

Confidentiality Requested:

Yes  No

KANSAS CORPORATION COMMISSION  
OIL & GAS CONSERVATION DIVISION

Form ACO-1

January 2018

Form must be Typed

Form must be Signed

All blanks must be Filled

**WELL COMPLETION FORM**  
**WELL HISTORY - DESCRIPTION OF WELL & LEASE**

OPERATOR: License # \_\_\_\_\_

Name: \_\_\_\_\_

Address 1: \_\_\_\_\_

Address 2: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_ + \_\_\_\_\_

Contact Person: \_\_\_\_\_

Phone: ( \_\_\_\_\_ ) \_\_\_\_\_

CONTRACTOR: License # \_\_\_\_\_

Name: \_\_\_\_\_

Wellsite Geologist: \_\_\_\_\_

Purchaser: \_\_\_\_\_

Designate Type of Completion:

New Well  Re-Entry  Workover

Oil  WSW  SWD

Gas  DH  EOR

OG  GSW

CM (Coal Bed Methane)

Cathodic  Other (Core, Expl., etc.): \_\_\_\_\_

If Workover/Re-entry: Old Well Info as follows:

Operator: \_\_\_\_\_

Well Name: \_\_\_\_\_

Original Comp. Date: \_\_\_\_\_ Original Total Depth: \_\_\_\_\_

Deepening  Re-perf.  Conv. to EOR  Conv. to SWD

Plug Back  Liner  Conv. to GSW  Conv. to Producer

Commingled Permit #: \_\_\_\_\_

Dual Completion Permit #: \_\_\_\_\_

SWD Permit #: \_\_\_\_\_

EOR Permit #: \_\_\_\_\_

GSW Permit #: \_\_\_\_\_

Spud Date or Date Reached TD Completion Date or Recompletion Date

API No.: \_\_\_\_\_

Spot Description: \_\_\_\_\_

\_\_\_\_\_ - \_\_\_\_\_ - \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West

\_\_\_\_\_ Feet from  North /  South Line of Section

\_\_\_\_\_ Feet from  East /  West Line of Section

Footages Calculated from Nearest Outside Section Corner:

NE  NW  SE  SW

GPS Location: Lat: \_\_\_\_\_, Long: \_\_\_\_\_  
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)

Datum:  NAD27  NAD83  WGS84

County: \_\_\_\_\_

Lease Name: \_\_\_\_\_ Well #: \_\_\_\_\_

Field Name: \_\_\_\_\_

Producing Formation: \_\_\_\_\_

Elevation: Ground: \_\_\_\_\_ Kelly Bushing: \_\_\_\_\_

Total Vertical Depth: \_\_\_\_\_ Plug Back Total Depth: \_\_\_\_\_

Amount of Surface Pipe Set and Cemented at: \_\_\_\_\_ Feet

Multiple Stage Cementing Collar Used?  Yes  No

If yes, show depth set: \_\_\_\_\_ Feet

If Alternate II completion, cement circulated from: \_\_\_\_\_

feet depth to: \_\_\_\_\_ w/ \_\_\_\_\_ sx cmt.

**Drilling Fluid Management Plan**

(Data must be collected from the Reserve Pit)

Chloride content: \_\_\_\_\_ ppm Fluid volume: \_\_\_\_\_ bbls

Dewatering method used: \_\_\_\_\_

Location of fluid disposal if hauled offsite:

Operator Name: \_\_\_\_\_

Lease Name: \_\_\_\_\_ License #: \_\_\_\_\_

Quarter \_\_\_\_\_ Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West

County: \_\_\_\_\_ Permit #: \_\_\_\_\_

**AFFIDAVIT**

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

**KCC Office Use ONLY**

Confidentiality Requested

Date: \_\_\_\_\_

Confidential Release Date: \_\_\_\_\_

Wireline Log Received  Drill Stem Tests Received

Geologist Report / Mud Logs Received

UIC Distribution

ALT  I  II  III Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

Operator Name: \_\_\_\_\_ Lease Name: \_\_\_\_\_ Well #: \_\_\_\_\_

Sec. \_\_\_\_\_ Twp. \_\_\_\_\_ S. R. \_\_\_\_\_  East  West County: \_\_\_\_\_

**INSTRUCTIONS:** Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to [kcc-well-logs@kcc.ks.gov](mailto:kcc-well-logs@kcc.ks.gov). Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i>  Samples Sent to Geological Survey <input type="checkbox"/> Yes <input type="checkbox"/> No  Cores Taken <input type="checkbox"/> Yes <input type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input type="checkbox"/> No Geologist Report / Mud Logs <input type="checkbox"/> Yes <input type="checkbox"/> No  List All E. Logs Run: _____	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample  Name Top Datum
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CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input type="checkbox"/> Perforate <input type="checkbox"/> Protect Casing <input type="checkbox"/> Plug Back TD <input type="checkbox"/> Plug Off Zone				

1. Did you perform a hydraulic fracturing treatment on this well?  Yes  No *(If No, skip questions 2 and 3)*
2. Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons?  Yes  No *(If No, skip question 3)*
3. Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry?  Yes  No *(If No, fill out Page Three of the ACO-1)*

