HARDROCK
Consulting, Inc.

Geologic Report

Drilling Time and Sample Log

Operator **Pioneer Resources, Inc.**
Lease **Knopp** No. **8**
API # **15-109-21593-0000**
Field **Bridges Northeast**
Location **1460' FSL & 2170' FWL**
Sec. **13** Twp. **14s** Rge. **32w**
County **Logan** State **Kansas**

Elevation
KB **2792'**
DF
GL **2785'**

Casing Record
Surface 8 5/8" @ 221'
150sx Common 3% CC, 2% Gel
Production None

Electrical Surveys
ELI
CNL/CDL, DIL, MEL

Formation	Sample tops	Log Tops	Datum	Struct Comp
Anhydrite	2249'	2250'	+543	+533 +10
Base	2272'	2272'	+520	+507 +13
Heebner	3782'	3782'	-990	-994 +4
Toronto	3799'	3800'	-1007	-1013 +6
Lansing	3819'	3818'	-1026	-1032 +6
Muncie Creek	3975'	3975'	-1183	NA
BKC	4134'	4139'	-1347	-1346 -1
Altamont	4201'	4201'	-1409	-1408 -1
Myrick Station	4302'	4300'	-1508	-1513 +5
Fort Scott	4325'	4324'	-1532	-1537 +5
Johnson	4392'	4392'	-1600	-1606 +6
Morrow	4420'	4419'	-1627	-1634 +7
Morrow Sand	4440'	4442'	-1650	NA
Miss	4458'	4458'	-1666	-1657 -9
Total Depth	4530'	4531'	-1739	

Reference Well For Structural Comparison **Pioneer Resources, Inc.** **Knopp #7**
2283' FNL & 1650' FEL Sec. 13 T14s R32w Logan Co. Kansas

Drilling Contractor	**STP Drilling, LLC.**		
Commenced	**5-10-2019**	Completed	**5-19-2019**
Samples Saved From	**3650'**	To	**RTD**
Drilling Time Kept From	**3550'**	To	**RTD**
Samples Examined From	**3650'**	To	**RTD**
Geological Supervision From	**3700'**	To	**RTD**

Displacement **3500'**

Mud Type **Chemical**

Summary and Recommendations

The location for the Knopp #8 was found via 3-D seismic survey. The n location ran structurally as expected via the survey. Three Drill Stem Tes were conducted, all of which were negative. After all gathered data had b examined the decision was made to plug and abandon the Knopp #8 well.

Plugging Orders
50sx @ 2275'
100sx @ 1275'
50 sx @ 275'
10sx @ 40'
30sx Rathole

Respectfully Submitted,

Jason T Alm
Hard Rock Consulting, Inc.

ew
ts
een

ROCK TYPES

▤ Lmst fw7>
▤ shale, grn
▤ shale, gry
▤ Carbon Sh
▤ shale, red
▤ Ss

ACCESSORIES

MINERAL
ꭥ Glauconite

STRINGER
〰 Chert
▤ Sandstone
▤ Siltstone
▤ Shale
▤ green shale
▤ red shale

OTHER SYMBOLS

OIL SHOWS
- ● Even Stn
- ◕ Spotted Stn 50 - 75 %
- ◑ Spotted Stn 25 - 50 %
- ◔ Spotted Stn 1 - 25 %
- ○ Questionable Stn
- D Dead Oil Stn
- ■ Fluorescence

