

Geologic Report  
**Aaron L. Young**

Drilling Time and Sample Log

**Scale 1:240 (5"=100') Imperial  
Measured Depth Log**

**Well Name:** The Sisters #1-15  
**API:** 15-101-22597  
**Location:** Section 15 - T19S - R27W  
**License Number:** 31652  
**Spud Date:** 9 / 5 / 2017  
**Surface Coordinates:** 1725' FNL and 1095' FWL  
Approx. SE - NE - SW - NW  
**Bottom Hole  
Coordinates:**  
**Ground Elevation (ft):** 2652'      **K.B. Elevation (ft):** 2659'  
**Logged Interval (ft):** 3800'      **To:** 4631'      **Total Depth (ft):** 4631'  
**Formation:** Mississippi  
**Type of Drilling Fluid:** Chemical - MudCo

**Region:** Lane Co., KS  
**Drilling Completed:** 9 / 15 / 2017

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

**OPERATOR**

**Company:** Norstar Petroleum, Inc.  
**Address:** 88 Inverness Cir E. Unit F104  
Englewood, CO 80112 + 5514

**GEOLOGIST**

**Name:** Aaron L. Young, M. S.  
**Company:** Young Consulting LLC  
**Address:** 100 S Main Ste 505  
Wichita, KS 67202

**General Info**

**CONTRACTOR:** Pickrell Drilling, Rig #10

**BIT RECORD:**

No.	Size	Make	Jets	Out	Feet	Hours
1	12-1/4	JZ RR	16-16-16	307'	300'	3.5
2	7-7/8	JZ HA20	15-15-15	4650'	4331'	123.0

**SURVEYS:** 307'-.5, 919'-.75, 1388'-.75, 1919'-.5, 2419'-.75, 2919'-.75, 4510'-1, 4584'-.5

**GENERAL DRILLING AND PUMP INFORMATION:**

Drilling with 38,000 -40,000 lbs. on bit and approx 60-70 RPM.  
Running 10 stands of collars; 598.49'  
Pumping approx 800 psi at standpipe.

## Daily Status

9/1/17 - MIRU, shut down until 9/5/17

9/5/17 - Spud @ 9:15am, Drilled to 307', ran 7 jts of new 8 5/8" 23# surface casing set @ 302', cemented w/ 185 sx. Standard, w/ 2% gel & 3% CC, cem circ. WOC

9/6/17 - Drilling, @ 470'

9/7/17 - Drilling, @ 1919'

9/8/17 - Drilling, @ 2650'

9/9/17 - Drilling, @ 3252'

9/10/17 - Drilling, @ 3805'

9/11/17 - CFS @ 4253'

9/12/17 - Drilling, @ 4492', DST #1

9/13/17 - TOOH, @ 4510', DST #2

9/14/17 - Drilling, @ 4584'

9/15/17 - RTD, @ 4631' DST #3 Straddle Test, DST #4 Straddle Test

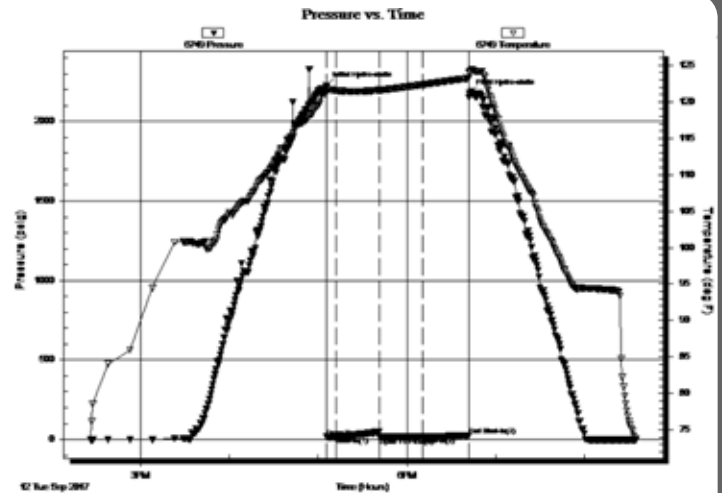
9/16/17 - Plugged w/ 50 sx at 2030', 80 sx at 1170', 40 sx at 600', 50 sx at 330', 20 sx at 60', 30 sx in rathole. All cement 60/40 POZ w/ 4% gel, 1/4# floeal. Plug down at 8:45am on 8/16/17. Released rig.