Date of first Production/Injection or Resumed Production/Injection:	Producing Method: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other <i>(Explain)</i> _____			
Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio Gravity

DISPOSITION OF GAS: <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	METHOD OF COMPLETION: <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5)</i> <i>(Submit ACO-4)</i>	PRODUCTION INTERVAL: Top Bottom
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Shots Per Foot	Perforation Top	Perforation Bottom	Bridge Plug Type	Bridge Plug Set At	Acid, Fracture, Shot, Cementing Squeeze Record <i>(Amount and Kind of Material Used)</i>

TUBING RECORD:	Size:	Set At:	Packer At:	
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**OPERATOR**

Company: TDI, INC.  
 Address: 1310 BISON ROAD  
 HAYS, KANSAS 67601-9696

Contact Geologist: TOM DENNING  
 Contact Phone Nbr: 785-628-2593  
 Well Name: ENGEL SOUTH # 2  
 Location: N2 SE NE SE SEC.21-T15S-R18W  
 API: 15-051-26,879-00-00  
 Pool: INFIELD  
 State: KANSAS

Field: SCHOENCHEN  
 Country: USA



Scale 1:240 Imperial

Well Name: ENGEL SOUTH # 2  
 Surface Location: N2 SE NE SE SEC.21-T15S-R18W  
 Bottom Location:  
 API: 15-051-26,879-00-00  
 License Number: 4787  
 Spud Date: 7/27/2017 Time: 1:00 PM  
 Region: ELLIS COUNTY  
 Drilling Completed: 8/3/2017 Time: 5:35 AM  
 Surface Coordinates: 1725' FSL & 330' FEL  
 Bottom Hole Coordinates:  
 Ground Elevation: 2009.00ft  
 K.B. Elevation: 2019.00ft  
 Logged Interval: 2800.00ft To: 3670.00ft  
 Total Depth: 3670.00ft  
 Formation: ARBUCKLE  
 Drilling Fluid Type: CHEMICAL/FRESH WATER GEL

**SURFACE CO-ORDINATES**

Well Type: Vertical  
 Longitude: -99.3206734  
 Latitude: 38.7306177  
 N/S Co-ord: 1725' FSL  
 E/W Co-ord: 330' FEL

**LOGGED BY**

Company: SOLUTIONS CONSULTING, INC.  
 Address: 108 W 35TH  
 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: 7/27/2017  
 TD Date: 8/3/2017

Time: 1:00 PM  
 Time: 5:35 AM

**ELEVATIONS**

K.B. Elevation: 2019.00ft      Ground Elevation: 2009.00ft  
 K.B. to Ground: 10.00ft

**NOTES**

RECOMMENDATION TO RUN PRODUCTION CASING TO FURTHER TEST THE CONGLOMERATE SAND SECTION.

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

DRILL STEM TESTING BY TRILOBITE TESTING INC: THREE (3) CONVENTIONAL TESTS AND ONE (1) STRADDLE TEST

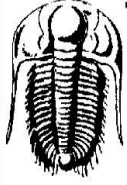
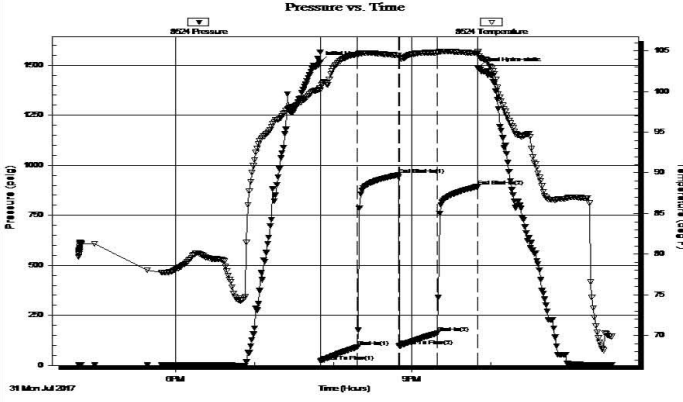
<b>ENGEL SOUTH #2</b>	<b>ENGEL SOUTH # 1</b>	<b>ENGEL # 1A</b>
<b>N2 SE NE SE</b>	<b>SE NE SW SE</b>	<b>NE NE SE</b>
<b>SEC.21-15S-18W</b>	<b>SEC.21-15-18W</b>	<b>SEC.21-15-18W</b>
<b>2019'KB</b>	<b>KB 1998'</b>	<b>KB 2020'</b>

<u>FORMATION</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>	<u>LOG TOPS</u>
Anhydrite	1168 +851	+ 855	+ 852
B-Anhydrite	1203 +816	+ 821	
Topeka	2982 - 963	- 958	
Heebner Sh.	3245-1226	-1223	-1228
Toronto	3265-1246	-1243	-1247
LKC	3294-1275	-1272	-1276
BKC	3530-1511	-1512	-1501
Arbuckle	3614-1595	-1604	-1551
RTD	3670-1651	-1652	-1556