DST
- ▦ DST Int
- ▦ DST alt
- ▦ Core
- ‖ tail pipe

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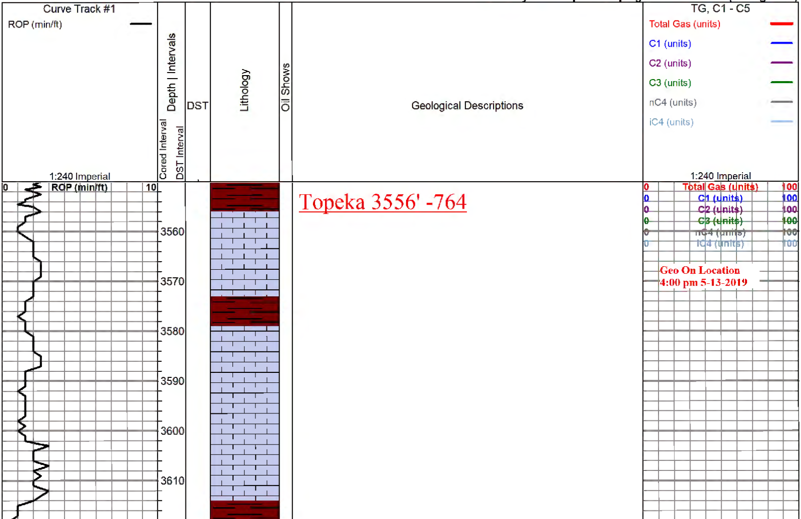
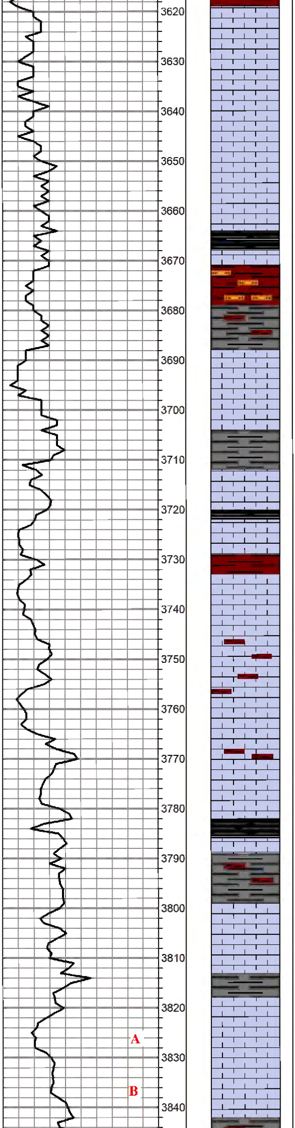




Ls - Tan-offwh, fn-subxln, dns.

Sh - Blk, carb.

Sh - Red-brn, silty in part

Sh - Gry-red

Ls - Offwh-tan, fn xln, ool w/ fair oom por, barren.

Sh - Gry

Sh - Drk gry-blk

Ls - Offwh-tan, fn xln, ool w/ fair to good oom por, barren

Ls - ala, also w/ scat fair interxln por, barren.

Ls - ala, sl mottled w/ gry-red sh.

Ls - Offwh-tan, fn-subxln, ool in part w/ poor interxln & scat poor oom por, barren.

Heebner 3782' -990

Sh - Blk, carb.

Sh - Gry-brn

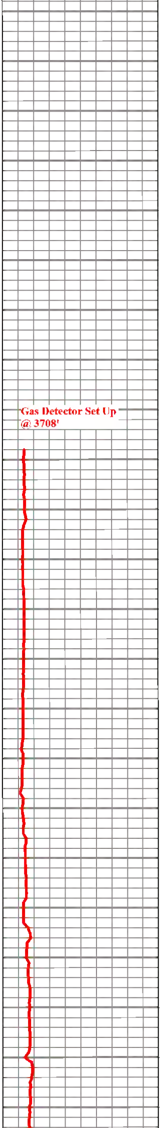
Toronto 3799' -1007

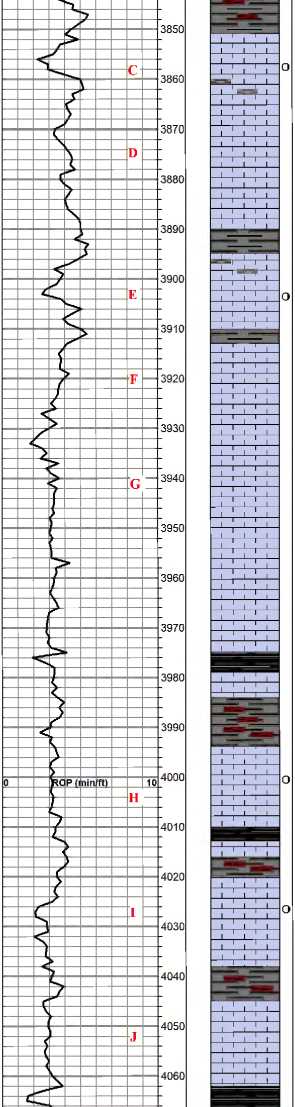
Ls - Offwh-tan, fn-subxln, ool in part w/ poor scat oom & interxln, por, barren

Lansing 3819' -1027

Ls - Tan-offwh, fn xln, ool in part with poor to fair scat oom & ooc por, barren, very chalky

Ls - Tan, subxln, ool pkst in part, dns, very chalky





Sh - Gry-brn

Ls - Offwh, fn xln, ool in part w/ poor scat ooc & vuggy por, few pcs w/ very lt tarry oil st, nsfo, no odor, no fluor.

Ls - Tan, subxln, dns, few scat ool.

Ls - ala

Sh - Gry

Ls - Tan-offwh, fn-subxln, ool in part w/ poor scat oom & ooc por, few pcs w/ very lt spot oil st, nsfo, no odor, no fluor.

Ls - Tan, fn-subxln, dns, chalky

Ls - Tan-offwh, fn xln, ool w/ poor to fair oom por, barren, chalky.

