

**OPERATOR**

Company: OUTLAW WELL SERVICE LLC  
 Address: 1408 WEST 42ND  
 HAYS, KANSAS 67601

Contact Geologist: PRESTON WOLF  
 Contact Phone Nbr: 785-650-2399  
 Well Name: LOWRY # 5-13  
 Location: 330 FSL 880 FWL  
 API: 15-163-24308-00-00  
 Pool:  
 State: KANSAS

Field: BRAY  
 Country: USA

## Scale 1:240 Imperial

Well Name: LOWRY # 5-13  
 Surface Location: 330 FSL 880 FWL  
 Bottom Location:  
 API: 15-163-24308-00-00  
 License Number: 34272  
 Spud Date: 10/21/2015 Time: 2:00 PM  
 Region: ROOKS COUNTY  
 Drilling Completed: 10/26/2015 Time: 11:40 PM  
 Surface Coordinates: 330 FSL & 880 FWL  
 Bottom Hole Coordinates:  
 Ground Elevation: 2001.00ft  
 K.B. Elevation: 2009.00ft  
 Logged Interval: 2850.00ft To: 3530.00ft  
 Total Depth: 3530.00ft  
 Formation: ARBUCKLE  
 Drilling Fluid Type: FRESH WATER / CHEMICAL GEL

**SURFACE CO-ORDINATES**

Well Type: Vertical  
 Longitude: -99.471318  
 Latitude: 39.337021  
 N/S Co-ord: 330 FSL  
 E/W Co-ord: 880 FWL

**LOGGED BY**

Company: SOLUTIONS CONSULTING, INC.  
 Address: 108 WEST 35TH  
 HAYS, KANSAS 67601

Phone Nbr: 785-650-4540 / 785-639-1337  
 Logged By: GEOLOGIST

Name: STEVE REED

**CONTRACTOR**

Contractor: DISCOVERY DRILLING, INC  
 Rig #: 4  
 Rig Type: MUD ROTARY  
 Spud Date: 10/21/2015 Time: 2:00 PM  
 TD Date: 10/26/2015 Time: 11:40 PM  
 Rig Release: 10/27/2015 Time: 8:00 PM

**ELEVATIONS**

K.B. Elevation: 2009.00ft Ground Elevation: 2001.00ft  
 K.B. to Ground: 8.00ft

**NOTES**

DUE TO STRUCTURAL POSITON. MARGINAL DRILL STEM TEST RESULTS. AND OVERALL DEPLETION IN THE

AREA, THE LOWRY #5-13 WAS DEEMED NOT COMMERCIALY PRODUCTIVE AT THIS TIME. THE DECISION WAS MADE TO PLUG AND ABANDON.

OPEN HOLE LOGGING BY PIONEER ENERGY SERVICES: DUAL INDUCTION LOG, DUAL COMPENSATED POROSITY LOG, MICRORESISTIVITY LOG

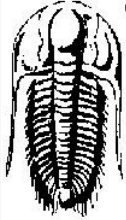
DRILL STEM TESTING BY TRILOBITE TESTING INC: FOUR (4) CONVENTIONAL AND ONE (1) STRADDLE TEST

RESPECTFULLY SUBMITTED BY: STEVE REED

	WELL NAME		COMPARISON WELL	COMPARISON WELL
	LOWRY #5-13		DON #1	CHARLIE #1
	API: 15-163-24308		API: 15-163-24301	API: 15-163-24296
	2009 KB		2013 KB	2012 KB
FORMATION	SAMPLE TOPS	LOG TOPS	LOG TOPS (DATUM)	LOG TOPS (DATUM)
<b>ANHYDRITE TOP</b>	1460 (+549)	1461 (+548)	+553	+557
<b>TOPEKA</b>	2961 (-952)	2961 (-952)	-950	-953
<b>HEEBNER</b>	3165 (-1156)	3165 (-1156)	-1154	-1155
<b>TORONTO</b>	3185 (-1176)	3186 (-1177)	-1174	-1176
<b>LKC</b>	3201 (-1192)	3202 (-1193)	-1190	-1192
<b>BKC</b>	3423 (-1414)	3420 (-1411)	-1411	-1411
<b>ARBUCKLE</b>	3460 (-1451)	3461 (-1452)	-1450	-1447
<b>RTD</b>	3530 (-1521)	3532 (-1523)	-1532	-1535

