

# **Geological Report**

## **Knopp #7**

2283' FNL & 1650' FEL

Sec. 13 T14s R32w

Logan County, Kansas



**Pioneer Resources, Inc.**

## General Data

Well Data: Pioneer Resources, Inc.  
Knopp #7  
2283' FNL & 1650' FEL  
Sec. 13 T14s R32w  
Logan County, Kansas  
API # 15-109-21496-0000

Drilling Contractor: Discovery Drilling Co. Inc. Rig #2

Geologist: Jason T Alm

Spud Date: April 17, 2017

Completion Date: April 26, 2017

Elevation: 2837' Ground Level  
2845' Kelly Bushing

Directions: Oakley KS, South on Hwy 83 21 mi to Jayhawk Rd.  
East 2 mi to county line, North 1 mi, West into  
location by tank batteries.

Casing: 220' 8 5/8" surface casing  
4553' 5 1/2" production casing

Samples: 10' wet and dry, 3700' to RTD

Drilling Time: 3600' to RTD

Electric Logs: ELI "Gus Pfannenstiel"  
CNL/CDL, DIL, MEL

Drillstem Tests: Five, Trilobite Testing, Inc. "Bradley Walters"

Problems: Deviation surveys were dropped several times. The  
last survey was 4 ¼ degrees off.

Remarks: None

## Formation Tops

Formation	Pioneer Resources, Inc. Knopp #7 Sec. 13 T14s R32w 2283' FNL & 1650' FEL
Anhydrite	2316' +533
Base	2338' +507
Heebner	3839' -994
Toronto	3858' -1013
Lansing	3877' -1032
BKC	4191' -1346
Marmaton	4253' -1408
Pawnee	4327' -1482
Myrick	4358' -1513
Fort Scott	4382' -1537
Cherokee	4409' -1564
Johnson	4451' -1606
Morrow	4479' -1634
Mississippian	4502' -1657
RTD	4550' -1705
LTD	4554' -1709

## Sample Zone Descriptions

- LKC “A” zone (3877’ -994): Covered in DST #1**  
 Ls – Fine to sub-crystalline, oolitic with scattered poor oomoldic porosity, few rocks with dark tarry oil stain, no show of free oil, no odor, mostly barren, very dull scattered yellow fluorescents, 3 units hotwire.
- LKC “C” zone (3910’ -1065): Covered in DST #1**  
 Ls – Fine to sub-crystalline, oolitic with poor to fair scattered oolitic porosity, light to fair oil stain with light scattered saturation, slight show of free oil when broken, light yellow fluorescents, fair to good cut, 10 units hotwire.
- LKC “H” zone (4052’ -1207): Covered in DST #2**  
 Ls – Fine to sub-crystalline, oolitic with poor oomoldic and pinpoint oomoldic porosity, light oil stain in porosity, very slight show of free oil when broken, very light odor, fair yellow fluorescents, 20 units hotwire.

**LKC “I” zone (4082’ -1237): Covered in DST #3**  
 Ls – Fine crystalline with scattered poor to fair pinpoint vuggy and inter-crystalline porosity, light to fair oil stain with light scattered saturation, slight show of free oil when broken, few gas bubbles, light to fair yellow fluorescents, 117 units hotwire.

**LKC “J” zone (4106’ -1261): Covered in DST #4**  
 Ls – Fine to sub-crystalline, oolitic with scattered poor oomoldic and oolitic porosity, few rocks with light to fair oil stain, no show of free oil, scattered yellow fluorescents, very chalky, 22 units hotwire.

**LKC “K” zone (4128’ -1283): Covered in DST #4**  
 Ls – Fine crystalline, slightly oolitic with poor vuggy and scattered inter-crystalline porosity, light to fair oil stain with very light spotted saturation, slight show of free oil on cup, good odor, fair yellow fluorescents, 67 units hotwire.

**Cherokee Lime (4412’ -1567): Covered in DST #5**  
 Ls – Fine to sub-crystalline in part with fair vuggy and poor to fair inter-fossil porosity, light to fair oil stain with light scattered saturation, fair show of free oil, very light odor, light spotted yellow fluorescents, good streaming cut, few visible gas bubbles, 50-78 units hotwire.

**Johnson (4451’ -1606): Covered in DST #5**  
 Ls – Fine to sub-crystalline in part with poor to fair vuggy and scattered inter-crystalline porosity, light to heavy oil stain and saturation, good show of free oil, good odor, light to fair spotted yellow fluorescents, good cut, 145-74 units hotwire.