**SUMMARY OF DAILY ACTIVITY**

7-27-17      RU, Spud 1:00 PM,  
 7-28-17      985', drilling, set 8 5/8" surface casing to 1172' w/ 450 sxs SMD,  
                   WOC 12 hrs, slope 1 degree @1193'.  
 7-29-17      1173', drill plug at 8:00 AM  
 7-30-17      2248', drilling  
 7-31-17      3020', drilling, displaced 2914' to 2946', CFS 3199', short trip, DST  
                   #1 3182'-3199' Topeka-Oread  
 8-01-17      3312' TIWB, drilling, mud pump bearing issue  
 8-02-17      3590', drilling, CFS 3590', TOWB, DST # 2 3529' to 3590', Cong. Sand,  
                   TIWB, CFS 3599', TOWB, DST # 3 3508' to 3599', Cong. Sand

8-03-17 3670', TIWB after DST # 3, drilling, RTD 3670' @5:35AM, TOWB,  
 logs, Straddle test # 4 3299' to 3345' "C" and "D" of LKC, TIWB,  
 LDDP  
 8-04-17 3670', run production casing and cement bottom stage, RD

 <p><b>TRILOBITE TESTING, INC.</b></p>	<h3>DRILL STEM TEST REPORT</h3> <p>TDI, Inc. <span style="float: right;"><b>21-15S-18W Ellis, KS</b></span>          1310 Bison Rd. <span style="float: right;"><b>Engel South #2</b></span>          Hays, KS 67601 <span style="float: right;">Job Ticket: 63285 <b>DST#: 1</b></span>          ATTN: Herb Deines <span style="float: right;">Test Start: 2017.07.31 @ 16:46:05</span></p>																																								
<p><b>GENERAL INFORMATION:</b></p> <p>Formation: <b>Topeka &amp; Oread</b>          Deviated: No Whipstock: ft (KB)          Time Tool Opened: 19:50:11          Time Test Ended: 23:32:41</p> <p><b>Interval: 3182.00 ft (KB) To 3199.00 ft (KB) (TVD)</b>          Total Depth: 3199.00 ft (KB) (TVD)          Hole Diameter: 7.88 inches Hole Condition: Fair</p> <p style="text-align: right;">Test Type: Conventional Bottom Hole (Initial)          Tester: Brannan Lonsdale          Unit No: 73          Reference Elevations: 2019.00 ft (KB)          2009.00 ft (CF)          KB to GR/CF: 10.00 ft</p>																																									
<p><b>Serial #: 8524 Outside</b></p> <p>Press@RunDepth: 160.70 psig @ 3183.00 ft (KB) Capacity: 8000.00 psig          Start Date: 2017.07.31 End Date: 2017.07.31 Last Calib.: 2017.07.31          Start Time: 16:46:06 End Time: 23:32:41 Time On Btm: 2017.07.31 @ 19:49:41          Time Off Btm: 2017.07.31 @ 21:50:11</p> <p><b>TEST COMMENT:</b> 30- IF- BOB 13mins          30- IS- No blow          30- FF- BOB 17mins          30- FS- No blow</p>																																									
 <p style="font-size: small;">31 Mon Jul 2017</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th colspan="4">PRESSURE SUMMARY</th> </tr> <tr> <th>Time (Min.)</th> <th>Pressure (psig)</th> <th>Temp (deg F)</th> <th>Annotation</th> </tr> </thead> <tbody> <tr><td>0</td><td>1515.87</td><td>100.38</td><td>Initial Hydro-static</td></tr> <tr><td>1</td><td>19.88</td><td>100.13</td><td>Open To Flow (1)</td></tr> <tr><td>29</td><td>92.95</td><td>104.55</td><td>Shut-In(1)</td></tr> <tr><td>60</td><td>951.41</td><td>104.43</td><td>End Shut-In(1)</td></tr> <tr><td>61</td><td>96.91</td><td>104.15</td><td>Open To Flow (2)</td></tr> <tr><td>90</td><td>160.70</td><td>104.76</td><td>Shut-In(2)</td></tr> <tr><td>120</td><td>892.76</td><td>104.69</td><td>End Shut-In(2)</td></tr> <tr><td>121</td><td>1485.52</td><td>104.88</td><td>Final Hydro-static</td></tr> </tbody> </table>	PRESSURE SUMMARY				Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation	0	1515.87	100.38	Initial Hydro-static	1	19.88	100.13	Open To Flow (1)	29	92.95	104.55	Shut-In(1)	60	951.41	104.43	End Shut-In(1)	61	96.91	104.15	Open To Flow (2)	90	160.70	104.76	Shut-In(2)	120	892.76	104.69	End Shut-In(2)	121	1485.52	104.88	Final Hydro-static
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**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

TDI, Inc.  
 1310 Bison Rd.  
 Hays, KS 67601  
 ATTN: Herb Deines

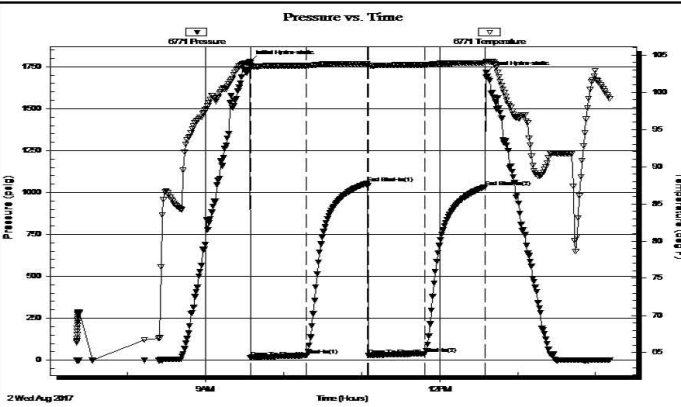
**21-15S-18W Ellis, KS**  
**Engel South #2**  
 Job Ticket: 63286 **DST#: 2**  
 Test Start: 2017.08.02 @ 07:20:55