**DST #1 FT. SCOTT 4480' - 4510'**  
5" - 30" - 30" - 30"

IF: Weak surface blow, died in 3 min  
ISI: No Blow  
FF: No Blow  
FSI: No Blow

Rec'd: 2' Mud

SIP: 50-25# FP: 15-46#, 16-16# HP: 2226-2175#

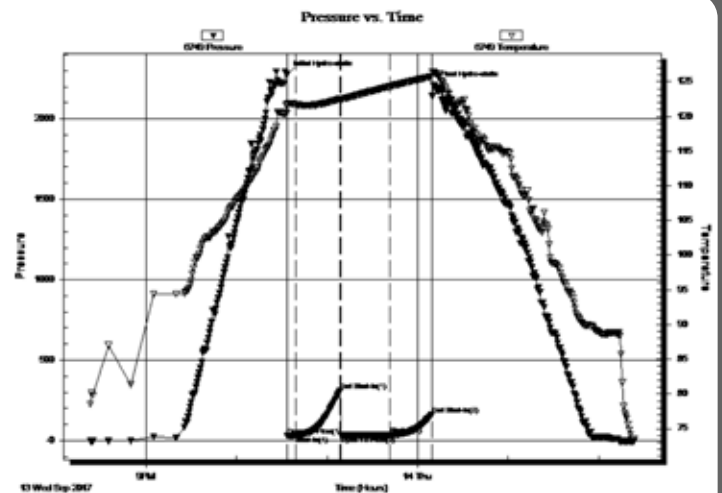


**DST #2 CHEROKEE SAND 4534' - 4584'**  
5" - 30" - 30" - 30"

IF: Weak surface blow  
ISI: No Blow  
FF: No Blow  
FSI: No Blow

Rec'd: 5' Mud

SIP: 308-162# FP: 31-32#, 32-33# HP: 2273-2205#



**DST #3**  
**WRONG INTERVAL TESTED**

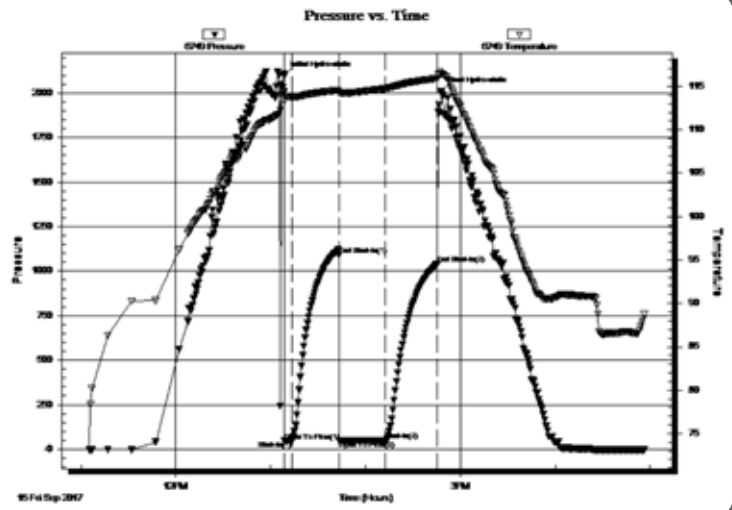
TEST INTENDED TO BE LKC 'J' ZONE STRADDLE TEST AFTER LOGS, AN EXTRA STAND WAS PUT IN THE TAIL, MOVING TEST INTERVAL UP APPROX 63'

4147' - 4169'  
 5" - 30" - 30" - 30"

IF: Built to weak surface blow  
 ISI: No Blow  
 FF: No Blow  
 FSI: No Blow

Rec'd: 70' Mud

SIP: 1090-1042# FP: 47-47#, 48-49# HP: 2096-2011#



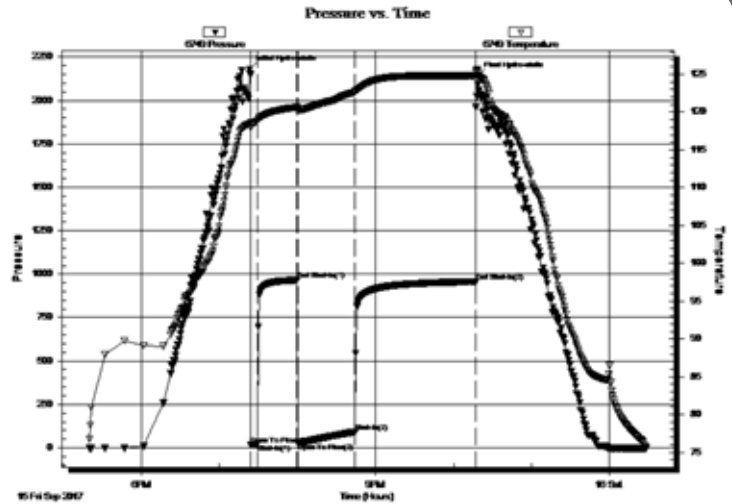
**DST #4 LKC 'J' STRADDLE TEST AFTER LOGS**

4210' - 4232'  
 5" - 30" - 45" - 90"

IF: Built to 2"  
 ISI: No Blow  
 FF: Built to 4"  
 FSI: No Blow

Rec'd: 124' MCW (10% M, 90% W), 62' WCM (30% W, 70% M)