#### SUMMARY OF DAILY ACTIVITY

- 10-21-15** MIRU, spud @ 2:00pm, set 8 5/8" surface pipe to 221.36 w/150 sxs 80/20 poz 2% Gel, 3%CC, survey 1/2°, plug down @ 7:00pm, WOC, drill plug @ 3:00am
- 10-22-15** 555, drilling
- 10-23-15** 2162, drilling, displaced @ 2878
- 10-24-15** 3003, drilling, CFS @ 3250, short trip, CTCH, TOWB for DST #1 3228-3250, survey 1/2°, pipe strap .01' short to board, DST #1 Misrun (bridge @ 1000 feet), Recondition hole, DST #2 3228-3250
- 10-25-15** 3250, DST #2, drilling, CFS@ 3464, DST #3 3407-3464,
- 10-26-15** 3464, DST #4 3407-3470, drilling, TD of 3530 reached @ 11:40pm, CTCH, TOWB for logging, survey 1°, logging
- 10-27-15** 3530, DST #5 straddle 3252-3266, prepare for plugging, release rig @ 8:00pm



**TRILOBITE TESTING, INC.**

## DRILL STEM TEST REPORT

Outlaw Well Service  
 1408 West 42nd  
 Hays KS 67601  
 ATTN: Steve Reed

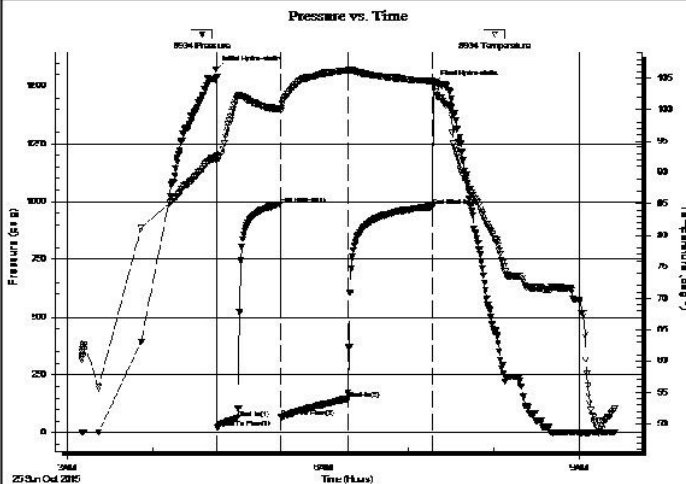
**20-8-19, Rooks, KS**  
**Lowry #5-13**  
 Job Ticket: 64863      **DST#: 2**  
 Test Start: 2015.10.25 @ 03:10:00

### GENERAL INFORMATION:

Formation: **KC "C"**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 04:45:30  
 Time Test Ended: 09:25:00  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Brett Dickinson  
 Unit No: 59  
 Interval: **3228.00 ft (KB) To 3250.00 ft (KB) (TVD)**  
 Total Depth: 3250.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Reference Elevations: 2009.00 ft (KB)  
 2001.00 ft (CF)  
 KB to GR/CF: 8.00 ft

**Serial #: 8934      Outside**  
 Press@RunDepth: 145.86 psig @ 3229.00 ft (KB)      Capacity: 8000.00 psig  
 Start Date: 2015.10.25      End Date: 2015.10.25      Last Calib.: 2015.10.25  
 Start Time: 03:10:05      End Time: 09:24:59      Time On Btm: 2015.10.25 @ 04:44:45  
 Time Off Btm: 2015.10.25 @ 07:18:00

TEST COMMENT: IF-BOB in 12min  
 IS-1/8in blow  
 FF-BOB in 13min  
 FS-1/4in blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1571.44	92.47	Initial Hydro-static
1	21.05	91.96	Open To Flow (1)
15	63.21	101.92	Shut-In(1)
45	988.66	100.03	End Shut-In(1)
46	67.24	100.13	Open To Flow (2)
93	145.86	106.21	Shut-In(2)
153	979.27	104.53	End Shut-In(2)
154	1507.65	104.34	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
180.00	MCW 90%W 10%M	2.25
60.00	GWOCM 5%G 10%O 10%W 75%M	0.84
50.00	GO 15%G 85%O	0.70
0.00	120ft GIP	0.00

### Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

\* Recovery from multiple tests



**TRILOBITE  
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## DRILL STEM TEST REPORT

Outlaw Well Service

20-8-19, Rooks, KS

1408 West 42nd  
Hays KS 67601

Lowry #5-13

Job Ticket: 64864

DST#: 3

ATTN: Steve Reed

Test Start: 2015.10.26 @ 01:45:00

### GENERAL INFORMATION:

Formation: **Arb**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 03:52:00

Time Test Ended: 08:21:30

Test Type: Conventional Bottom Hole (Reset)

Tester: Brett Dickinson

Unit No: 59

Interval: 3407.00 ft (KB) To 3464.00 ft (KB) (TV D)

Total Depth: 3464.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Fair

Reference Elevations: 2009.00 ft (KB)

2001.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 8934 Outside

Press@RunDepth: 27.23 psig @ 3408.00 ft (KB)

Start Date: 2015.10.26

End Date:

2015.10.26

Capacity: 8000.00 psig

Last Calib.:

2015.10.26

Start Time: 01:45:05

End Time:

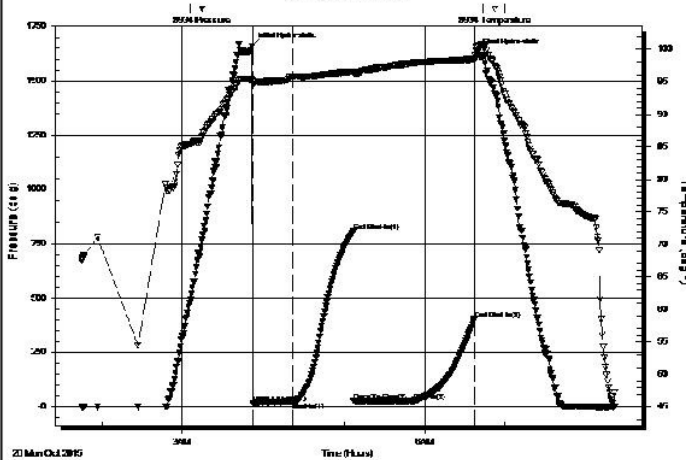
08:21:29

Time On Btm: 2015.10.26 @ 03:51:30

Time Off Btm: 2015.10.26 @ 06:38:45

TEST COMMENT: IF-1in blow  
IS-No bloe  
FF-1/4in blow  
FS-No blow

Pressure vs. Time



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1661.42	95.42	Initial Hydro-static
1	16.28	94.46	Open To Flow (1)
31	21.70	95.88	Shut-In(1)
76	804.74	96.59	End Shut-In(1)
76	25.97	96.34	Open To Flow (2)
120	27.23	97.95	Shut-In(2)
166	403.26	98.49	End Shut-In(2)
168	1632.21	100.48	Final Hydro-static

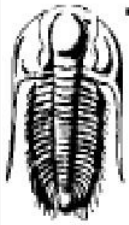
### Recovery

Length (ft)	Description	Volume (bbl)
1.00	Oil	0.00
14.00	V SOCM 5%O 95%M	0.07

\* Recovery from multiple tests

### Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



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## DRILL STEM TEST REPORT

Outlaw Well Service

20-8-19, Rooks, KS

1408 West 42nd  
Hays KS 67601

Low ry #5-13

Job Ticket: 64865

DST#: 4

ATTN: Steve Reed

Test Start: 2015.10.26 @ 13:15:05

### GENERAL INFORMATION:

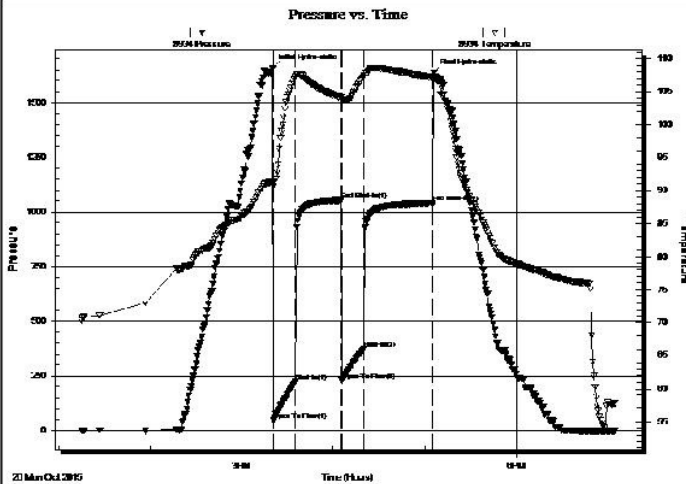
Formation: **Arb**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 15:21:00  
 Time Test Ended: 19:04:59  
 Interval: **3407.00 ft (KB) To 3470.00 ft (KB) (TVD)**  
 Total Depth: 3470.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Brett Dickinson  
 Unit No: 59  
 Reference Elevations: 2009.00 ft (KB)  
 2001.00 ft (CF)  
 KB to GR/CF: 8.00 ft