**GENERAL INFORMATION:**

Formation: **Cong. Sand**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 09:34:31  
 Time Test Ended: 14:11:16  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Brannan Lonsdale  
 Unit No: 73  
 Interval: **3529.00 ft (KB) To 3590.00 ft (KB) (TVD)**  
 Total Depth: 3590.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Reference Elevations: 2019.00 ft (KB)  
 2009.00 ft (CF)  
 KB to GR/CF: 10.00 ft

**Serial #: 6771 Inside**  
 Press@RunDepth: 37.96 psig @ 3530.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.08.02 End Date: 2017.08.02 Last Calib.: 2017.08.02  
 Start Time: 07:20:56 End Time: 14:11:16 Time On Btm: 2017.08.02 @ 09:34:16  
 Time Off Btm: 2017.08.02 @ 12:36:01

TEST COMMENT: 45- IF- Built very slowly to 2.5"  
 45- IS- No blow  
 45- FF- No blow  
 45- FS- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1782.41	103.95	Initial Hydro-static
1	16.04	103.56	Open To Flow (1)
44	27.54	103.56	Shut-In(1)
91	1056.08	103.85	End Shut-In(1)
92	28.40	103.59	Open To Flow (2)
135	37.96	103.67	Shut-In(2)
181	1033.75	103.93	End Shut-In(2)
182	1716.98	104.13	Final Hydro-static

**Recovery**

Length (ft)	Description	Volume (bbt)
15.00	M	0.07
55.00	OO	0.64

\* Recovery from multiple tests

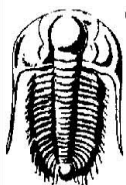
**Gas Rates**

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

Trilobite Testing, Inc

Ref. No: 63286

Printed: 2017.08.02 @ 14:32:12



**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

TDI, Inc.  
 1310 Bison Rd.  
 Hays, KS 67601  
 ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
 Job Ticket: 63287 **DST#: 3**  
 Test Start: 2017.08.02 @ 18:27:58

**GENERAL INFORMATION:**

Formation: **Cong. Sand**

Formation: Cong. Sand  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 19:57:19  
 Time Test Ended: 00:34:19

Test Type: Conventional Bottom Hole (Reset)  
 Tester: Brannan Lonsdale  
 Unit No: 73

Interval: 3508.00 ft (KB) To 3599.00 ft (KB) (TVD)  
 Total Depth: 3599.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair

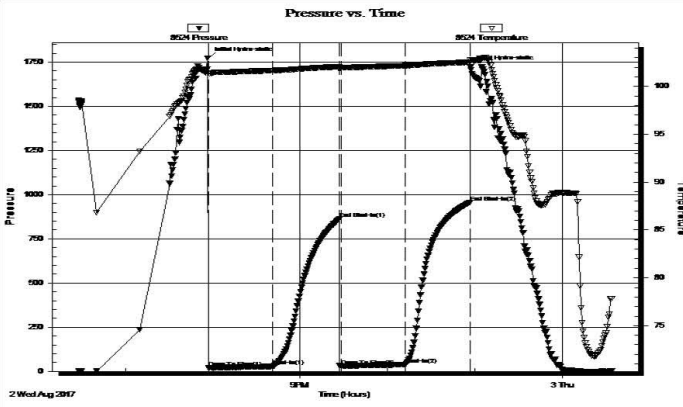
Reference Elevations: 2019.00 ft (KB)  
 2009.00 ft (CF)  
 KB to GR/CF: 10.00 ft

**Serial #: 8524** Outside

Press@RunDepth: 39.72 psig @ 3509.00 ft (KB)  
 Start Date: 2017.08.02 End Date: 2017.08.03  
 Start Time: 18:27:59 End Time: 00:34:19

Capacity: 8000.00 psig  
 Last Calib.: 2017.08.03  
 Time On Btm: 2017.08.02 @ 19:56:49  
 Time Off Btm: 2017.08.02 @ 22:57:04

TEST COMMENT: 45- IF- Built very slow ly to 2.5"  
 45- IS- No blow  
 45- FF- Built very slow ly to 1.5"  
 45- FS- No blow



PRESSURE SUMMARY			
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1772.83	101.84	Initial Hydro-static
1	21.32	101.42	Open To Flow (1)
45	27.79	101.66	Shut-In(1)
91	862.76	102.06	End Shut-In(1)
92	28.34	101.95	Open To Flow (2)
136	39.72	102.17	Shut-In(2)
180	955.64	102.53	End Shut-In(2)
181	1721.87	102.74	Final Hydro-static