SIP: 966-957# FP: 18-24#, 28-92# HP: 2180-2141#



**ROCK TYPES**

- Anhy
- Bent
- Brec
- Cht
- Clyst
- Coal
- Congl
- Dol

- Gyp
- Igne
- Lmst
- Meta
- Mrlst
- Salt
- Shale
- Shcol

- Shgy
- Sltst
- Ss
- Till
- Carb sh
- Dol
- Dtd
- Gry sh

- Sandylms
- Shale
- Sltstn
- Shlyslts
- SltysH
- Lms

### ACCESSORIES

#### MINERAL

- Anhy
- Arggrn
- Arg
- Bent
- Bit
- Brecfrag
- Calc
- Carb
- Chtdk
- Chtlt
- Dol
- Feldspar
- Ferrpel
- Ferr
- Glau
- Gyp
- Hvymin
- Kaol
- Marl
- Minxl
- Nodule
- Phos
- Pyr



- Salt
- Sandy
- Silt
- Sil
- Sulphur
- Tuff
- Chlorite
- Dol
- Sand
- Silty

#### FOSSIL

- Algae
- Amph
- Belm
- Bioclst
- Brach
- Bryozoa
- Cephal
- Coral
- Crin
- Echin
- Fish
- Foram



- Fossil
- Gastro
- Oolite
- Ostra
- Pelec
- Pellet
- Pisolite
- Plant
- Strom
- Fuss
- Oomold

#### STRINGER

- Anhy
- Arg
- Bent
- Coal
- Dol
- Gyp
- Ls
- Mrst
- Sltstrg
- Ssstrg
- Carbsh



- Clystn
- Dol
- Grysh
- Gryslt
- Lms
- Sandylms
- Sh
- Sltstn

#### TEXTURE

- Boundst
- Chalky
- Cryxln
- Earthy
- Finexln
- Grainst
- Lithogr
- Microxln
- Mudst
- Packst
- Wackest

