

Scale 1:240 Imperial

Well Name: SPRING CREEK #18-1  
Surface Location: N2 SE SE NE SEC. 18 - 6S - 25W  
Bottom Location:  
API: 15-065-24118  
License Number: 33335  
Spud Date: 7/7/2016 Time: 4:30 PM  
Region: GRAHAM COUNTY KANSAS  
Drilling Completed: 7/13/2016 Time: 7:49 AM  
Surface Coordinates: 1992' FNL & 330' FEL  
Bottom Hole Coordinates:  
Ground Elevation: 2575.00ft  
K.B. Elevation: 2583.00ft  
Logged Interval: 3300.00ft To: 3900.00ft  
Total Depth: 3900.00ft  
Formation: LANSING - KANSAS CITY  
Drilling Fluid Type: FRESH WATER / CHEMICAL GEL

**OPERATOR**

Company: IA OPERATING, INC.  
Address: 9915 W 21ST ST  
SUITE B  
WICHITA, KS 67205  
Contact Geologist: JON ALLEN  
Contact Phone Nbr: (316) 721-0036  
Well Name: SPRING CREEK #18-1  
Location: N2 SE SE NE SEC. 18 - 6S - 25W  
API: 15-065-24118  
Pool: KANSAS Field: WILDCAT  
State: KANSAS Country: USA

**SURFACE CO-ORDINATES**

Well Type: Vertical  
Longitude: -100.1446823  
Latitude: 39.5324787  
N/S Co-ord: 1992' FNL  
E/W Co-ord: 330' FEL

**LOGGED BY**



Company: BIG CREEK CONSULTING, INC.  
Address: 1909 MAPLE  
ELLIS, KS 67637  
Phone Nbr: (785) 259-3737  
Logged By: GEOLOGIST Name: JEFF LAWLER

**CONTRACTOR**

Contractor: DISCOVERY DRILLING  
Rig #: 2  
Rig Type: MUD ROTARY  
Spud Date: 7/7/2016 Time: 4:30 PM  
TD Date: 7/13/2016 Time: 7:49 AM  
Rig Release: Time:

### ELEVATIONS

K.B. Elevation: 2583.00ft  
K.B. to Ground: 8.00ft

Ground Elevation: 2575.00ft

### NOTES

### WELL COMPARISON SHEET

FORMATION	WELL COMPARISON SHEET																													
	R				•				•				P&A 6-02																	
	EMPIRE DRILLING				COBALT ENERGY, LLS				BLUERIDGE PETRO. CORP.				N-B COMPANY																	
	MUIR #1				SD UNIT 'A' #1-19				SHOEN TRUST #2-22				KLIEN #1																	
SPRING CREEK 18-1				NW NW NW 18-6-25				SW NW SW SE 19-6-25				SE NW NW NW 22-6-25				NW SE SE 19-6-25														
KB		2583		GL		2575		KB		2553		KB		2602		KB		2591		KB		2595								
LOG TOPS		SAMPLE TOPS		COMP. CARD		LOG CORR.		SMPL.		LOGS		LOG CORR.		SMPL.		LOGS		LOG CORR.		SMPL.		COMP. CARD		LOG CORR.		SMPL.				
DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	DEPTH	DATUM	
ANHYDRITE TOP	2167	416	2167	416	2085	468				2170	432					2177	414					2165	430							14
BASE	2199	384	2202	381						2202	400					2209	382					2198	397							16
TOPEKA	3472	-889	3477	-894	3449	-896	+ 7	+ 2		3478	-876	- 13	- 18			3462	-871	- 18	- 23			3484	-889	+ 0	- 5					5
HEEBNER SHALE	3628	-1045	3629	-1046	3614	-1061	+ 16	+ 15		3633	-1031	- 14	- 15			3667	-1076	+ 31	+ 30			3639	-1044	- 1	- 2					2
TORONTO	3650	-1067	3652	-1069	3638	-1085	+ 18	+ 16		3656	-1054	- 13	- 15			3691	-1100	+ 33	+ 31											
LKC	3667	-1084	3670	-1087	3656	-1103	+ 19	+ 16		3672	-1070	- 14	- 17			3706	-1115	+ 31	+ 28			3675	-1080	- 4	- 7					7
BKC	3852	-1269	3853	-1270	3840	-1287	+ 18	+ 17		3862	-1260	- 9	- 10			3893	-1302	+ 33	+ 32			3867	-1272	+ 3	+ 2					2
CONGLOMERATE					4043	-1490																								
ARBUCKLE					4069	-1516																								
TOTAL DEPTH	3903	-1320	3900	-1317	4119	-1566	+ 246	+ 249		3925	-1323	+ 3	+ 6			3975	-1384	+ 64	+ 67			3910	-1315	- 5	- 2					2