Recovery		
Length (ft)	Description	Volume (bbl)
30.00	M	0.43
40.00	OO	0.57

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

\* Recovery from multiple tests

Trilobite Testing, Inc

Ref. No: 63287

Printed: 2017.08.03 @ 07:20:19



**DRILL STEM TEST REPORT**

TDI, Inc.  
 1310 Bison Rd.  
 Hays, KS 67601  
 ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
 Job Ticket: 63288 **DST#: 4**  
 Test Start: 2017.08.03 @ 12:30:26

**GENERAL INFORMATION:**

Formation: LKC "C&D"  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 14:48:17  
 Time Test Ended: 18:28:02

Test Type: Conventional Straddle (Reset)  
 Tester: Brannan Lonsdale  
 Unit No: 73

Interval: 3299.00 ft (KB) To 3345.00 ft (KB) (TVD)  
 Total Depth: 3670.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair

Reference Elevations: 2019.00 ft (KB)  
 2009.00 ft (CF)  
 KB to GR/CF: 10.00 ft

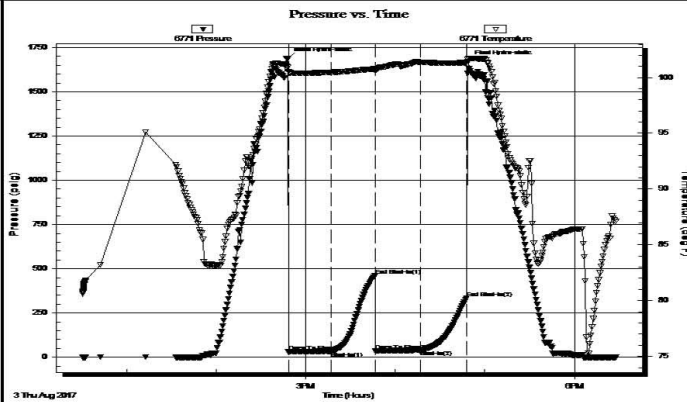
**Serial #: 6771** Inside

Press@RunDepth: 39.24 psig @ 3300.00 ft (KB)  
 Start Date: 2017.08.03 End Date: 2017.08.03  
 Start Time: 12:30:27 End Time: 18:28:02

Capacity: 8000.00 psig  
 Last Calib.: 2017.08.03  
 Time On Btm: 2017.08.03 @ 14:48:02  
 Time Off Btm: 2017.08.03 @ 16:48:47

TEST COMMENT: 30- IF- Surface blow died in 7mins  
 30- IS- No blow  
 30- FF- No blow  
 30- FS- No blow





PRESSURE SUMMARY			
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1688.92	100.90	Initial Hydro-static
1	29.57	100.53	Open To Flow (1)
29	33.70	100.47	Shut-In(1)
59	460.46	100.77	End Shut-In(1)
59	35.18	100.57	Open To Flow (2)
89	39.24	101.36	Shut-In(2)
120	334.75	101.34	End Shut-In(2)
121	1671.01	101.65	Final Hydro-static

Recovery		
Length (ft)	Description	Volume (bbl)
3.00	M w / few oil spots	0.01

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

\* Recovery from multiple tests

Trilobite Testing, Inc

Ref. No: 63288

Printed: 2017.08.03 @ 20:53:01

### ROCK TYPES

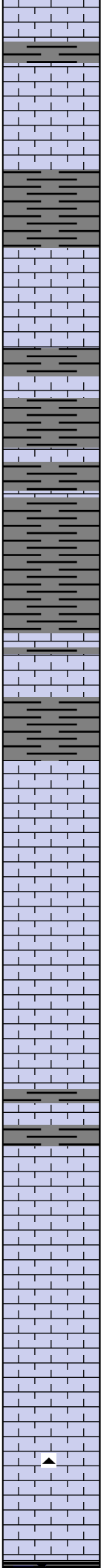
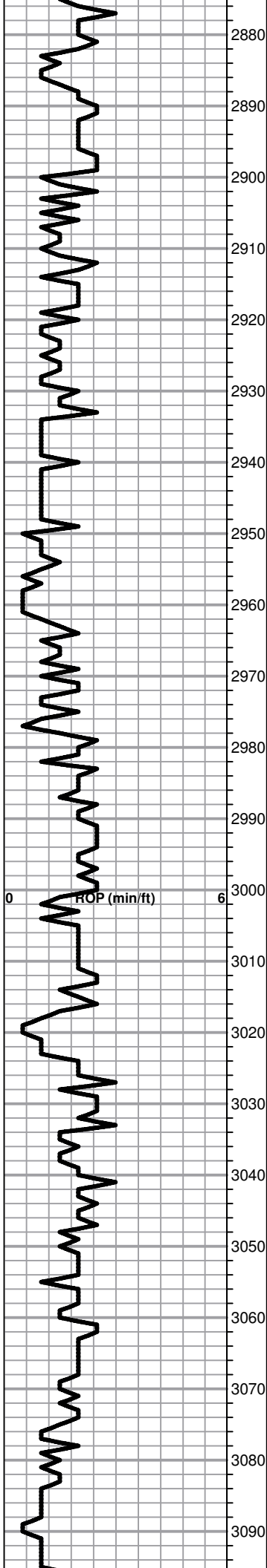
	Chtcngl		Lmst fw7>		shale, gry		Ss
	Dolprim		Lscong1		Carbon Sh		
	Dol Lime		shale, grn		shale, red		