### Serial #: 8934

Outside

Press@RunDepth: 374.11 psig @ 3408.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2015.10.26 End Date: 2015.10.26 Last Calib.: 2015.10.26  
 Start Time: 13:15:05 End Time: 19:04:59 Time On Btm: 2015.10.26 @ 15:20:30  
 Time Off Btm: 2015.10.26 @ 17:06:00

TEST COMMENT: IF-BOB in 3min  
 IS-No blow  
 FF-BOB in 3min  
 FS-No blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1658.69	91.40	Initial Hydro-static
1	44.78	90.78	Open To Flow (1)
15	221.97	107.26	Shut-In(1)
45	1053.86	104.19	End Shut-In(1)
46	229.01	103.91	Open To Flow (2)
60	374.11	107.42	Shut-In(2)
105	1041.02	107.21	End Shut-In(2)
106	1635.49	107.37	Final Hydro-static

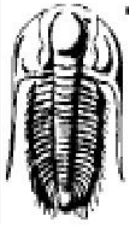
### Recovery

Length (ft)	Description	Volume (bbl)
480.00	MCW 70%W 30%M	6.46
240.00	OS WCM 5%W 95%M	3.37

\* Recovery from multiple tests

### Gas Rates

	Chcke (inches)	Pressure (psig)	Gas Rate (Mcf/d)



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Outlaw Well Service

20-8-19, Rooks, KS

1408 West 42nd  
Hays KS 67601

Low ry #5-13

Job Ticket: 64866

DST#: 5

ATTN: Steve Reed

Test Start: 2015.10.27 @ 06:10:00

### GENERAL INFORMATION:

Formation: **KC "D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 08:06:30

Time Test Ended: 12:31:15

Test Type: Conventional Straddle (Reset)

Tester: Brett Dickinson

Unit No: 59

Interval: 3252.00 ft (KB) To 3266.00 ft (KB) (TV D)

Reference Elevations: 2009.00 ft (KB)

Total Depth: 3266.00 ft (KB) (TVD)

2001.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 8.00 ft

**Serial #: 8934** Inside

Press@RunDepth: 129.99 psig @ 3253.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2015.10.27

End Date: 2015.10.27

Last Calib.: 2015.10.27

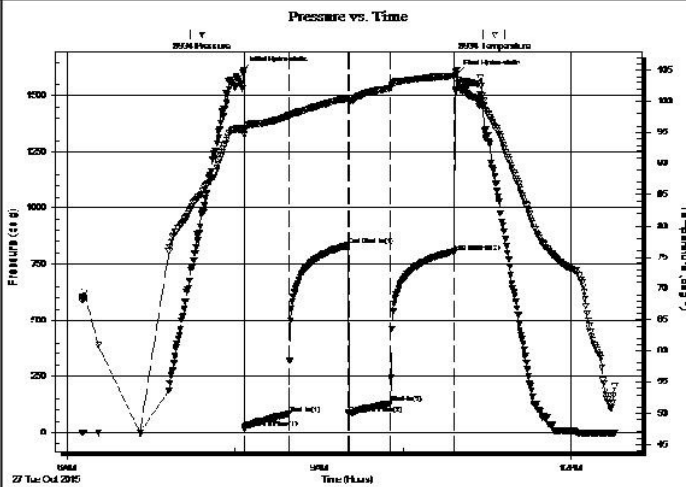
Start Time: 06:10:05

End Time: 12:31:14

Time On Btm: 2015.10.27 @ 08:05:45

Time Off Btm: 2015.10.27 @ 10:38:30

TEST COMMENT: IF-BOB in 21min  
IS-No blow  
FF-6in blow  
FS-No blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1614.59	95.64	Initial Hydro-static
1	19.11	94.66	Open To Flow (1)
32	81.45	97.58	Shut-In(1)
75	833.93	100.53	End Shut-In(1)
75	85.54	100.15	Open To Flow (2)
105	129.99	102.11	Shut-In(2)
151	806.97	104.09	End Shut-In(2)
153	1599.10	105.02	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
2.00	OS MW 20%M 80%W	0.01
248.00	Water	3.22