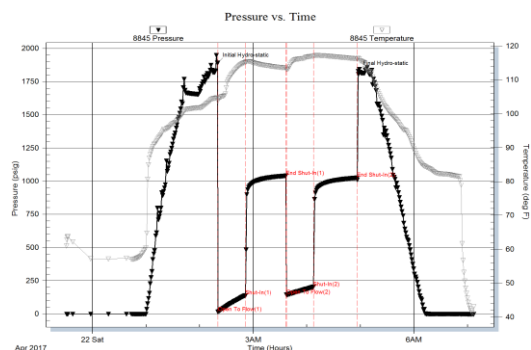
**Drill Stem Tests**  
 Trilobite Testing, Inc.  
 “Bradley Walter”

**DST #1 LKC A – C zones**

Interval (3861’ – 3920’) Anchor Length 59’

IHP	– 1888 #	
IFP	– 30” – B.O.B. 15 min.	13-138 #
ISI	– 45” – Dead	1040 #
FFP	– 30” – B.O.B. 20 min.	143-202 #
FSI	– 45” – Dead	1025 #
FHP	– 1827 #	
BHT	– 116°F	

Recovery: 430’ MCW w/ oil puddle on top

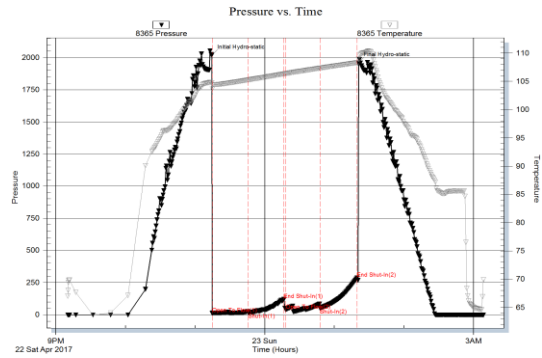


**DST #2 LKC H zone**

Interval (4028' – 4070') Anchor Length 42'

IHP	- 2019 #	
IFP	- 30" – Built to 1/2 in.	11-15 #
ISI	- 30" – Dead	119 #
FFP	- 30" – W.S.B.	38-51 #
FSI	- 30" – Dead	285 #
FHP	- 1960 #	
BHT	- 108°F	

Recovery: 10' Mud w/ oil spots

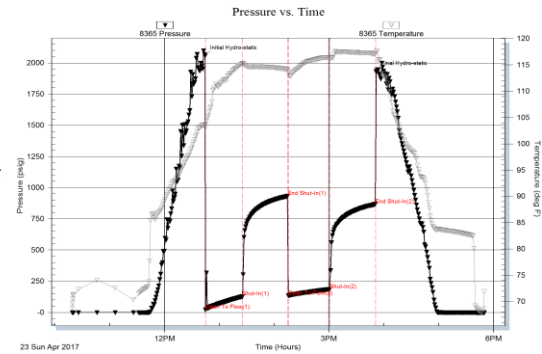


**DST #3 LKC I zone**

Interval (4062' – 4095') Anchor Length 33'

IHP	- 2057 #	
IFP	- 45" – B.O.B. 21 min.	20-127 #
ISI	- 45" – W.S.B.	930 #
FFP	- 45" – B.O.B. 37 min.	132-185 #
FSI	- 45" – W.S.B.	866 #
FHP	- 1934 #	
BHT	- 117°F	

Recovery: 450' MCW w/ oil spots

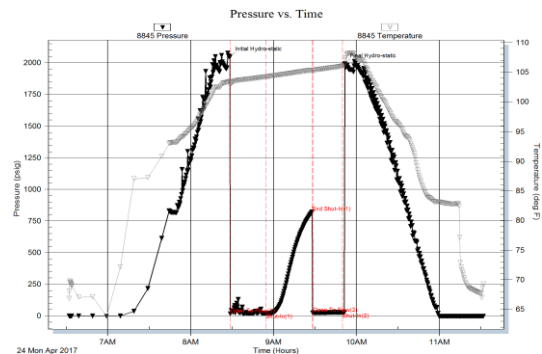


**DST #4 LKC J – L zones**

Interval (4089' – 4185') Anchor Length 96'