### DST #1 LKC B - F 3680' 0 3742'



**DIAMOND TESTING**  
P.O. Box 157  
HOISINGTON, KANSAS 67544  
(800) 542-7313  
**DRILL-STEM TEST TICKET**  
FILE: SPRINGCREEK18-1DST1

TIME ON: 15:51 7-11-16  
TIME OFF: 03:08 7-12-16

Company IA OPERATING, INC. Lease & Well No. SPRING CREEK #18-1  
Contractor DISCOVERY DRILLING CO., INC. RIG #2 Charge to IA OPERATING, INC.  
Elevation 2583 KB Formation LKC "B-F" Effective Pay \_\_\_\_\_ Ft. Ticket No. T541  
Date 7-11-16 Sec. 18 Twp. 6 S Range 25 W County GRAHAM State KANSAS  
Test Approved By JEFF LAWLER Diamond Representative TIM VENTERS

Formation Test No. 1 Interval Tested from 3680 ft. to 3742 ft. Total Depth 3742 ft.  
Packer Depth 3675 ft. Size 6 3/4 in. Packer depth \_\_\_\_\_ ft. Size 6 3/4 in.  
Packer Depth 3680 ft. Size 6 3/4 in. Packer depth \_\_\_\_\_ ft. Size 6 3/4 in.

Depth of Selective Zone Set \_\_\_\_\_  
Top Recorder Depth (Inside) 3668 ft. Recorder Number 5504 Cap. 5,000 P.S.I.  
Bottom Recorder Depth (Outside) 3739 ft. Recorder Number 11029 Cap. 5,025 P.S.I.  
Below Straddle Recorder Depth \_\_\_\_\_ ft. Recorder Number \_\_\_\_\_ Cap. \_\_\_\_\_ P.S.I.

Mud Type CHEMICAL Viscosity 48 Drill Collar Length 0 ft. I.D. 2 1/4 in.  
Weight 9.0 Water Loss 6.0 cc. Weight Pipe Length 311 ft. I.D. 2 7/8 in.  
Chlorides 1,000 P.P.M. Drill Pipe Length 3343 ft. I.D. 3 1/2 in.  
Jars: Make STERLING Serial Number 4 Test Tool Length 26 ft. Tool Size 3 1/2-IF in.  
Did Well Flow? NO Reversed Out NO Anchor Length 31 ft. Size 4 1/2-FH in.  
Main Hole Size 7 7/8 Tool Joint Size 4 1/2 XH in. Surface Choke Size 1 in. Bottom Choke Size 5/8 in.

Blow: 1st Open: GOOD 2 INCH BLOW, BUILDING, REACHING BOB 2 MIN. (BOB BB)  
2nd Open: WEAK 1/2 INCH BLOW, BUILDING, REACHING BOB 6 1/2 MIN. (NO BB)

Recovered 780 ft. of GIP  
Recovered 650 ft. of GO, 6% GAS, 94% OIL, GRAVITY: 36  
Recovered 680 ft. of G,SMCO, 4% GAS, 91% OIL, 5% MUD  
Recovered 310 ft. of G,W&VHMCO, 8% GAS, 39% OIL, 16% WATER, 37% MUD  
Recovered 310 ft. of G,SO&MCW, 4% GAS, 19% OIL, 65% WATER, 12% MUD

Price Job

Recovered 1950 ft. of TOTAL FLUID	CHLORIDES: 43,000 ppm	Other Charges
Remarks:	PH: 7.5	Insurance
	RW: .25 @ 55 deg.	
TOOL SAMPLE: 4% GAS, 94% OIL, 1% WATER, 1% MUD		Total

Time Set Packer(s) 6:22 PM	A.M. P.M.	Time Started Off Bottom 9:37 PM	A.M. P.M.	Maximum Temperature 114 deg.
Initial Hydrostatic Pressure.....	(A)	1760 P.S.I.		
Initial Flow Period..... Minutes	30 (B)	129 P.S.I. to (C)	439 P.S.I.	
Initial Closed In Period..... Minutes	45 (D)	1188 P.S.I.		
Final Flow Period..... Minutes	60 (E)	457 P.S.I. to (F)	760 P.S.I.	
Final Closed In Period..... Minutes	60 (G)	1191 P.S.I.		
Final Hydrostatic Pressure.....	(H)	1756 P.S.I.		

