview Shale	2076	0936
Compton	2109	-969
Kinderhook	2125	-985
Viola	2195	-1055
Simpson Sand	2215	-1075
Arbuckle	2325	-1185
Rotary Total Depth	2442	-1302
Log Total Depth	2342	-1202

(All tops and zones are corrected to Electric Log measurements.)

**SAMPLE ANALYSIS, SHOWS OF OIL, TESTING DATA, ETC.**

**KANSAS CITY SECTION**

1014-1028'	Limestone; white and gray, fossiliferous, oocastic, fair oocastic porosity, trace white chert.
1053-1065'	Limestone; white and cream, fossiliferous, sparry calcite cement, chalky, trace white gray chert.

**SOUTH MOUND SECTION**

1235-1246'	Black carboniferous shale; few pieces poorly developed coal (8 unit gas kick).
------------	--

**ALTAMONT SECTION**

1271-1280'	Limestone; tan, white, slightly cherty, dense.
------------	--

**MULBERRY SECTION**

1282-1285'	Shale; black, carboniferous, trace coal black, bleeding gas (no kick)
------------	---

**PAWNEE SECTION**

1324-1331'	Limestone; tan and gray, fossiliferous, cherty in part, few dolomitic, poor visible porosity, trace pale fluorescence.
------------	--

**ENGLEVALE SECTION**

1350-1353'	Shale; black, carboniferous, trace coal, black, blocky, poorly developed, show gas bubbles, (26 unit gas kick).
------------	---

**SUMMITT SECTION**

1390-1393'	Coal and black carboniferous shale, trace gas.
------------	--

**MULKEY SECTION**

1399-1403'	Coal, black, trace gas bubbles.
------------	---------------------------------

**UPPER SQUIRREL SAND SECTION**

1404-1420'	Sand; gray, grayish green, micaceous, shaley, poorly developed, trace gas bubbles.
1420-1440'	Sand; gray, very fine grained, micaceous, shaley, black carboniferous material laminated in few clusters, trace iron pyrite.

KCC  
MAY 24 2001  
CONFIDENTIAL  
ORIGINAL  
CONFIDENTIAL

**MIDDLE SQUIRREL SAND SECTION**

1440-1459' Sand; gray, very fine to medium grained, sub rounded, sub angular, friable, fair to good intergranular porosity, fair dark brown to brown stain, show of free oil and fair odor in fresh samples, good streaming cut, scattered black carboniferous material and coal.

**LOWER SQUIRREL SAND SECTION**

1459-1481' Sand; gray to white, quartzitic, medium grained, sub angular and sub rounded, friable, fair to good intergranular porosity, good dark brown and brown stain, show of free oil (gassy) and fair odor. Trace glauconitic, coal and iron pyrite, good milky cut. (gas increase was noted through the Squirrel Section).

**CROWBERG SECTION**

1504-1507' Coal, black.

**FLEMING SECTION**

1514-1519' Coal (20 unit kick)

**MINERAL SECTION**

1546-1551 Coal; trace calcareous sand.

**SCAMMIN SECTION**

1564-1568 Coal; (flakey), trace gas bubbles.

**WEIR-PITTSBURG SECTION**

1578-1581 Coal plus gray, dark gray shale.

**SEVILLE SECTION**

1612-1614 Coal; trace silty sand.

**ROWE SECTION**

1726-1732 Coal; bleeding gas (79 unit kick).

**NEUTRAL SECTION**

1746-1748 Coal; laminated with iron pyrite (77 unit kick).

**AW SECTION**

1755-1758 Coal; trace iron pyrite, show gas bubbles (69 unit kick).

**CW SECTION**

1764-1768 Coal; gas bubbles. (89 unit kick).

**RIVERTON SECTION**

1772-1778 Coal; trace white, very fine grained sand, trace gas bubbles (89 unit kick)

**MISSISSIPPIAN SECTION**

1781-1786'	Limestone; tan, fossiliferous, slightly cherty, no shows.
1788-1800'	Limestone; gray and white, highly fossiliferous, few finely oolitic, chalky, trace white chert.
1800-1810'	Limestone; white and gray, fossiliferous, granular, chalky, no shows.
1810-1820'	Limestone; as above, trace tan chert.
1820-1830'	Limestone; tan and white, highly dolomitic, trace tan granular, dolomitic.
1836-1848'	Sand; gray and white, dolomitic, friable, fair porosity, trace white and gray chert.
1848-1862'	Chert; white and gray, highly fossiliferous, boney, trace brown, tan, sucrosic, dolomite.
1866-1880'	Dolomite; gray and tan, finely crystalline, sucrosic, glauconitic, plus white and gray, fossiliferous chert.
1900-1920'	Limestone; tan, highly oolitic/fossiliferous, fair to good interoolitic and fossil cast porosity, no shows.