### ACCESSORIES

<b>MINERAL</b>	<b>FOSSIL</b>
▲ Chert, dark	○ Oolite
△ Chert White	⊕ Oomoldic

Printed by GEOstrip VC Striplog version 4.0.8.15 (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 ROP (min/ft)	0   6					1:240 Imperial
	2850 2860 2870				<p>BEGIN 1' DRILL TIME FROM 2850' TO RTD            BEGIN 10' WET AND DRY SAMPLES FROM 2950' TO RTD</p> <p><b>ANHYDRITE TOP 1168+851</b>  <b>ANHYDRITE BASE 1203+816</b></p>	<p>8 5/8" SURFACE CASING SET TO 1172' W/375 SXS SMD. DID NOT CIRCULATE. RAN 1" AND TAGGED TOP OF CEMENT AT 85'. PUMPED 75 SXS WITH CEMENT TO SURFACE</p> <p>SLOPE 1 DEGREE @1173'</p>



Shale, lt-med gray, soft blocky

Lime, lt-med brn, fnxn

Shale, lt gray, soft sticky clumping

Shale, lt gray, soft sticky clumping

Lime, med-dark brn, fnxn

**TOPEKA 2982-963**

Lime, med brn, fnxn, slightly fossiliferous

Lime, lt-med brn, fnxn, slightly fossiliferous-fusulinids

Lime, lt-med brn-med grayish brn, fn-vfxln, slightly fossiliferous

Lime, lt-med brn, fnxn-granular with bedded chalk, NS

Lime, lt brn, fnxn

Lime, lt-med brn-gray, fnxn

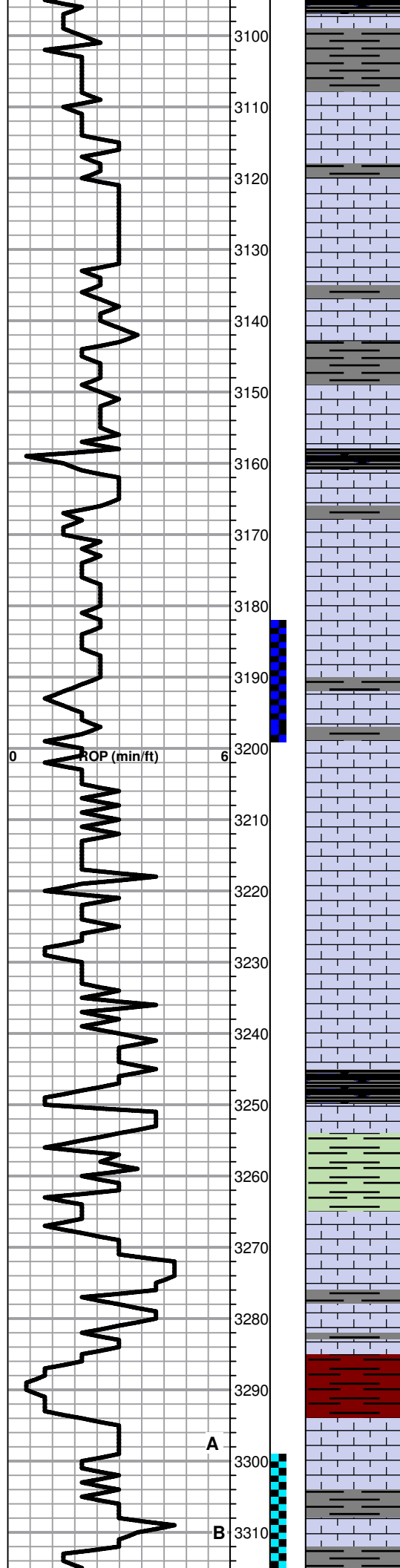
Lime, lt brn-lt grayish brn, fn-vfxln

Lime, lt-med brn, fn-micro xln

Lime, lt-med brn, fn-vfxln, slightly fossiliferous

Lime, crm-lt brn, fnxn-granular in chalky matrix, slightly fossiliferous

Lime, lt brn, granular with bedded chalk



Shale, black carbonaceous, blocky

Shale, lt gray, soft mud

Lime, crm-lt brn, fn-micro xln

Lime, crm-lt brn, fn-micro xln

Lime, lt brn, fn-micro xln

Lime, lt brn, fn-micro xln, slightly fossiliferous

Shale, lt gray, soft sticky  
Lime, lt-med brn, fn-micro xln

Shale, black carbonaceous, fissile, blocky

\* Lime, lt brn, mostly fn-micro xln, lt gassy odor, NFO or staining noted

Lime, lt brn, fnxln-granular in part, slightly fossiliferous with bedded chalk

○ Lime, lt brn, fnxln with a zone of fine oolites and fossil fragments with scattered vugs with sparry recrystallization in vugs. Lt odor with saturated lt brn staining, NFO