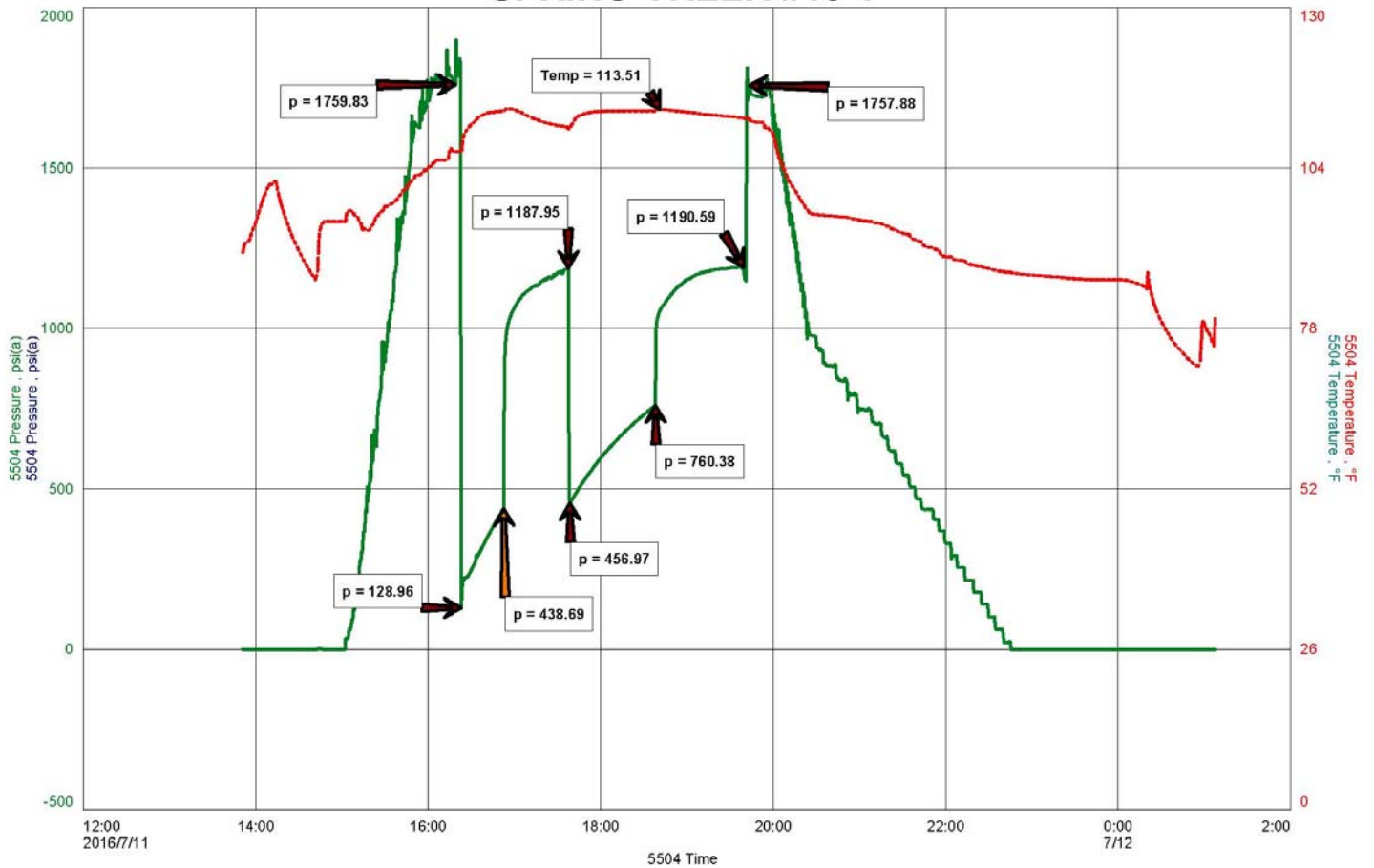
Diamond Testing shall not be liable for damages of any kind to the property or personnel of the one for whom a test is made or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statement or opinion concerning the result of any test. Tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.

### DST #1 CHART

IA OPERATING, INC.  
DST #1, LKC "B-F", 3680-3742  
Start Test Date: 2016/07/11  
Final Test Date: 2016/07/12

SPRING CREEK #18-1  
Formation: DST #1, LKC "B-F", 3680-3742  
Pool: WILDCAT  
Job Number: T541

### SPRING CREEK #18-1



### DST #2 LKC H-J 3766' - 3822'



P.O. Box 157  
**HOISINGTON, KANSAS 67544**  
 (800) 542-7313  
**DRILL-STEM TEST TICKET**  
 FILE: SPRINGCREEK18-1DST2

TIME ON: 14:58  
 TIME OFF: 23:18

Company IA OPERATING, INC. Lease & Well No. SPRING CREEK #18-1  
 Contractor DISCOVERY DRILLING CO., INC. RIG #2 Charge to IA OPERATING, INC.  
 Elevation 2583 KB Formation LKC "H-J" Effective Pay \_\_\_\_\_ Ft. Ticket No. T542  
 Date 7-12-16 Sec. 18 Twp. \_\_\_\_\_ 6 S Range \_\_\_\_\_ 25 W County GRAHAM State KANSAS  
 Test Approved By JEFF LAWLER Diamond Representative TIM VENTERS