### OTHER SYMBOLS

#### POROSITY TYPE

- Earthy
- Fenest
- Fracture
- Inter
- Moldic
- Organic
- Pinpoint
- Vuggy

#### SORTING

- Well
- Moderate
- Poor

#### ROUNDING

- Rounded
- Subrnd
- Subang
- Angular

#### OIL SHOWS

- Even
- Spotted
- Ques
- Dead
- Gas show

#### INTERVALS

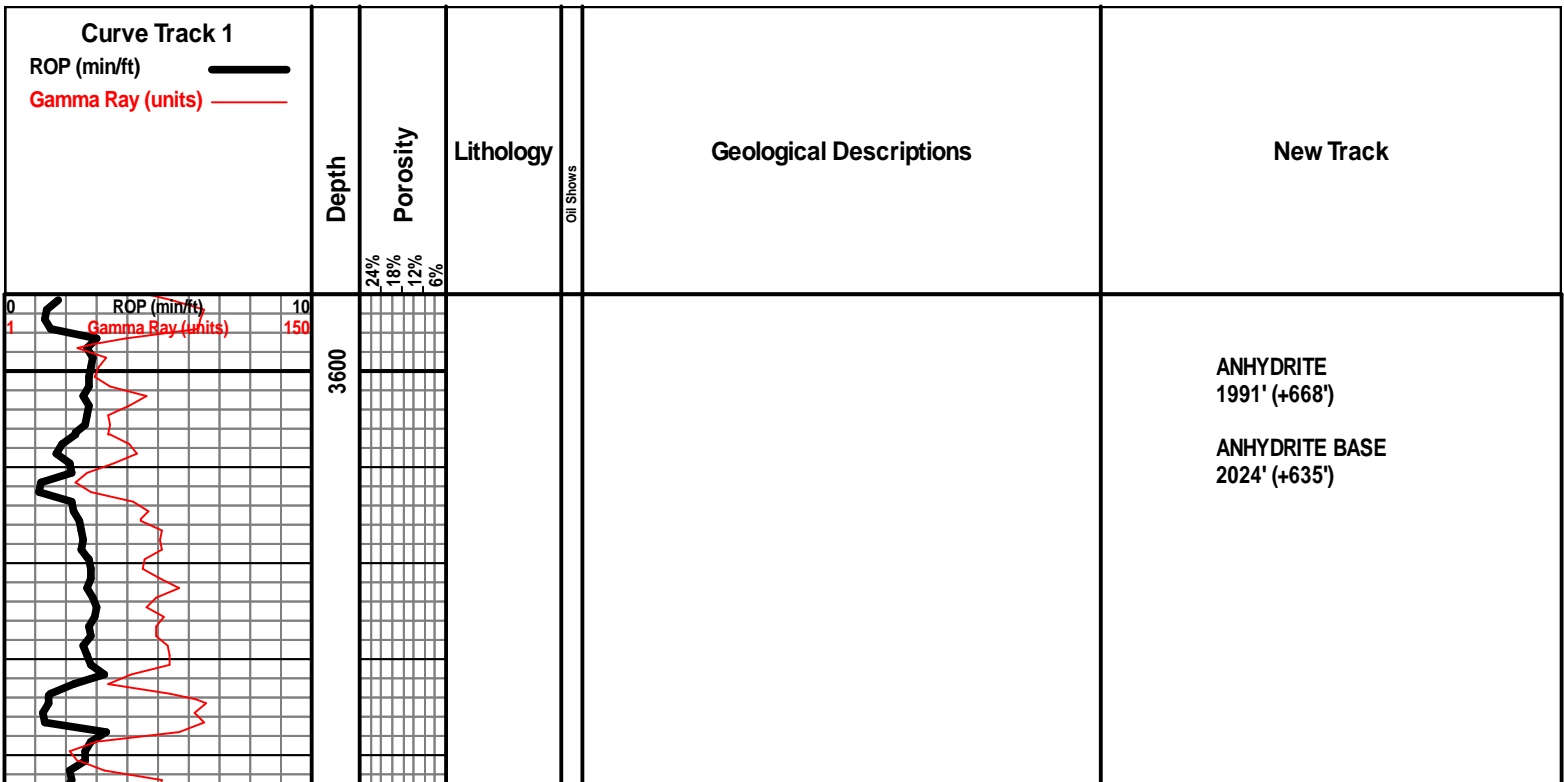
- Core
- Dst



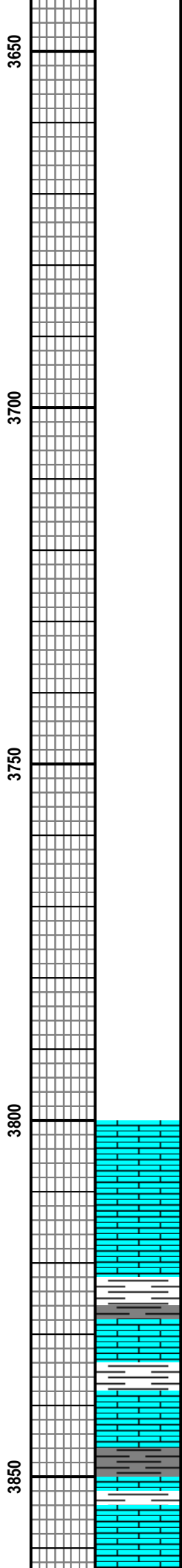
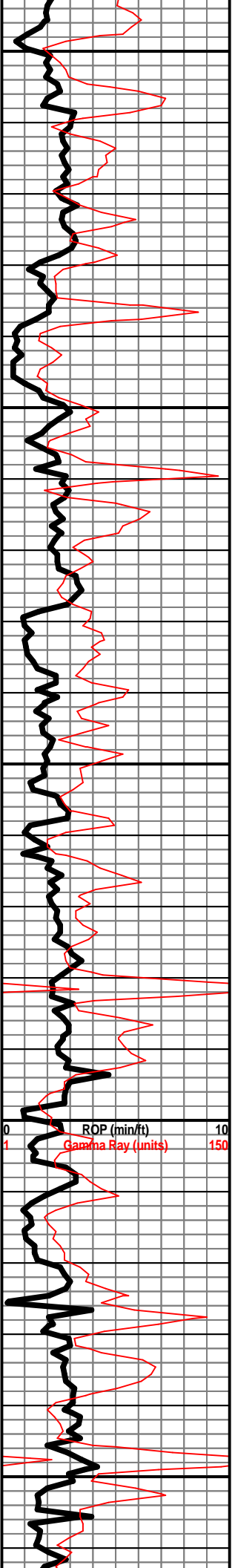
Dst

#### EVENTS

- Rft
- Sidewall
- Conn



ELECTRONIC DRILL  
TIME TAKEN



LS - TAN / BRN, F XLN, MOD DNS / DNS, ABUND  
FOSS, PYRITIC IN PT

LS - TAN, F / M XLN, DNS, FOSS IN PT

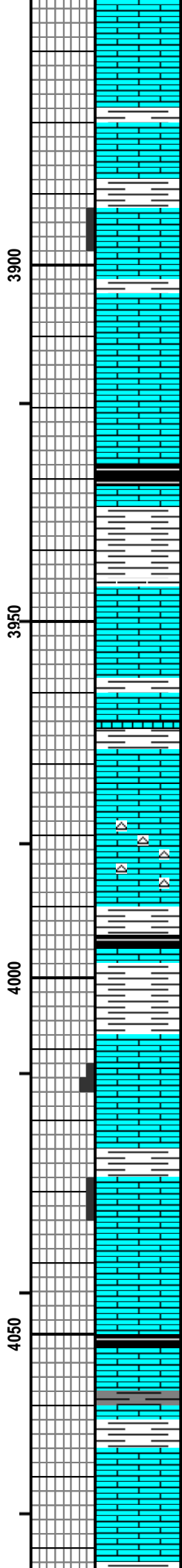
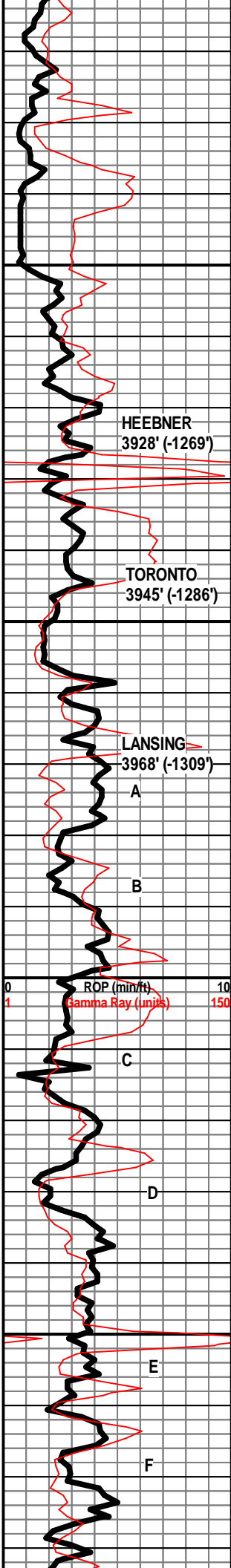
LS - CRM / TAN, F XLN, MOD DNS / DNS, ABUD FOSS,  
LRG FUSIL, W/ CHT - WHT / TAN / CLR IN PT, FRSH,  
PRED OPAQ, TRANSLUCNT IN PT, W/ CHT - LT GY /  
DK GY