\* Recovery from multiple tests

### Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)

Trilobite Testing, Inc

Ref. No: 64866

Printed: 2015.10.27 @ 13:00:00

Type

Date

From Depth





To Depth

10/22/2015

0.00ft

0.00ft

### ROCK TYPES

 Dolprim	 Lmst fw7>	 Carbon Sh
 Lmst fw<7	 shale, gry	 shale, red

### ACCESSORIES

#### MINERAL

- P Pyrite
- △ Chert White
- Mc Mica
- ▨ Euhed rhombs of dol or c

#### FOSSIL

- F Fossils < 20%
- φ Oolite
- ⊕ Fossilinid

#### STRINGER

- ~~~~ Chert

#### TEXTURE

- C Chalky
- L Lithogr

### OTHER SYMBOLS

#### EVENTS

- ⌋ Casing Shoe
- ▷ RTF
- ▴ Sidewall
- ▲ Left Casing Shoe
- ▼ Right Casing Shoe

#### INTERVALS

- Core
- DST

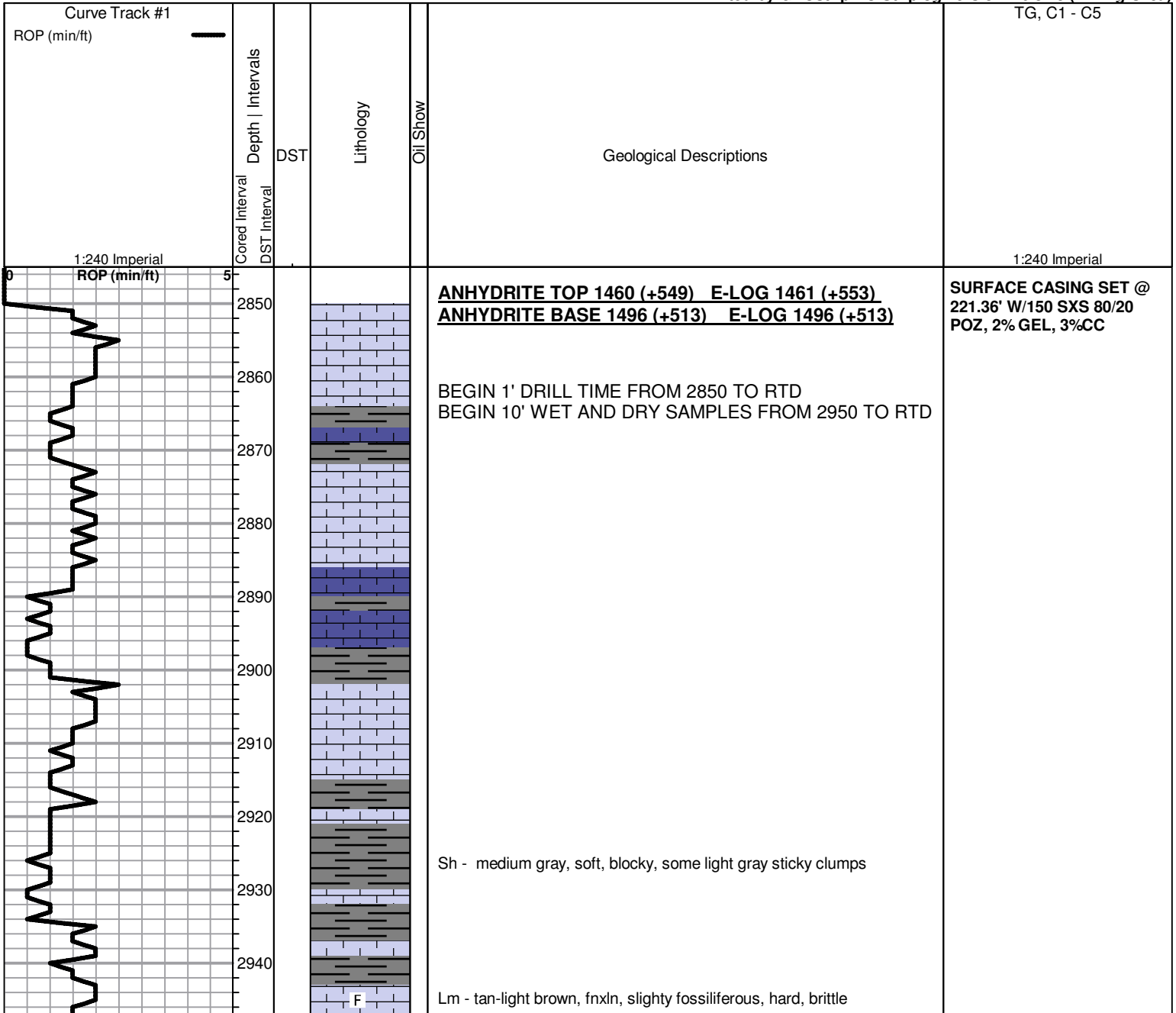
#### Oil Show

- Good Show
- Fair Show
- Poor Show
- Spotted or Trace
- Questionable Strn
- D Dead Oil Strn
- Fluorescence
- \* Gas

#### DST

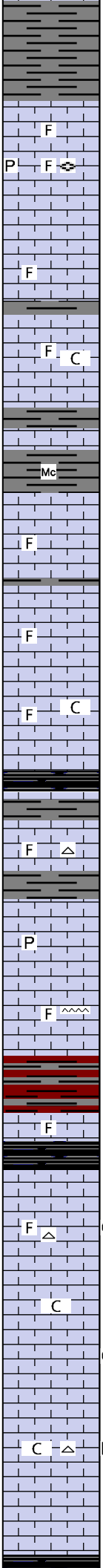
- DST Int
- DST alt
- Core
- tail pipe
- DST
- DST
- DST

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2950  
2960  
2970  
2980  
2990  
3000  
3010  
3020  
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3040  
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3060  
3070  
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3090  
3100  
3110  
3120  
3130  
3140  
3150  
3160

0 5  
RSP (min/ft)



**TOPEKA SPL 2961 (-952 ) ELOG 2961 (-952)**

Lm - tan/cream, fossiliferous, hard, brittle

Lm - tan, fossiliferous, medxn, pyrite, fusulinids

Lm - light-medium gray, medxn, fossiliferous, hard, brittle

Lm - light brown, fnxn, scattered fossils, brittle

Lm - light brown/cream, fnxn, some sucrosic in part, fossiliferous, slightly chalky