Formation Test No. 2 Interval Tested from 3766 ft. to 3822 ft. Total Depth 3822 ft.  
 Packer Depth 3761 ft. Size 6 3/4 in. Packer depth \_\_\_\_\_ ft. Size 6 3/4 in.  
 Packer Depth 3766 ft. Size 6 3/4 in. Packer depth \_\_\_\_\_ ft. Size 6 3/4 in.

Depth of Selective Zone Set \_\_\_\_\_  
 Top Recorder Depth (Inside) 3754 ft. Recorder Number 5504 Cap. 5,000 P.S.I.  
 Bottom Recorder Depth (Outside) 3819 ft. Recorder Number 11029 Cap. 5,025 P.S.I.  
 Below Straddle Recorder Depth \_\_\_\_\_ ft. Recorder Number \_\_\_\_\_ Cap. \_\_\_\_\_ P.S.I.

Mud Type CHEMICAL Viscosity 53 Drill Collar Length 0 ft. I.D. 2 1/4 in.  
 Weight 8.9 Water Loss 8.0 cc. Weight Pipe Length 311 ft. I.D. 2 7/8 in.  
 Chlorides 900 P.P.M. Drill Pipe Length 3429 ft. I.D. 3 1/2 in.  
 Jars: Make STERLING Serial Number 4 Test Tool Length 26 ft. Tool Size 3 1/2-IF in.  
 Did Well Flow? NO Reversed Out NO Anchor Length 24 ft. Size 4 1/2-FH in.  
 Main Hole Size 7 7/8 Tool Joint Size 4 1/2 XH in. <sup>32' DP IN ANCHOR</sup> Surface Choke Size 1 in. Bottom Choke Size 5/8 in.

Blow: 1st Open: WEAK 1/4 INCH BLOW, BUILDING, REACHING BOB 10 MIN. (WS BB)  
 2nd Open: WEAK 1/2 INCH BLOW, BUILDING, REACHING BOB 13 1/2 MIN. (3" BB)

Recovered 765 ft. of GIP  
 Recovered 355 ft. of GO, 2% GAS, 98% OIL, GRAVITY: 35  
 Recovered 185 ft. of G,HMCO, 18% GAS, 50% OIL, 32% MUD  
 Recovered 540 ft. of TOTAL FLUID