Ls - Offwh-tan, subxln, sl ool, dns, chalky in part

Ls - ala

Muncie Creek 3975' -1183

Sh - Blk, carb.

Sh - Gry-brn

Ls - Tan, fn-subxln w/ scat poor to very poor vuggy por, few pcs w/ lt spot oil st, nsfo, no odor, no fluor, very chalky.

Sh - Blk-drk gry

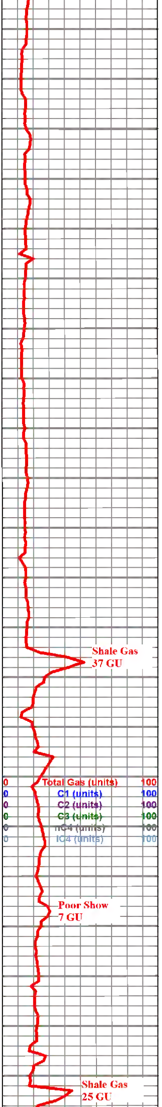
Ls - Tan, fn-subxln, ool in part w/ poor to scat fair pinpoint interxln & vuggy por, lt spot oil st in por, nsfo, no odor, very dull fluor, mostly barren.

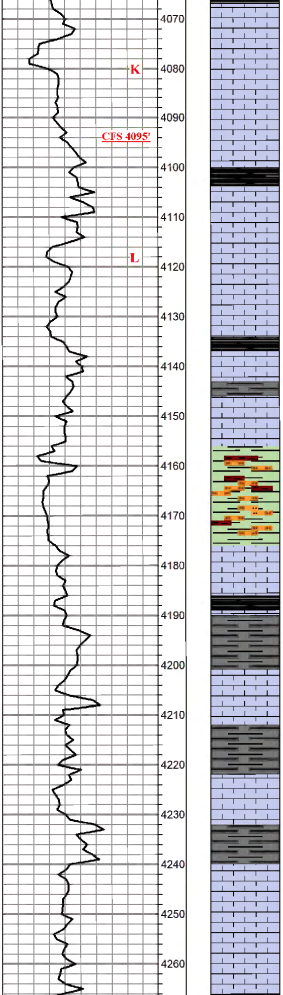
Sh - Gry-brn

Ls - Tan-lt gry, subxln, dns, ool in part, sl chalky.

Stark 4062' -1270

Sh - Blk, carb.





Ls - Tan, fn xln, ool in part w/ fair ooc & pinpoint interxln por, few pcs w/ tarry oil st, mostly barren, no odor, no fluor, mottled w/ gry sh in part.

Ls - Tan-lt gry, subxln, dns, ool in part, sl chalky.

Sh - Blk-drk gry.

Ls - Tan-lt gry, subxln, ool in part, dns, sl mottled w/ gry sh.

Ls - Lt gry, subxln, ool w/ poor scat ooc por, barren, sl chalky.

BKC 4134' -1342

Sh - Drk gry-blk

Ls - Tan-gry, subxln, ool in part, dns

Ls - ala

Sh - Grn-brn-gry, mixed w/ very fn sltst, barren.

Ls - Tan-lt gry, subxln, dns, sl chert

Sh - Blk, carb.