Lime, lt brn, fnxln

Lime, lt brn, fnxln

Lime, lt brn, fnxln

Lime, lt brn, fnxln with bedded chalk

Lime, lt-med brn, fn-vfxln

**HEEBNER SHALE 3245-1226**

Shale, black carbonaceous, fissile, blocky  
Lime, lt-med brn, fn-micro xln

Shale, dove gray-lime green, soft sticky mud

**TORONTO 3265-1246**

Lime, white-crm, fn-vfxln, firm bedded chalk, NS

Lime, crm-lt brn, vfxln

Shale, reddish brn-lt gray, soft blocky

**LKC 3294-1275**

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

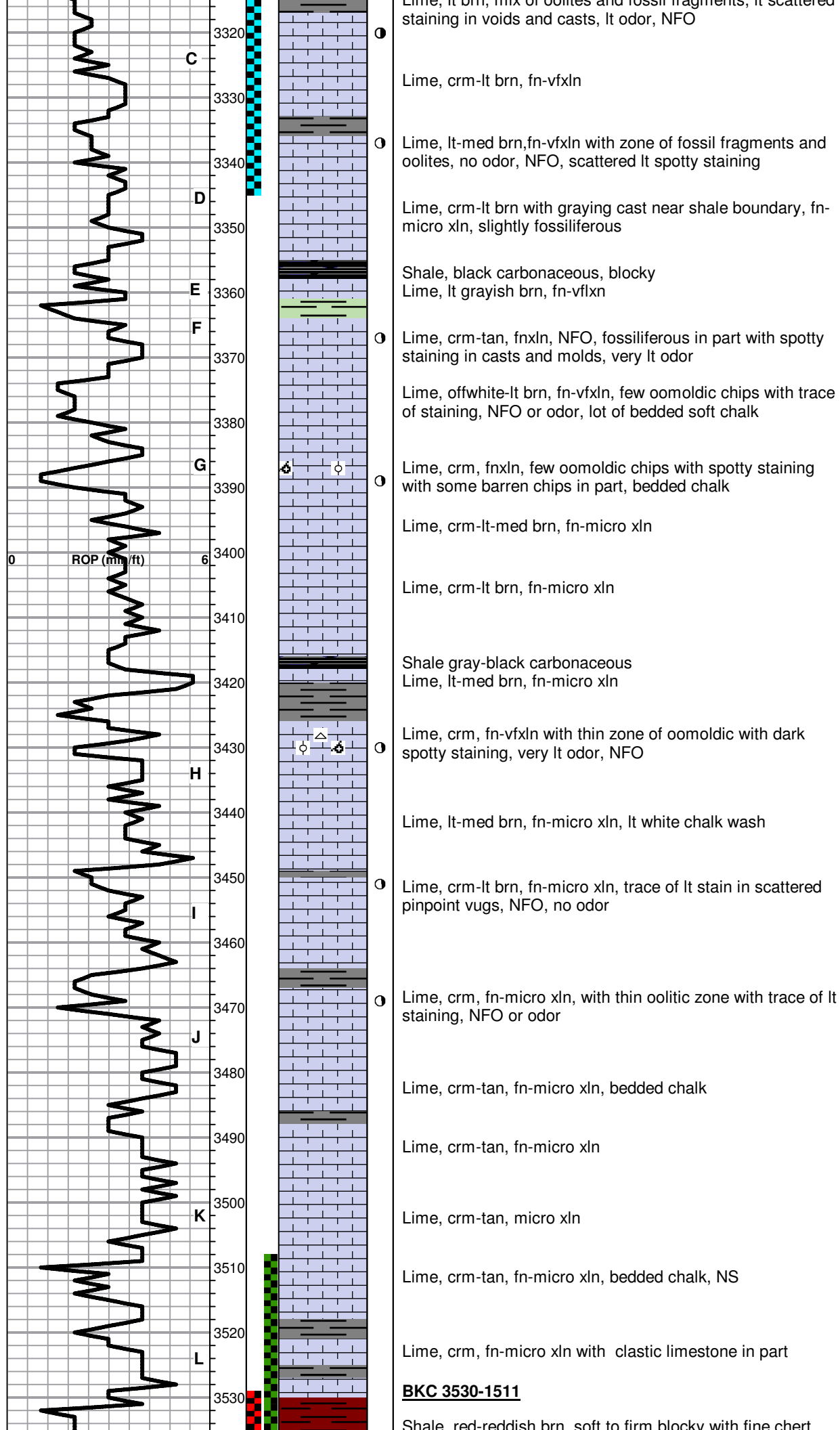
Lime, lt-med brn-med grayish brn, fn-micro xln, slightly fossiliferous