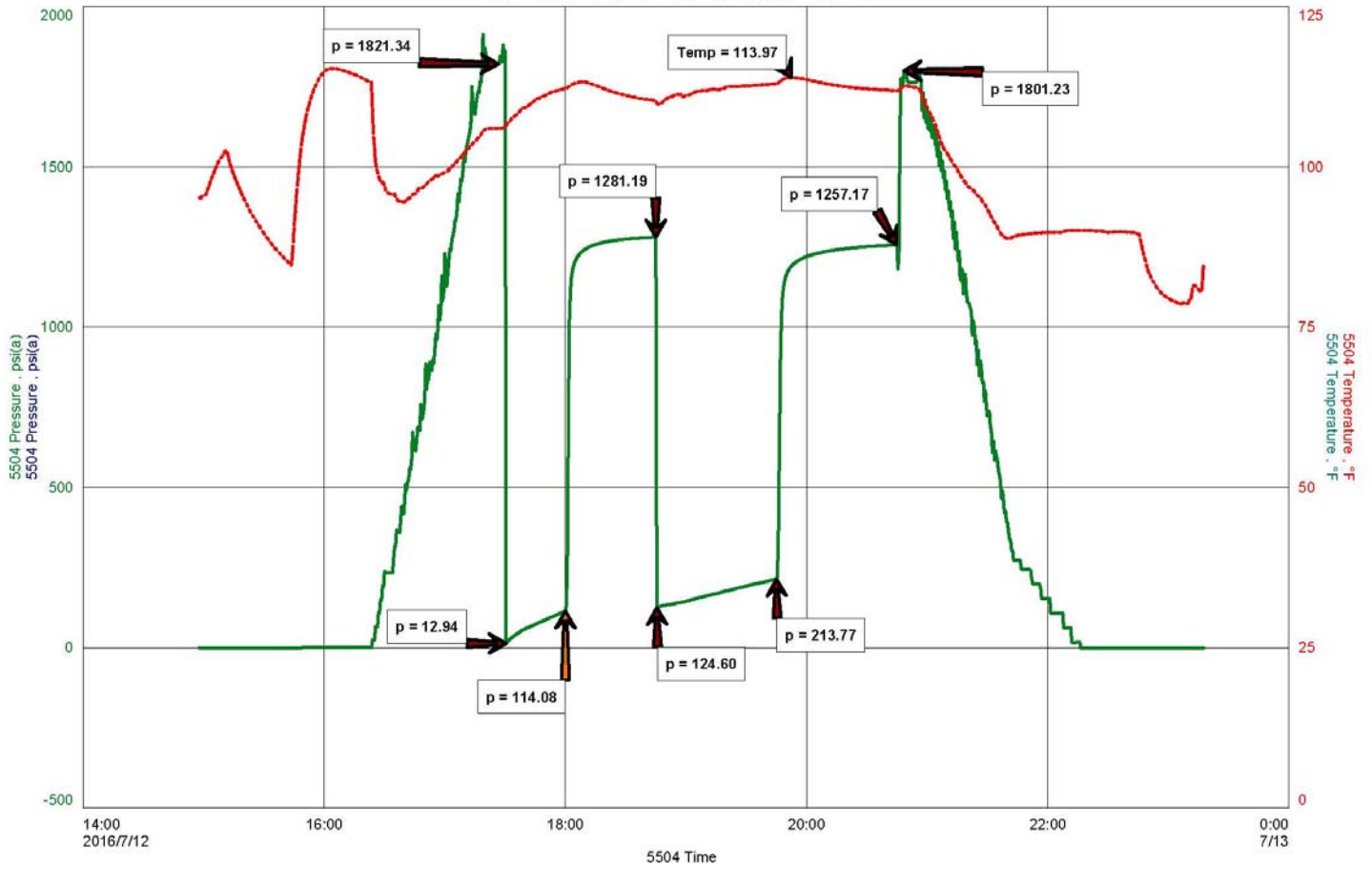
Recovered _____ ft. of _____	Price Job
Recovered _____ ft. of _____	Other Charges
Remarks: _____	Insurance
TOOL SAMPLE: 91% OIL, 9% MUD	Total

Time Set Packer(s) 5:30 PM A.M. P.M. Time Started Off Bottom 8:45 PM A.M. P.M. Maximum Temperature 114 deg.  
 Initial Hydrostatic Pressure..... (A) 1821 P.S.I.  
 Initial Flow Period..... Minutes 30 (B) 13 P.S.I. to (C) 114 P.S.I.  
 Initial Closed In Period..... Minutes 45 (D) 1281 P.S.I.  
 Final Flow Period..... Minutes 60 (E) 125 P.S.I. to (F) 214 P.S.I.  
 Final Closed In Period..... Minutes 60 (G) 1257 P.S.I.  
 Final Hydrostatic Pressure..... (H) 1801 P.S.I.

Diamond Testing shall not be liable for damages of any kind to the property or personnel of the one for whom a test is made or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statement or opinion concerning the result of any test. Tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.

**DST #2 CHART**

# SPRING CREEK #18-1



C:\Users\Diamond\Desktop\DRILL STEM TESTS\SPRINGCREEK18-1DST2.FKT 13-Jul-16 Ver



## ROCK TYPES

- Cht shale, gry
- Carbon Sh shale, red
- Arg/Shale

## ACCESSORIES

### STRINGER

- Sandstone

## OTHER SYMBOLS

### MISC

- Daily Report
- Digital Photo
- Document
- Folder
- Link
- Vertical Log File
- Horizontal Log File
- Core Log File
- Drill Cuttings Rpt

### DST

- DST Int
- DST alt

Printed by GEOstrip VC Striplog version 4.0.8.15 (www.grsi.ca)

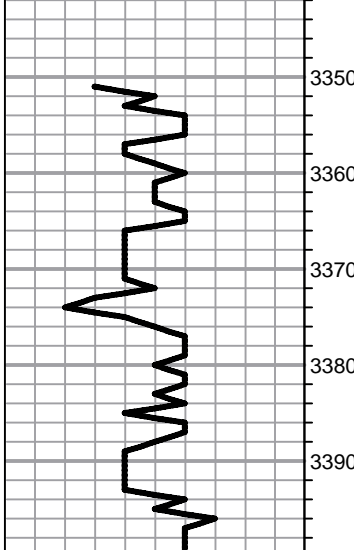
Curve Track #1							Curve Track #3
ROP (min/ft)		Depth   Intervals	DST	Lithology	Oil Show	Geological Descriptions	
Gamma (API)							
Cal (in)							