Sh - Gry-grn-brn

Marmaton 4201' -1409

Ls - Tan-gry, subxln, dns

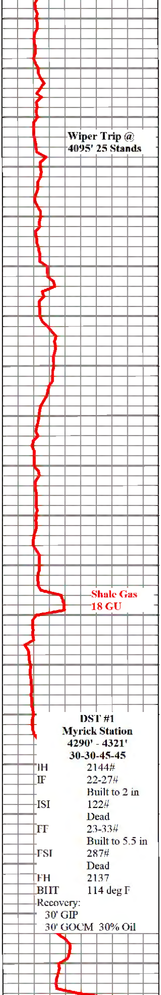
Sh - Gry-brn

Ls - Tan-lt gry, subxln, dns

Sh - Gry-brn

Ls - Tan-lt gry, subxln, dns, ool in part, chalky in part

Ls - ala



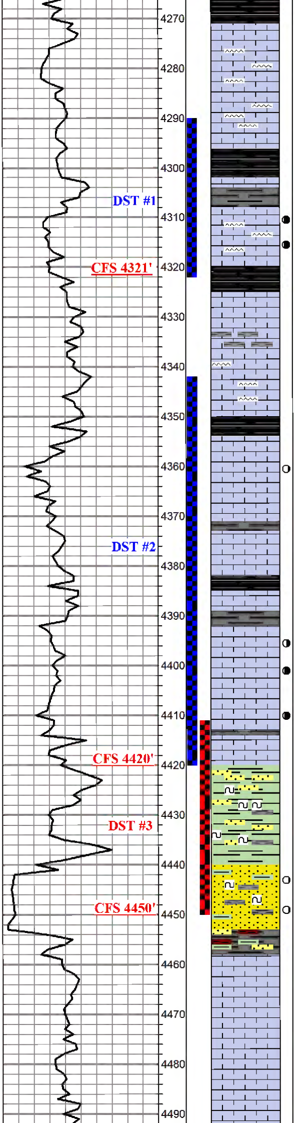
Wiper Trip @
4095' 25 Stands

Shale Gas
18 GU

DST #1
Myrick Station
4290' - 4321'
30-30-45-45

IH	2144#
IF	22-27# Built to 2 in
ISI	122# Dead
FF	23-33# Built to 5.5 in
FSI	287# Dead
FH	2137
BHT	114 deg F

Recovery:
30' GIP
30' GOCM 30% Oil



Sh - Blk, carb.

Ls - Tan-lt gry, fn-sub micritic xln, ool in part, mostly dns, very cherty-lt gry-wht.

Sh - Blk, Carb.

Myrick Station 4302' -1510

Ls - Tan-lt gry, fn xln, ool in part w/ fair oom & scat pinpoint vuggy por, lt-fair oil st w/ lt spot sat, fsfo, good odor, fair yel fluor, heavily mottled w/ gry chert.

Fort Scott 4325' -1533

Ls - Tan-gry, subxln, dns, ool pkst in part.

Ls - Tan-lt gry, subxln, dns, ool in part, heavy chert-gry-wht

Cherokee 4350' -1558

Sh - Blk, carb.

Ls - Tan-gry, fn xln, ool in part w/ scat fair oom & vuggy por, lt oil st in por, very sl sfo when broken, very lt odor, poor yel flour, oil is mostly heavy and dead, very chalky.

Ls - Tan-gry, subxln, ool in part, dns, mottled w/ gry sh.

Sh - Blk, carb.

Johnson 4392' -1600

Ls - Tan, fn-subxln w/ poor to scat fair interxln & vuggy por, lt-fair oil st in por, st scat sat, fsfo, good odor, fair to good yel fluor.

Ls - ala, strong odor.

Morrow 4420' -1628

Sh - Grn, mottled fn-coarse gr Ss, barren, sl glauc.

Sh - ala, mixed w/ dns ool Ls.

Morrow Sand 4440' -1648

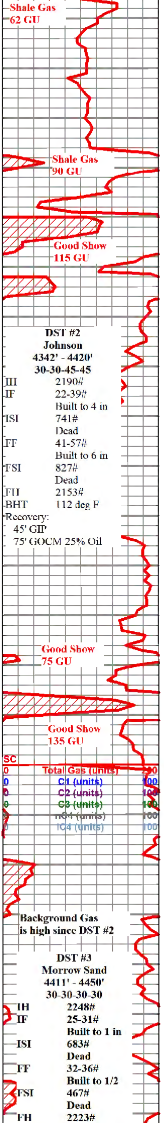
Ss - Quartz, frosted, fn-med gr, sub-rounded, fair sort, poor cement w/ good inter-gr por, few pcs w/ lt brn oil st, sl sfo on cup, very lt yel fluor, fair cut, heavily glauconitic, mottled w/ grn-gry sh in part.

Mississippian 4458' -1666

Ls - Wht-tan, fn-subgr, ool in part, dns, sl pyritic

Ls - ala, sl glauconitic

Ls - ala



DST #2
Johnson
4342' - 4420'
30-30-45-45

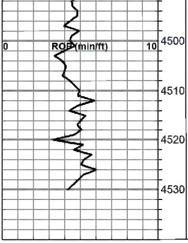
IH	2190#
IF	22-39#
	Built to 4 in
ISI	741#
	Dead
FF	41-57#
	Built to 6 in
FSI	827#
	Dead
FH	2153#
BHT	112 deg F

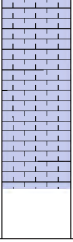
Recovery:
45' GIP
75' GOCM 25% Oil

Background Gas
is high since DST #2

DST #3
Morrow Sand
4411' - 4450'
30-30-30-30

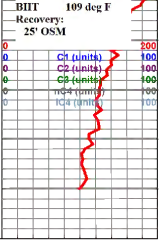
IH	2248#
IF	25-31#
	Built to 1 in
ISI	683#
	Dead
FF	32-36#
	Built to 1/2
FSI	467#
	Dead
FH	2223#





Ls - Offwh-tan, fn-subxln, granular in part, sl ool, dns

Ls - Offwh-tan, fn-subxln, ool, dns

Total Depth 4530' -1738