**OSAGE SECTION**

1918-1930'	Dolomite; tan and brown, finely crystalline, sucrosic in part, plus white and gray chert.
1930-1940'	Dolomite; as above, trace white chalk.
1940-1950'	Dolomite; as above, trace iron pyrite.
1980-2001'	Dolomite; as above, plus chert, weathered, scattered vuggy porosity, no shows.

**CHOTEAU SECTION**

2011-2020'	Limestone; gray and dark gray, finely crystalline, dense, slightly dolomitic.
2020-2030'	Limestone; as above, gray and brown opaque chert.
2030-2040'	Limestone; white and gray, finely crystalline, few medium crystalline, chalky, poor porosity.
2050-2070'	Limestone; tan and gray, finely crystalline, few granular, slightly dolomitic, poor porosity, no shows.

**COMPTON SECTION**

2109-2125'	Limestone; tan and brown, finely crystalline, poorly developed porosity.
------------	--

KCC

11/1/201

CONFIDENTIAL

ORIGINAL

CONFIDENTIAL

### **VIOLA SECTION**

- 2195-2202' Dolomite; white, finely crystalline, sucrosic, plus chert, white and cream, weathered in part, brown to golden brown stain, weak show free oil and faint odor in fresh samples (5 unit gas increase).
- 2202-2215' Limestone; white, fine and medium crystalline, plus white sucrosic, dolomite, no shows.

### **SIMPSON SECTION**

- 2215-2230' Sand; clear and gray, quartzitic, sub rounded, rounded, friable, fair porosity, no shows.
- 2230-2240' Sand; as above, good porosity, plus loose unconsolidated quartz grains, trace varied colored shale.
- 2240-2260' Sand; as above, trace white chalk.
- 2260-2270' Loose unconsolidated quartz grains and gray, green, sub waxey shale.
- 2270-2295' Sand; white, very fine to medium grained, sub rounded, rounded, friable, fair to good intergranular porosity, plus large rounded quartz grains.
- 2296-2325' Sand; as above, trace iron pyrite, few glauconitic.

### **ARBUCKLE SECTION**

- 2325-2330' Dolomite; tan and brown, fine to medium crystalline, few cherty, poor visible porosity, trace white boney opaque chert.
- 2334-2450' Dolomite; gray, tan, white, finely crystalline, cherty, plus white, clear, opaque chert, trace iron pyrite.
- 2350-2366' Dolomite; gray, tan, white, finely crystalline, scattered porosity.
- 2366-2380' Dolomite; as above, poor visible porosity, plus gray and tan chert, trace iron pyrite.
- 2380-2390' Dolomite; gray, tan, fine to medium crystalline, scattered intercrystalline, porosity, trace poorly developed vuggy porosity.
- 2390-2400' Dolomite; as above.
- 2400-2420' Dolomite; white and gray, medium crystalline, few coarse crystalline, scattered porosity, trace white and gray chert.
- 2420-2430' Dolomite; tan, brown, fine to medium crystalline, scattered intercrystalline and vuggy type porosity, no shows.
- 2430-2442' Dolomite; tan, brown, fine to medium crystalline, fair to good porosity, no shows.

Osage Resources  
Osage #5  
SE-SW-SW; Section 6-22s-14e  
Coffey County, Kansas  
Page No. 6

KCC  
CONFIDENTIAL

ORIGINAL

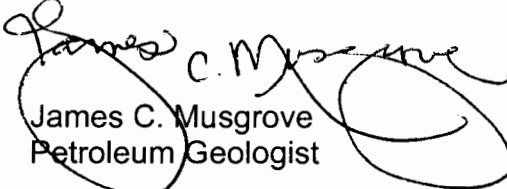
CONFIDENTIAL

**Rotary Total Depth**      **2442 (-1302)**  
**Log Total Depth**        **2342 (-1202)**

**Recommendations:**

5 1/2" disposal casing was set and cemented at 2210' (232 ft off bottom) and the Osage #5 is to be completed as a salt water disposal well using "open hole" completion.

Respectfully submitted;

  
James C. Musgrove  
Petroleum Geologist