Cored Interval  
DST Interval

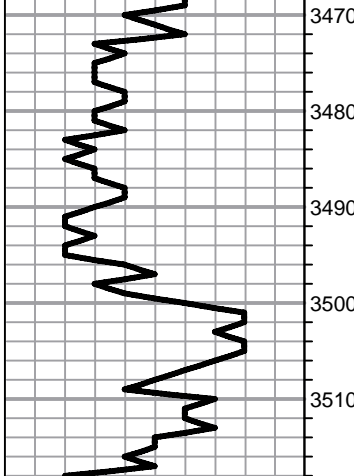
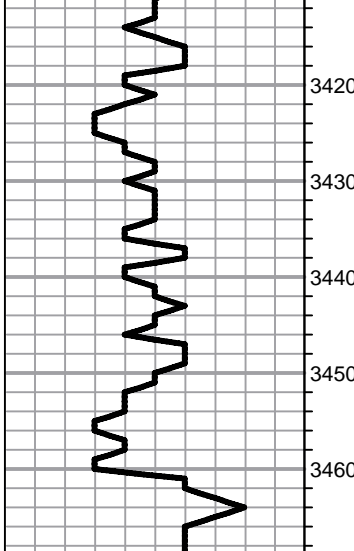
1:240 Imperial

1:240 Imperial

0 ROP (min/ft) 5  
0 Gamma (API) 150  
6 Cal (in) 16



0 ROP (min/ft) 5  
0 Gamma (API) 150  
6 Cal (in) 16



**1' DRILL TIME THROUGH ANHYDRITE  
1' DRILL TIME FROM 3350' - RTD  
10' WET/DRY SAMPLES FROM 3420' - RTD**

**GEOLOGICAL SUPERVISION BY JEFF LAWLER**

**8 5/8" SURFACE PIPE SET @ 307'**

**ANHYDRITE TOP 2167' (+416) E-LOG 2167' (+416)  
ANHYDRITE BASE 2202' (+381) E-LOG 2199' (+384)**

Lm- Cream Buff, VFXLN, dense, well cemented, mostly tight w/ poor vis. porosity, few pcs sl chalky in part

Lm- Cream Off White, VF-FXLN, fsl, some arenaceous in part, loosely cemented w/ sctrd interXLN porosity, clean & barren, Sh- Gray Maroon, dense & waxy

Lm- A/A w/ tan mostly tight oolitic w/ clear cementation, min. vis. porosity, several pcs of granular & sl oolitic w/ mod. well inter oolite porosity, some chalky in part

Sh- Mint Green Maroon, dense & waxy, soft & earthy

Lm- Lt Pink Cream & Yellow, dense, well cemented w/ dense reXLN, oolitic w/ sctrd XLN porosity & secondary clear reXLN porosity, barren

Lm- Off White, VF-FXLN, dense, well cemented, mostly oolitic w/ sctrd XLN porosity, clean & barren, some soft white chalk

Lm- A/A w/ several pcs of salmon/white cherty oolitic Ls w/ min. vis. porosity, few pcs of clear, sub-rounded loosely cemented consolidated & well sorted Ss. w/ consistent porosity, barren

Lm- Cream Off White, FXLN, massive, oolitic, loosely cemented, sctrd XLN porosity, barren

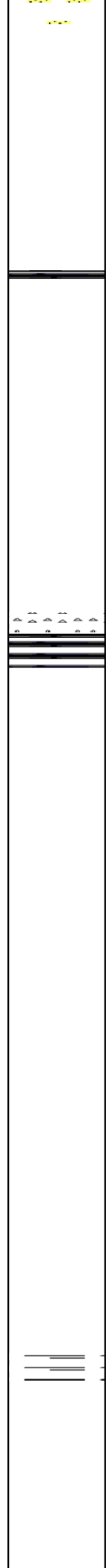
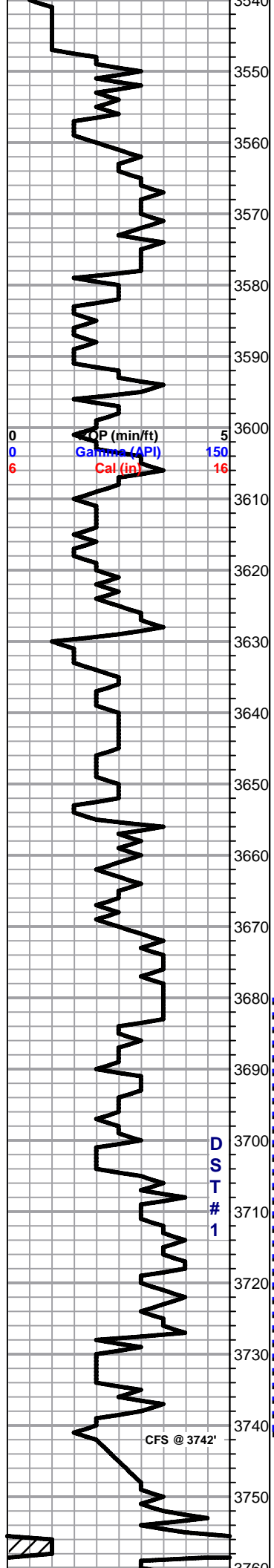
Sh- Black Gray Green Maroon, soft, earthy, dense & waxy