LS - TAN / CRM / WHT, VF XLN, SUBCHKY, CHKY IN  
PT, W/ SH - LT GRN / GY

SH - DK GY, W/ LS - TAN / GY, VF / F XLN, MOD DNS /  
DNS, FOSS

LS - TAN / LT BRN, F XLN, DNS, FOSS, W/ SH - LT  
GRN / GY

LS - DK TAN / GY, F XLN, DNS, PYRITIC IN PT



LS - DK TAN / GY, F XLN, DNS, PYRITIC IN PT

LS - CRM / TAN / LT BRN, F XLN, MOD DNS / DNS, FOSS, STYLOLITIZED IN PT

LS - CRM / TAN, F XLN, MOD DNS, ABUND FOSS

LS - CRM / TAN, F XLN, MOD DNS, P INTRAMOLDIC POR IN PT, ABUND FOSS

SH - GY, W/ LS - CRM / TAN, VF / F XLN, MOD DNS, FOSS

LS - GY / BRN, F XLN, MOD DNS / DNS, FOSS, W/ LS - WHT - VF XLN, CHKY

LS - TAN / BRN, F XLN, MOD DNS / DNS, FOSS

SH - BLK, CARB

LS - TAN / GY, F XLN, W/ SH - LT GY / GRN

LS - CRM / TAN, F XLN, MOD DNS / DNS, FOSS, W/ SH - GY / GRN

LS - CRM / TAN, F XLN, MOD DNS / SUBCHKY, FOSS

LS - WHT / CRM, VF / F XLN, SUBCHKY / CHKY, MOD DNS IN PT, FOSS IN PT, W/ SH - GRN / RD

LS - CRM / TAN, F XLN, DNS, OOLITIC, ABUND FOSS, VOIDS FILLED W/ CALCTE

LS - CRM / TAN, F XLN, DNS, OOLITIC, FOSS, W/ CHT - CRM / TAN / GY, FRSH, SLI TRANSLUCNT

SH - RD / GRN / GY, W/ SH - BLK, V SLI CARB

SH - GRN / GY / RD

LS - TAN, F XLN, MOD DNS / DNS, FEW PIECES W/ P VUG + INTXLN POR, NS, NO ODOR, W/ CHT - WHT / GY / BRN, FRSH, PRED OPAQ, SLI TRANSLUCNT IN PT