IHP	- 2045 #	
IFP	- 30" – Built to 1 in.	16-21 #
ISI	- 30" – Dead	820 #
FFP	- 20" – W.S.B.	23-26 #
FHP	- 1991 #	
BHT	- 107°F	

Recovery: 20' Mud w/ oil spots

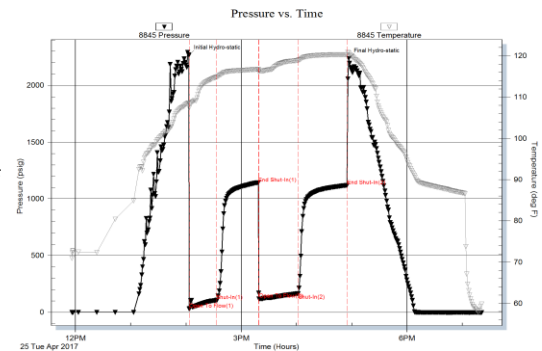


**DST #5 Johnson Zone**

Interval (4402' – 4472') Anchor Length 70'

IHP	- 2264 #	
IFP	- 30" – B.O.B. 10 min.	30-105 #
ISI	- 45" – Built to 2 1/2 in.	1142 #
FFP	- 45" – B.O.B. 4 min.	118-165 #
FSI	- 45" – Built to 3 in.	1118 #
FHP	- 2236 #	
BHT	- 120°F	

Recovery: 1100' GIP  
 230' GMCO 60% Oil  
 180' GMCO 35% Oil



## Structural Comparison

	Pioneer Resources, Inc. Knopp #7 Sec. 13 T14s R32w 2283' FNL & 1650' FEL	Pioneer Resources, Inc. Knopp #1 Sec. 13 T14s R32w 398' FSL & 1070' FEL		Pioneer Resources, Inc. Knopp #5 Sec. 13 T14s R32w 1645' FNL & 330' FWL	
<b>Formation</b>					
Anhydrite	<b>2316' +533</b>	NA	<b>NA</b>	NA	<b>NA</b>
Base	<b>2338' +507</b>	NA	<b>NA</b>	NA	<b>NA</b>
Heebner	<b>3839' -994</b>	3784' -994	<b>FL</b>	3787' -980	<b>(-14)</b>
Toronto	<b>3858' -1013</b>	3802' -1012	<b>(-1)</b>	3805' -998	<b>(-15)</b>
Lansing	<b>3877' -1032</b>	3818' -1028	<b>(-4)</b>	3822' -1015	<b>(-17)</b>
BKC	<b>4191' -1346</b>	4136' -1346	<b>FL</b>	4141' -1334	<b>(-12)</b>
Marmaton	<b>4253' -1408</b>	4200' -1410	<b>(+2)</b>	4207' -1400	<b>(-8)</b>
Pawnee	<b>4327' -1482</b>	4268' -1478	<b>(-4)</b>	4276' -1469	<b>(-13)</b>
Myrick	<b>4358' -1513</b>	4298' -1508	<b>(-5)</b>	4308' -1502	<b>(-11)</b>
Fort Scott	<b>4382' -1537</b>	4320' -1530	<b>(-7)</b>	4335' -1528	<b>(-9)</b>
Cherokee	<b>4409' -1564</b>	4347' -1557	<b>(-7)</b>	4361' -1554	<b>(-10)</b>
Johnson	<b>4451' -1606</b>	4387' -1597	<b>(-9)</b>	4402' -1595	<b>(-11)</b>
Morrow	<b>4479' -1634</b>	4414' -1624	<b>(-10)</b>	4432' -1625	<b>(-9)</b>
Mississippian	<b>4502' -1657</b>	4422' -1632	<b>(-25)</b>	4463' -1656	<b>(-1)</b>

### Summary

The location for the Knopp #7 well was found via 3-D seismic survey. The new well ran structurally as expected via the survey. Five Drill Stem Tests were conducted, one of which recovered commercial amounts of oil from the Johnson Zone. After all gathered data had been examined the decision was made to run 5 ½ inch production casing to further evaluate the Knopp #7 well.

### Recommended Perforations

**Primary:**

**Johnson Zone**

**4466' – 4471'**

**DST #5**

**4455' – 4459'**

**4451' – 4453'**

**Before Abandonment:**

**Cherokee Lime**

**4422' – 4429'**

**DST #5**

Respectfully Submitted,

Jason T Alm  
Hard Rock Consulting, Inc.