## OPERATOR

| | | | |
|---|---|---|---|
| Company: | TDI, INC. | | |
| Address: | 1310 BISON ROAD<br>HAYS, KANSAS 67601 | | |
| Contact Geologist: | TOM DENNING | | |
| Contact Phone Nbr: | 785-628-2593 | | |
| Well Name: | DREILING D #9 | | |
| Location: | SE NW NE NE Sec.21-14s-16w | API: | 15-051-26,630-00-00 |
| Pool: | INFIELD | Field: | DREILING |
| State: | KANSAS | Country: | USA |

Scale 1:240 Imperial

| | | | |
|---|---|---|---|
| Well Name: | DREILING D #9 | | |
| Surface Location: | SE NW NE NE Sec.21-14s-16w | | |
| Bottom Location: | | | |
| API: | 15-051-26,630-00-00 | | |
| License Number: | 4787 | | |
| Spud Date: | 11/29/2013 | Time: | 2:30 PM |
| Region: | ELLIS COUNTY | | |
| Drilling Completed: | 12/3/2013 | Time: | 9:54 AM |
| Surface Coordinates: | 370' FNL & 960' FEL | | |
| Bottom Hole Coordinates: | | | |
| Ground Elevation: | 1894.00ft | | |
| K.B. Elevation: | 1904.00ft | | |
| Logged Interval: | 2000.00ft | To: | 3537.00ft |
| Total Depth: | 3537.00ft | | |
| Formation: | ARBUCKLE | | |
| Drilling Fluid Type: | CHEMICAL/FRESH WATER GEL | | |

## SURFACE CO-ORDINATES

| | | | |
|---|---|---|---|
| Well Type: | Vertical | | |
| Longitude: | -99.09849 | Latitude: | 38.8264412 |
| N/S Co-ord: | 370' FNL | | |
| E/W Co-ord: | 960' FEL | | |

## LOGGED BY

| | | | |
|---|---|---|---|
| Company: | SOLUTIONS CONSULTING, INC. | | |
| Address: | 108 W 35TH<br>HAYS, KS 67601 | | |
| Phone Nbr: | (785) 639-1337 | | |
| Logged By: | GEOLOGIST | Name: | HERB DEINES |

## CONTRACTOR

| | | | |
|---|---|---|---|
| Contractor: | SOUTHWIND DRILLING INC. | | |
| Rig #: | 1 | | |
| Rig Type: | MUD ROTARY | | |
| Spud Date: | 11/29/2013 | Time: | 2:30 PM |
| TD Date: | 12/3/2013 | Time: | 9:54 AM |
| Rig Release: | 12/4/2013 | Time: | 11:00 AM |

## ELEVATIONS

| | | | |
|---|---|---|---|
| K.B. Elevation: | 1904.00ft | Ground Elevation: | 1894.00ft |
| K.B. to Ground: | 10.00ft | | |

## NOTES

DECISION TO RUN PRODUCTION CASING TO TEST TARKIO SANDS AND UPPER LANSING-KANSAS CITY

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

NO DRILL STEM TESTS WERE RAN

## FORMATION TOPS SUMMARY AND CHRONOLOGY OF DAILY ACTIVITY

| | ***DREILING D # 9***<br>**SE NW NE NE**<br>**SEC.21-14S-16W**<br>**1894'GL 1904'KB** | | ***DREILING D # 8***<br>**SW SW NE NE**<br>**SEC.21-14S-16W** |
|---|---|---|---|
| FORMATION | SAMPLE TOPS | LOG TOPS | COMPARISON |
| **Anhydrite** | 1000 +904 | **993 +911** | *+ 909* |
| **B-Anhydrite** | 1040 +864 | **1040 +864** | *+ 869* |
| **Stotler/Tarkio Lm** | | **2632 -728** | *- 726* |
| **Topeka** | 2873 -969 | **2876 -972** | *- 968* |

| | | | |
|---|---|---|---|
| **Heebner Shale** | 3095-1191 | **3094-1190** | *-1185* |
| **Toronto** | 3113-1209 | **3113-1209** | *-1203* |
| **LKC** | 3139-1235 | **3140-1236** | *-1230* |
| **BKC** | 3381-1477 | **3382-1478** | *-1469* |
| **Arbuckle** | 3450-1546 | **3467-1563** | *-1517* |
| **RTD** | 3537-1633 | **3538-1634** | *-1611* |

## SUMMARY OF DAILY ACTIVITY

**11-29-13** RU, Spud 2:30PM, set 8 5/8" surface casing to 213' w/ 150 sxs Common 2%Gel 3%CC, WOC 8 hrs, slope @ 214' 1 degree