SH - LT GY / DK GY, W/ LS - WHT / CRM, VF / F XLN, SUBCHKY / CHKY, V CHKY IN PT

LS - CRM, VF / F XLN, MOD DNS / DNS, FEW PIECES W/ P INTXLN POR, NS, NS ODOR, ABUND FOSS

LS - CRM / TAN, F XLN, MOD DNS / DNS, FOSS IN PT

SH - DK GY / BLK, CARB, W/ LS - TAN / LT GY, F XLN, DNS, FOSS IN PT

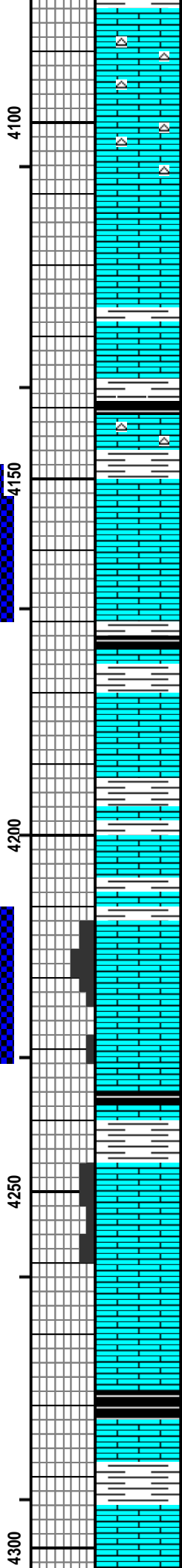
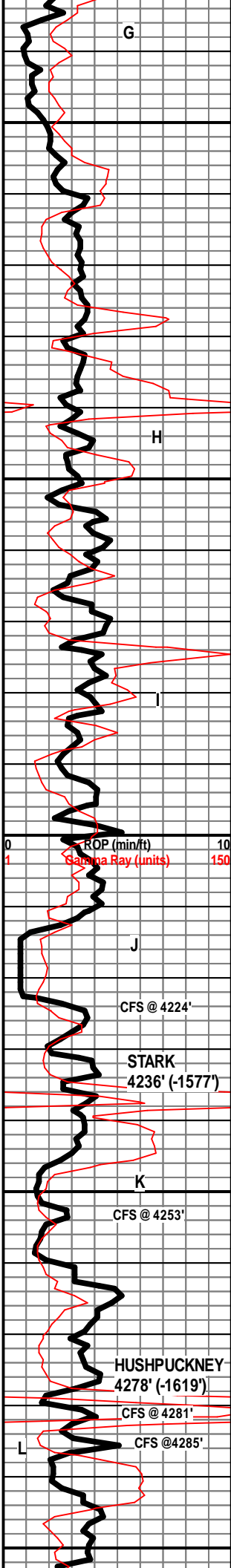
SH - DK GY, CARB, W/ SH - RD / GRN, W/ LS - TAN / LT BRN, F XLN, MOD DNS, ABUND OF CALCTE FILLED CRACKS + FOSS MOLDS

LS - WHT / CRM, VF XLN, SUBCHKY / CHKY

LS - TAN, F XLN, MOD DNS / DNS, ABUND STYLOLITES, FOSS IN PT

WT 8.9  
VIS 59  
LCM 2#

WT 8.9  
VIS 66  
LCM 2#



LS - CRM / WHT, VF / F XLN, MOD DNS / SUBCHKY, CHKY IN PT, W/ SH - GRN  
 LS - CRM / TAN, VF XLN, MOD DNS, SUBCHKY IN PT, FOSS IN PT, W/ CHT - WHT / TAN, FRSH, PRED OPAQ, TRANSLUCNT IN PT  
 LS - TAN, VF / F XLN, MOD DNS / SUBCHKY IN PT, FOSS, W/ CHT - WHT / CLR, FRSH, TRANSLUCNT & OPAQ  
 LS - TAN / GY, F XLN, MOD DNS / DNS, FOSS, W/ SH - GRN / RD  
 LS - GY, VF / F XLN, SUBCHKY  
 SH - BLK, CARB, W/ SH - GY, W/ LS - TAN / GY, F XLN DNS, W/ CHT - WHT, PRED OPAQ, TRANSLUCNT IN PT  
 SH - RD, W/ LS - CRM / WHT, VF / F XLN, SUBCHKY / CHKY  
 LS - CRM / WHT, VF XLN, SUBCHKY / CHKY  
 SH - RD / GRN, W/ SH - BLK, SLI CARB, W/ LS - TAN / GY, F XLN, DNS, FOSS  
 LS - CRM / TAN, VF / F XLN, MOD DNS / SUBCHKY  
 LS - TAN / LT BRN, F XLN, DNS, FOSS, W/ SH - GRN / GY  
 LS - WHT / CRM, F XLN, MOD DNS / SUBCHKY, W/ SH - GY  
 LS - CRM / WHT, F XLN, SUBCHKY / MOD DNS, W/ SH - GY  
 LS - CRM / TAN, F XLN, F / G INTXLN + OOLMOLDIC POR, PRED OOLMOLDIC, VUG POR IN PT, FOSS, NS, NO ODOR, V SLI YEL-GRN FLUOR  
 LS - CRM / TAN, VF / F XLN, DNS IN PT, PRED MOD DNS / SUBCHKY  
 SH - DK GY / BLK, SLI CARB  
 LS - CRM / TAN, FXLN, DNS, ABUND FOSS, OOLITIC, P OOLMOLDIC POR IN PT, NS, NO ODOR, W/ SH - GY / GRN  
 LS - CRM / TAN, F XLN, PRED OOL, FOSS, G OOLMOLDIC POR, P / F INTXLN POR, NS, NO ODOR  
 LS - TAN / BRN, F XLN, DNS, FOSS IN PT  
 SH - BLK, CARB, W/ LS - CRM / TAN, VF / F XLN, MOD DNS / SUBCHKY  
 LS - GY / BRN, F XLN, DNS, ABUND FOSS, NS, NO ODOR, NO FLUOR  
 LS - CRM / TAN, VF / F XLN, MOD DNS / SUBCHKY IN PT, FOSS IN PT, NS, NO ODOR, W/ SH - GRN / GY  
 LS - TAN / GY, VF / F XLN, MOD DNS / SUBCHKY, FOSS IN PT, NO VIS POR, NS, NO ODOR, SLI