**TOPEKA 3477' (-894) E-LOG 3472' (-889)**

Lm- Cream Off White, FXLN, dense, oolitic, mod. dev. w/ dense XLN porosity, barren

Lm- Cream Buff, VF-FXLN, dense, well cemented, sl fsl, poor vis. porosity, earthy

Sh- Black Gray Maroon, carbonaceous, gritty & earthy



Ss- Frosted Tan, Vf Grn, dense, mod. well cemented, consolidated & well sorted, sub-rounded, barren

Sh- Maroon, gritty & earthy Ss- Brown/Maroon, Fn Grn, loosely cemented

Lm- Cream Tan, FXLN, fsl, mod. dev. w/ dense XLN porosity & clear replacement porosity, barren, soft white chalk

Sh- Black Maroon Green, carbonaceous, gritty & earthy, waxy

Lm- Cream Off White, FXLN, oolitic, mod. well dev. w/ sctrd XLN & fn ppt porosity, clear replacement cementation

Lm- Cream Buff, VF-FXLN, dense, well cemented & mostly tight w/ sctrd XLN porosity, barren

Lm- Cream Off White, VF-FXLN, densely packed small oolites, poorly dev. w/ clear replacement cementation, massive, sctrd XLN porosity, barren

Lm/Chert- Translucent Gray, CryptoXLN, porcelain like chert/cherty Ls w/o vis. porosity/matrix

**HEEBNER 3629' (-1046) E-LOG 3628' (-1045)** Sh- Black Maroon Green, fissile & carbonaceous, gritty & earthy

**TORONTO 3652' (-1069) E-LOG 3650' (-1067)** Lm- Buff Cream, FXLN, dense, well cemented, poorly dev. w/ sctrd XLN porosity, barren, much soft white chalk

Sh- Maroon Green, gritty & earthy, waxy & dense

**LKC 3670' (-1087) E-LOG 3678' (-1084)** Lm- Off White, VF-FXLN, mostly dense & tight, some fsl & sl oolitic, poorly dev. w/ sctrd XLN porosity, vry clean & barren

Lm- Cream Off White, VF-FXLN, dense, poorly dev. & mostly tight w/ sctrd XLN porosity

Sh- Maroon Gray, gritty & earthy

Lm- Cream Off White, FXLN, fsl & oolitic, mod. well dev. w/ sctrd inter oolite ppt porosity, SCTRD DRK - SUB SAT. STN, TR FO, WK-FR ODR

Lm- Cream Off White, FXLN, fsl, well cemented, sctrd inter fsl ppt porosity, reXLN w/in porosity, SCTRD LT STN, NSFO, WK ODR

Lm- Cream Buff, VF-FXLN, dense, well cemented & mostly tight w/ poor vis. porosity, barren

Sh- Marron argillaceous clumps

Lm- Tan Cream, F-MEDXLN, well dev. & oolitic w/ mostly consistent ppt inter oolite porosity, few w/ sctrd reXLN w/in porosity, SCTRD LT-DRK STN, TR FO UPON CRUSH, WK-FR ODR, SL INCREASED IN 40 min. SAMPLE

**\*\*AUTO DRILLER PROBLEMS / DRILL TIME ERRACT\*\***

Lm/Chert- Bone White Milky Gray, fresh bedded vitreous chert & loosely cemented chalky Ls w/ poor vis. porosity, all vry clean & barren

SHORT TRIP SURVEY 1 1/4 dgr

DST #1 LKC B-F  
3680' - 3742'  
30-45-60-60

1950' TF  
780' GIP  
650' GO  
(6%G, 94%O)  
GRAVITY: 36 API

680' GSMCO  
(4%G, 91%O, 5%M)

310' GW&HMCO  
(8%G, 39%O, 16%W, 37%M)