Sh - light to medium gray, soft, blocky

Sh - A/A, micaceous in part

Lm - light brown, medxn, fossiliferous, brittle

Lm - medium gray-brown, fnxn with dark fossil clasts, dense, hard

Lm - light brown, medxn, fossiliferous, slightly chalky, brittle

Sh - black carbonaceous, waxy with bronze specks

Lm - cream, medxn, fossiliferous, brittle, tan chert

Lm - cream, fnxn with pyrite inclusions, clean and sharp

Lm - cream, fossiliferous, fn-medxn, brittle, cherty

Sh - reddish brown, firm, blocky, some light gray sticky clumps

Lm - tan, fnxn, scattered fossils, dense, hard

Sh - black carbonaceous, firm, fissile

Lm - tan, fossiliferous, fnxn, scattered vuggy porosity, good odor, few specks of free oil, good streaming wet cut under UV light, tight overall, white chert

Lm - tan, fnxn, hard, dense, cherty, slight bedded chalk, no shows

Lm - light brown, fnxn w/pinpoint porosity, scattered light brown stain, good odor, slight SFO, good fluorescence, hard, well cemented

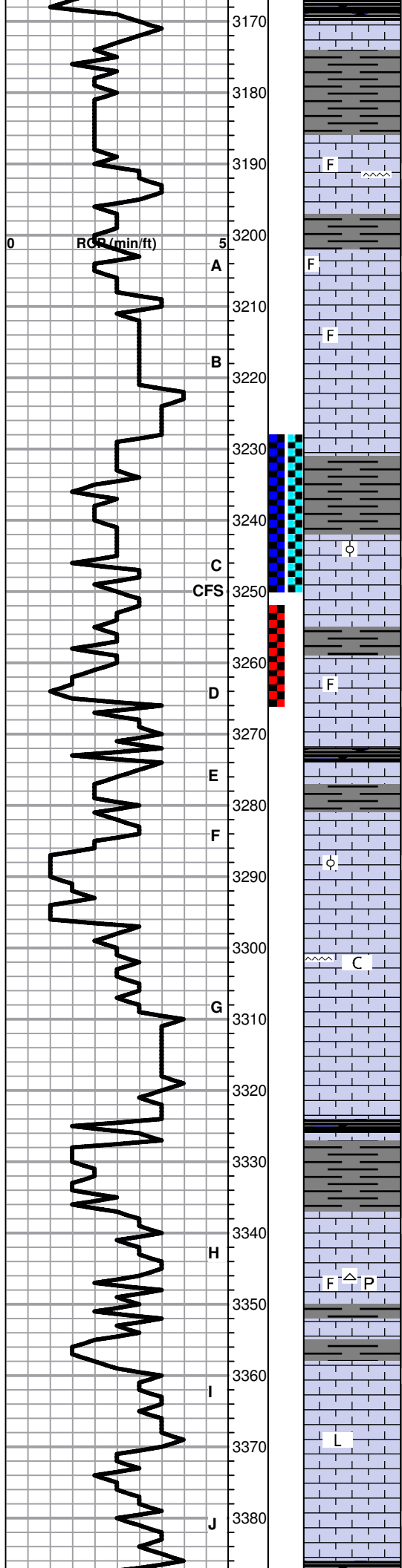
Lm - cream-offwhite, vfxn, hard, brittle, bedded chalk in part, slight gilsonitic stain, white chert

Lm - tan-cream, vfxn, sharp and clean, dense

**MUD WT 8.7  
VIS 50  
LCM 2 LBS**

**HEEBNER SPL 3165 (-1156) ELOG 3165 (-1156)**





Sh - black carbonaceous, firm, waxy

Lm - cream, vfxln, dense, hard

Sh - light gray, soft, blocky

**TORONTO SPL 3185 (-1176) ELOG 3186 (-1177)**

Lm - cream-bright white, fossiliferous w/scattered stain and some pinpoint porosity, tight overall, dense, hard, no odor, cherty

**LKC SPL 3201 (-1192) ELOG 3202 (-1193)**

Lm - cream, fossiliferous w/ oolites, slight vuggy porosity, slight scattered stain, fair odor, NSFO