DST #3  
 WRONG INTERVAL TESTED  
 TEST INTENDED TO BE LKC 'J' ZONE STRADDLE TEST AFTER LOGS, AN EXTRA STAND WAS PUT IN THE TAIL, MOVING TEST INTERVAL UP APPROX 63'

4147' - 4169'  
 5" - 30" - 30" - 30"

IF: Built to weak surface blow  
 ISI: No Blow  
 FF: No Blow  
 FSI: No Blow

Rec'd: 70' Mud

IH: 2096#  
 IF: 47-47#  
 ISI: 1090#  
 FF: 48-49#  
 FSI: 1042#  
 FH: 2011#

DST #4 LKC 'J' STRADDLE TEST AFTER LOGS

4210' - 4232'  
 5" - 30" - 45" - 90"

IF: Built to 2"  
 ISI: No Blow  
 FF: Built to 4"  
 FSI: No Blow

Rec'd: 124' MCW (10% M, 90% W), 62' WCM (30% W, 70% M)

IH: 2180#  
 IF: 18-24#  
 ISI: 966#  
 FF: 28-92#  
 FSI: 957#  
 FH: 2141#

WT 9.2  
 VIS 57  
 LCM 1#

WT 9.2  
 VIS 63  
 LCM 2#

WT 9.2  
 VIS 50  
 LCM 2#

WT 9.2  
 VIS 57  
 LCM 1#

WT 9.2  
 VIS 55  
 LCM 1#

G

H

I

J

K

L

ROP (min/ft)  
 Gamma Ray (units)

CFS @ 4224'  
 STARK  
 4236' (-1577')

HUSHPUCKNEY  
 4278' (-1619')  
 CFS @ 4281'  
 CFS @ 4285'

4100

4150

4200

4250

4300

0 10  
 1 150

CFS @ 4307'

MARMATON  
4351' (-1692')

ROP (min/ft) 10  
Gamma Ray (units) 150

PAWNEE  
4459' (-1800')

FT. SCOTT  
4492' (-1833')

CFS @ 4500'

CFS @ 4510'  
CHEROKEE  
SH

4350

4400

4450

4500

MINERAL FLUOR

SH - GRN / GY

LS - CRM / TAN, VF / F XLN, MOD DNS / SUBCHKY,  
DNS IN PT

SH - DK GY / BLK

LS - CRM / TAN, VF / F XLN, MOD DNS / SUBCHKY

SH - GY / GRN / RD

LS - CRM / TAN IN PT, F XLN, MOD DNS / DNS, FOSS,  
STYLOLITIZED IN PT

SH - BLK, SLI CARB, W/ SH - GRN / GY / RD

SH - GRN / MAR / RD ORNG, W/ LS - GY / BRN, F XLN,  
DNS, FOSS

LS - WHT / CRM, VF / F XLN, SUBCHKY / CHKY, W/ SH  
- GY

SH - RD / GRN / GY, W/ LS - CRM / TAN, VF / F XLN,  
MOD DNS / SUBCHKY, FOSS IN PT

LS - CRM / TAN, F XLN, MOD DNS / DNS, FOSS IN PT

LS - CRM, VF / F XLN, MOD DNS / SUBCHKY, W/ SH -  
RD / GRN / GY

SH - BLK, SLI CARB, W/ LS - CRM / TAN / LT GY IN PT,  
F XLN, DNS, ABUND FOSS

LS - WHT / CRM, VF XLN, SUBCHKY / CHKY

SH - BLK, CARB, W/ SH - RD / GRN / GY, W/ LS - TAN /  
BRN, F XLN, DNS, FOSS

LS - TAN, F XLN, DNS, FOSS

LS - TAN / LT BRN, GY IN PT, DNS, PYRITIC

LS - TAN / LT BRN, F XLN, DNS, ABUND FOSS, OOL IN PT, VOIDS  
FILLED W/ CALCTE, P INTERPART + INTXLN POR, NSFO, SHO OF  
GAS BUBB, ABUND OIL SHEEN, F ODOR, GYEL-GRN FLUOR

LS - LT BRN / DK BRN, F / M XLN, V DNS, FOSS, NS

LS - CRM / TAN / LT BRN, F XLN, P / F INTXLN + INTERPART POR,  
ABUND FOSS, FSFO, LT BRN OIL, G SHO GAS BUBB, G ODOR, G  
YEL-GRN FLUOR

SH - BLK, SLI CARB, IRON STN, W/ LS - CRM / TAN /  
GY, F XLN, DNS, FOSS IN PT

WT 9.3  
VIS 47  
LCM 1#

WT 9.4  
VIS 54  
LCM 1#

JET AND RAN  
TANK

WT 9.3  
VIS 51  
LCM 1#

DST #1 FT. SCOTT  
4480' - 4510'  
5" - 30" - 30" - 30"