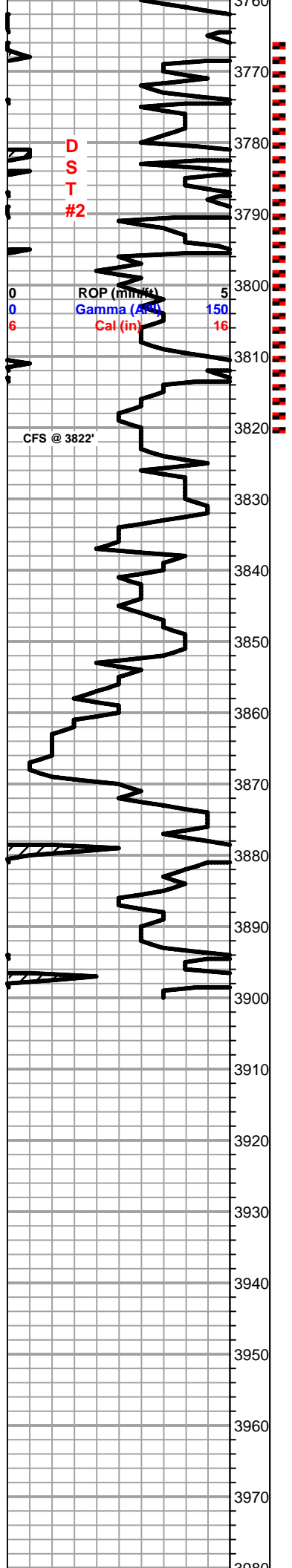
310' GSO&MCW  
(4%G, 19%O, 65%W, 12%M)

IFP: 129-439#  
FFP: 457-760#  
SIP: 1188-1191#



DST #2 LKC H-J  
3786' - 3822'  
30-45-60-60

765' GIP  
540' TOTAL FLUID



Lm- Tan Buff Gray, VF-FXLN, dense, well cemented, sl fsl, tight w/ sctrd XLN porosity

Sh- Black Maroon Gray Green, fissile & carbonaceous, gritty & earthy, argillaceous clumps

Lm/Dolo-Tan, VF-FXLN, dense, well cemented, micro pyrite inclusions, sctrd dev. & ppt porosity, some w/ reXLN veins, DRK STN, GD SHW GSY FO UPON CRUSH, FR ODR, dense well cemented dolomite w/ consistent XLN porosity, barren

Lm/Chert- Cream Off White, VF-FXLN, dense, well cemented, mostly tight w/ poor vis. porosity, fresh bedded vitreous chert

Sh- Gray Maroon, gritty & earthy, gummy argillaceous clumps

Lm- Cream Tan, F-MEDXLN, mix of sctrd dev. oolitic Ls w/ sctrd ppt & XLN porosity, SCTRDRK STN, TR FO & dense, poorly dev. cream Ls w/ sctrd XLN porosity, BLK RESIDUAL TARRY STN, NSFO, ALL W/ FR 3822' 40 min.- Lm- Cream, well dev. oolitic w/ consistent ppt inter oolite porosity, SCTRDRK STN, FR SFO UPON CRUSH, FR ODR

Lm- Off White, VF-FXLN, sl fsl, dense, poorly dev. w/ sctrd XLN porosity, barren

Sh- Maroon Gray, dense & waxy, gritty & earthy

Lm- Cream Off White, VF-FXLN, poorly dev. mix of well cemented w/ sctrd XLN porosity & loosely cemented & chalky w/ min. vis. porosity, vry clean & barren

**BKC 3953' (-1270) E-LOG 3852' (-1269)** Sh- Maroon Gray, gritty & earthy, dense & waxy, some pebbly

Sh/Ss- Sh A/A, Ss- Lt Green, Vf Grn, consolidated & mod. cemented, sub-rounded to rounded, consistent intergranular porosity, barren, some argillaceous clumps of maroon shale

Lm- Cream Buff Tan, VF-FXLN, dense, well cemented, mostly tight w/ min. vis. to sctrd XLN porosity, some w/ glauconite inclusions, barren

Sh- Maroon Gray Green, gritty & earthy, dense & waxy

Sh- A/A w/ argillaceous clumps

**RTD 3900' (-1317) LTD 3903' (-1320) @ 06:49 7/13/2016**

355' CLN OIL  
(2% G, 98% O)  
185' GSY HMCO  
(18% G, 50% O, 32% M)

IFP: 13-114#  
FFP: 125-214#  
SIP: 1281-1257#

H.jpg

J.jpg

J\_2.jpg



3900

3990

C.jpg

A002 1280x1024 2016/07/11 09:21:12 Unit: mm Magnification: 96.9 x 1



C X 25



0.5 mm

D X 35





0.5 mm

H X 25

J.jpg

A007 1280x1024 2016/07/12 13:10:40 Unit: mm Magnification: 96.9 x 1



J X 20

J\_2.jpg

A008 1280x1024 2016/07/12 13:39:22 Unit: mm Magnification: 96.9 x 1



J x 20