**11-30-13** 320', drill plug at 4:30 AM

**12-01-13** 1828', drilling

**12-02-13** 2712', drilling, displaced 2687' to 2708'

**12-03-13** 3402', drilling, RTD 3537' @9:54AM, short trip, CCH, TOWB, logs, TIWB, slope @3537' 1 ¼ degree

**12-04-13** 3537', finish LDDP, run production casing and cement, RD

## ROCK TYPES

Clystgy
Chtcongl
Dolprim
Lmst fw<7
Lmst fw7>
Lscongl
shale, grn
shale, gry
Carbon Sh
shale, red

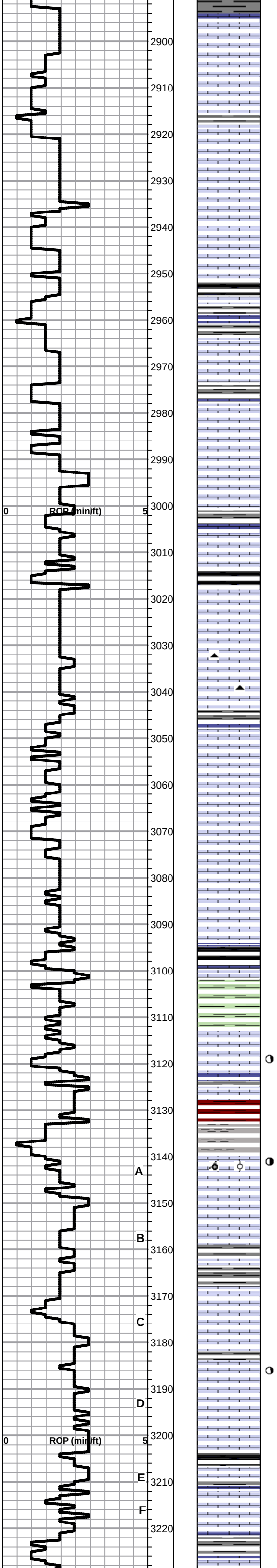
## ACCESSORIES

**MINERAL**
- Chert, dark
- Pyrite
- Chert White

**FOSSIL**
- Oolite
- Oomoldic

**Printed by GEOstrip VC Striplog version 4.0.7.0 (www.grsi.ca)**

| Curve Track #1 | Depth \| Intervals | DST | Lithology | Oil Show | Geological Descriptions | Curve Track #3 |
|---|---|---|---|---|---|---|
| ROP (min/ft) | Cored Interval / DST Interval | | | | | |
| 1:240 Imperial | | | | | | 1:240 Imperial |
| 0 ROP (min/ft) 5 | 2800 | | | | BEGIN 1' DRILL TIME FROM 2800' TO RTD<br>BEGIN 10' WET AND DRY SAMPLES FROM 2850' TO RTD | 8 5/8" SURFACE CASING SET TO 213' W/ 150 SXS COMMON 2%GEL 3%CC |
| 0 ROP (min/ft) 5 | 2810 | | | | **ANHYDRITE TOP 993+911**<br>**ANHYDRITE BASE 1040+864** | SLOPE 1 DEGREE |
| | 2820 | | P | | Lime, lt brn-lt gray, fnxln, fossiliferous in part | |
| | 2830 | | | | Shale, lt-med gray, soft blocky | |
| | 2840 | | | | Lime, lt brn, fnxln, slightly fossiliferous | |
| | 2850 | | | | Lime, lt brn-lt grayish brn, fnxln, slightly fossiliferous | |
| | 2860 | | | | Lime, lt-med brn-gray, slightly fossiliferous, slight bedded chalk | |
| | 2870 | | | | Shale, lt-med gray, soft-firm blocky | |
| | 2880 | | | | **TOPEKA 2876-972**<br>Lime, lt-med brn-med grayish brn, fnxln, slight bedded chalk | |
| | 2890 | | | | Lime, lt brn-lt grayish brn, fnxln | |




Lime, med brn-med grayish brn, fnxln, slight bedded chalk

Lime, tan-lt brn-lt grayish brn, fnxln-granular in part, lt chalk matrix in part

Lime, tan-lt grayish brn, granular-fnxln, fusulinids

Lime, lt-med brn-grayish brn, fnxln, hard on crush

Lime, lt-med brn, granular, chalky matrix

Lime, tan-lt brn, fnxln-granular, spotty gray mottling

Shale, black carbonaceous

Shale, med gray, firm blocky

Lime, tan-lt brn, fnxln-granular in part with scattered microxln chips in part

Lime, tan-lt brn, fnxln-granular in part, lt chalky matrix with bedded chalk

Lime, crm, fn-micro xln, lithographic, slight bedded chalk

Lime, tan-lt gray, fnxln

Lime, lt brn-lt grayish brn, fnxln

Shale, med gray-black carbonaceous

Lime, lt-med brn, fnxln-granular in part, slight bedded chalk

Lime, lt brn-lt grayish brn, fnxln
Chert, tan, fossiliferous-fusulinids

Lime, lt brn, granular, increasing bedded chalk content

Lime, lt brn, fnxln, soft on crush, bedded chalk with chalk matrix in part , slightly fossiliferous