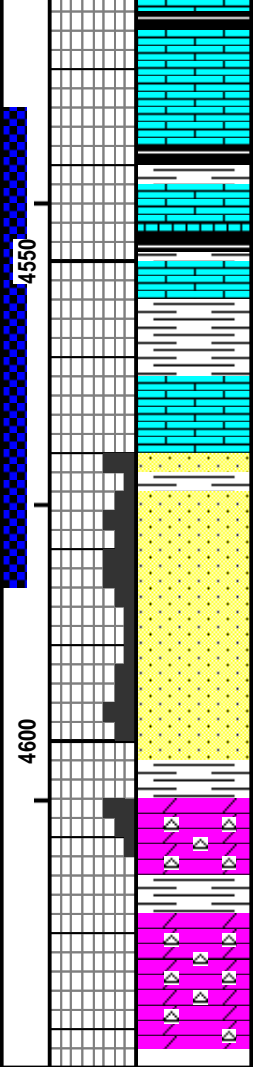
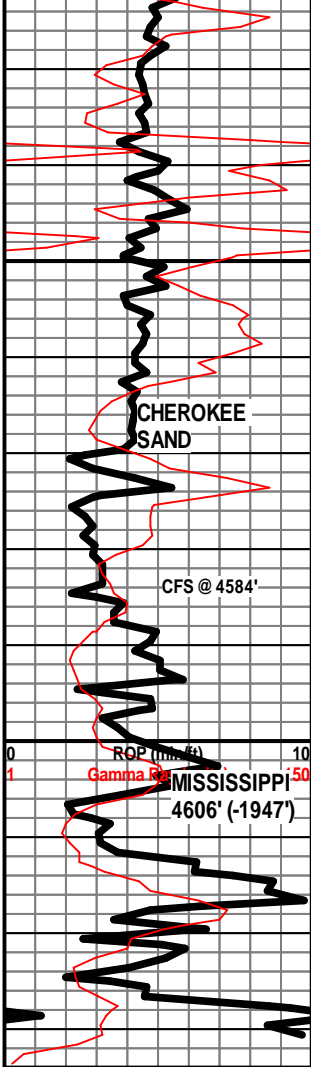
IF: Weak surface blow, died in 3 min  
ISI: No Blow  
FF: No Blow  
FSI: No Blow

Rec'd: 2' Mud

IH: 2226#  
IF: 15-46#  
ISI: 50#  
FF: 16-16#  
FSI: 25#  
FH: 2175#

STRAP 1.57' LONG  
TO BOARD





SH - BLK, CARB, W/ LS - BRN, F XLN, MOD DNS / DSN, ABUND OF FOSS, OOL IN PT

LS - LT BRN / TAN, F XLN, DNS, FOSS, W/ SH - BLK, SLI CARB, W/ SH - GRN / GY

LS - TAN / GY, F XLN, MOD DNS / DNS, W/ SH - BLK, CARB, W/ SH - RD / GRN / LT GRN / GY

SH - RD / GRN / RD-ORNG, W / LS - TAN, F / M XLN, DNS, FOSS IN PT

LS - CRM / WHT, VF / F XLN, MOD DNS / SUBCHKY, W/ SH - GRN / RD

SS - WHT / CLR, VF / F GR / M IN PT, SUB RND, MOD SRTD, W CEM, 30% DNS, 70% F / G INTGR POR, FRI IN PT, GSFO, LT BRN OIL, SLI YEL-GRN FLUOR

SS - PRED WHT / CLR IN PT, VF / F GRN, SUB RND, MOD SRTD, MOD / W CEM, G INTGR POR, PRED FRI, SPOTTY SFO, POR MOSTLY BARREN, SLI ODOR, SLI YEL-GRN FLUOR IN PT

SS - CLR / WHT / GY, F GRN, SUB ANG, W SRTD, W CEM, V DNS, NO VIS POR, NS, NO ODOR, NO FLUOR, W/ SH IN PT - GRN / GY

SS - WHT / CLR, VF / F GR, F / G INTGR POR, NS, NO ODOR, NO FLUOR

SH - RD / GRN / GY / RD-ORNG

DOLO - CRM / TAN, F XLN, PRED DNS & CHTLT, P INTXLNAND VUG POR IN PT, NS, NO ODOR, NO FLUOR, FOSS IN PT, FEW PIECES OF CHT - WHT / GY / CLR, F

SH - RD / GRN / GY, W/ DOLO - WHT / CRM / TAN, VF / F XLN PRED DNS, SUBCHKY IN PT, NS, NO ODOR

DOLO - GY / TAN / LT BRN, F XLN, DNS, CHTLT IN PT, FOSS IN PT, NS, NO ODOR, G YEL-GRN FLUOR, W/ SH - GY

**RTD 4631'**

**DST #2 CHEROKEE SAND**  
4534' - 4584'  
5" - 30" - 30" - 30"

IF: Weak surface blow  
ISI: No Blow  
FF: No Blow  
FSI: No Blow

Rec'd: 5' Mud

IH: 2273#  
IF: 31-32#  
ISI: 308#  
FF: 32-33#  
FSI: 162#  
FH: 2205#

WT 9.3  
VIS 54  
LCM 1#

**WT 9.2**  
**VIS 55**