Lm - cream-tan, fnxln, dense, fossiliferous, poor development, limited porosity

Lm - cream, vfxln, clean, sharp, no shows

Sh - dark gray, soft, fissile, some light gray sticky clumps

Lm - cream, oolitic w/scattered vugs, scattered golden brown stain, fair odor, slight SFO, good fluorescence, light gassy sheen

Lm - tan-light brown, fnxln, dense, hard, no shows

Lm - light brown, medxln, slightly fossiliferous with pinpoint porosity, saturated light brown stain, good odor, slight SFO, good streaming wet cut

Sh - black, carbonaceous, waxy, soft

Lm - tan, vfxln, clean, sharp, dense

Lm - cream, fnxln, slightly oolitic w/fn pinpoint porosity, scattered staining, slight SFO, good odor, streaming wet cut

Lm - cream-tan, fnxln, slightly chalky, white and tan chert

Lm - cream, vfxln, dense, hard, clean and barren

Lm - A/A

Sh - black, carbonaceous, firm, waxy

Sh - light gray, soft, blocky

Lm - offwhite, fn pinpoint porosity w/ scattered stain, good odor, few specks of FO, tight overall

Lm - cream-tan, fnxln, dense, hard, light brown and white chert, slightly fossiliferous, pyrite

Sh - medium gray, soft, blocky

Lm - cream, fnxln, scattered fn pinpoint porosity, scattered stain, faint odor, NSFO

Lm - cream, vfxln to lithographic, dense, hard, no shows

Lm - offwhite-cream, fnxln, scattered pinpoint porosity, scattered dark stain, few specks of FO, good odor, tight overall

**DST #1 MISRUN**  
bridge near 1000 feet

**DST #2 3228-3250 SEE**  
**HEADER FOR RESULTS**

**MUD WT 8.9**  
**VIS 56**  
**LCM 2 LBS**

**DST #2 3228-3250 SEE**  
**HEADER FOR RESULTS**