Lime, lt brn, fnxln, decreasing chalk content, slightly fossiliferous

Lime, lt brn, fnxln

**HEEBNER SHALE 3094-1190**

Shale, black carbonaceous, fissile, firm blocky
Lime, lt brn, vfxln

Shale, lt gray-lime green, soft blocky-soft sticky mud clumps

**TORONTO 3113-1209**

Lime, white-crm, fnxln with firm bedded chalk,  trace of spotty staining with very lite odor, NFO noted

Lime, lt-med brn, fnxln, bedded chalk

Shale, reddish brn, soft blocky

**LKC 3140-1236**

Lime, crm-lt brn, oolitic/oomoldic thin zone with lt scattered staining, lt odor, NFO

Lime, tan-lt brn, fnxln, increasing  gray fnxln lime near shale boundary

Lime, tan-lt brn, fnxln
Shale, lt gray, soft blocky

Lime, tan, fnxln-granular, no shows or staining  noted in samples

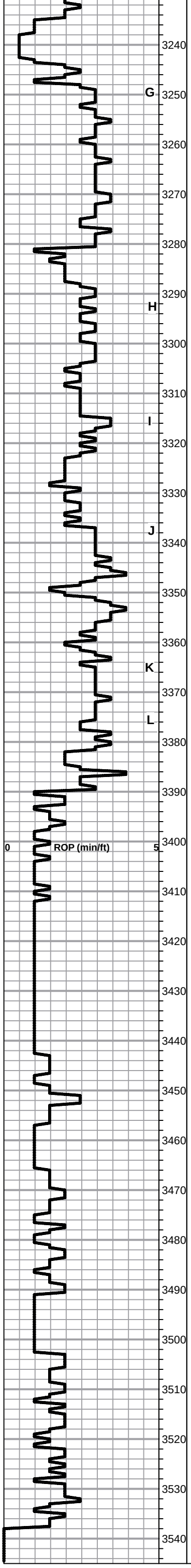
Lime, crm, mostly fnxln, thin bed of oolitic/oomoldic with interparticle porosity with lt spotty staining

Lime, crm-tan, fnxln, slight bedded chalk

Shale, gray-black carbonaceous
Lime, pale gray, fnxln

Lime, tan-lt brn, fnxln, cemented oolitic beds grading into fnxln chalky lime, NS

Lime, crm-lt brn, fnxln grading into granular




Lime, crm-lt brn, white chalk wash, few oolmoldic chips with spotty staining, no odor, NFO

Lime, crm-offwhite, fn-micro xln, slight bedded chalk

Lime, crm, fn-micro xln, slight bedded chalk

Lime, crm-offwhite, crm-offwhite, fn-micro xln, slight bedded chalk

Shale, lt gray, forming soft mud and clumps

Lime, crm-offwhite, fn-micro xln, slight bedded chalk
Chert, fossiliferous

Lime, lt brn-offwhite, fnxln,

Lime, lt gray, fnxln, slight bedded chalk

Lime, crm-tan, fn-vfxln, thin zone with fine granular lime with inter xln porosity, spotty staining, NFO, No Odor

Lime, offwhite-tan, fn-micro xln, slight bedded chalk

Shale, tan, lime green, soft mud

Lime, offwhite-crm, fn-micro xln, slight bedded chalk, NS

Shale, med gray-black, soft blocky

Lime, crm-tan, fn-micro xln, slight bedded chalk, NS

Lime, crm-tan, fn-micro xln, increasing bedded chalk

Lime, tan, fnxln, bedded chalk

**BKC 3382-1478**

Shale, reddish brn-maroon, soft blocky

Shale, red, soft with lt red wash

Shale, red, soft blocky with red wash

Shale, red, soft with vari color cherts, NS

Shale, red and vari colored cherts

Shale, red and vari colored cherts

Shale, red and vari colored cherts

Shale, red and vari colored cherts

**ARBUCKLE 3467-1563**

Dolomite, crm--tan, fnxln-granular in part, NS

Dolomite, ivory-crm, fnxln-granular

Dolomite, ivory, fnxln-granular
Chert, med salmon, fresh, sharp

Dolomite, ivory, granular

Dolomite, ivory, fn-cxln
Chert, bone white,fresh sharp

Dolomite, Ivory-crm, granular, fn-cxln

**RTD 3537-1633** **LTD 3538-1634**

LOG INTERVAL 3336-45 SHOULD BE PERFORATED AND TESTED TO RULE OUT A FRACTURED ZONE. SP AND MICRO LOOK GOOD

SLOPE 1 1/4 DEGREES