Lime, lt brn, mix of oolites and fossil fragments, lt scattered

DST # 1 3182' TO 3199' SEE  
HEADER FOR TEST  
SUMMARY

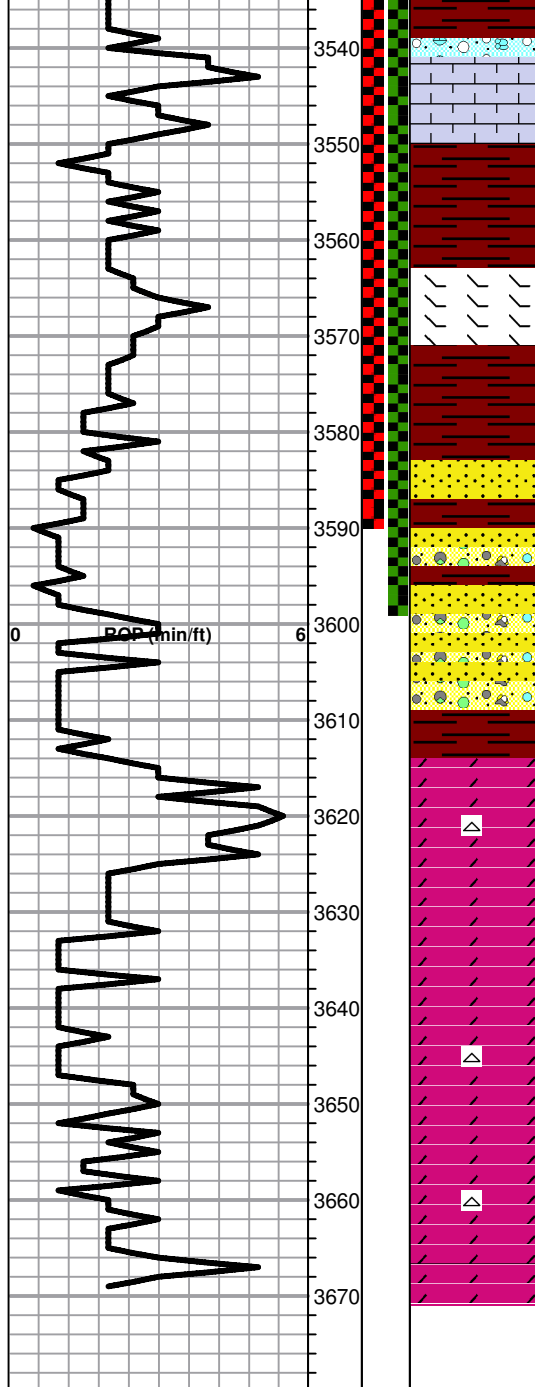
CFS 3199', SHORT TRIP  
SURVEY 2 DRGREES @3199'

A  
B



**BKC 3530-1511**

Shale, red-reddish brn, soft to firm blocky with fine chert



Shale, red reddish brn, soft to firm blocky with fine chert residual in part

Lime, crm-tan, fn-micro xln

Shale, tan-red, soft sticky

Lime, crm-tan, fn-micro xln, few chips orange chert, fresh

Shale red wash, soft mud with lt odor, source unknown

● SS, quartz, poor-good sorting cemented in part with little reaction to acid but improving with depth and grain size, saturated staining, lt odor and SFO

○ SS, as above with increasing chert and grain size, lt dolomitic cementing in part

○ SS and vari colored cherts as above

**ARBUCKLE 3614-1595**

D Dolomite, white-crm, fnxln with fine gilsonitic flakes, NFO or odor

D Dolomite, crm-tan, fnxln-fine granular, fine gilsonitic flakes in part

Dolomite, crm-lt brn, fnxln-granular, lt sulfur odor

Dolomite, white-crm, fnxln-fine granular, NS

Dolomite, crm, fnxln-granular, NS

Dolomite, white-crm, fnxln-fine granular

**RTD 3670-1651 LTD 3670-1651**

DST # 2 3529' TO 3590' SEE HEADER FOR TEST SUMMARY

DST # 3 3508' TO 3599' SEE HEADER FOR TEST SUMMARY

SLOPE 1 DEGREE @3590'

SLOPE 1 DEGREE @3670'

JOB LOG

SWIFT Services, Inc.

DATE 7/29/17 PAGE NO. 1

CUSTOMER TDI WELL NO. #2 LEASE Engel South JOB TYPE Cement Surface Casing TICKET NO. 29423

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
	1600							On location w/Float Equip
								25 # 8 5/8 Casing RTD - 1220'
								Total Pipe - 1172'
								Baffle @ - 1123'
								Turbolizers 1, 5, 17
	1645							start Casing / Float Equip.
	1815							Break Circ on Bottom
	1845		20 Bbl					Pump 20 Bbl KCL Flush
		6 bpm					100	Start Cement 375 SKS SMD
	1925	3 bpm	145					Fin Cement Shut Down Washout Ptl
	1935							Drop Plug
		6 bpm						Start Displacement
	1945	2.5	72 bbl				300 / 500	Fin Disp. / Land Plug 500 PSI Did not Circulate Cmt to Surface
	1955							Washup truck wait for 150 SKS cmt
	2130							1" Pipe
	2130							Run 1" Pipe to 100'
	2200	1.25 bpm	18 bbl				100	Pump 75 SKS thru 1" to circulate to Surface.
	2315							Circulate 25 SKS into cellar
	2335							Cellar Stayed Full
	2345							Full 1", Washup truck.
								Rack up
	0005							Job Complete

Thanks  
Jon, Austin, Kirby

JOB LOG

SWIFT Services, Inc.

DATE 8/04/17 PAGE NO. 1

CUSTOMER		WELL NO.		LEASE		JOB TYPE		TICKET NO.	
TDI		#2		Engel South		Cmt Long String		30476	
CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS	
				T	C	TUBING	CASING		
	00:01							On location w/Float Equip	
								14# 5 1/2 Csg RTD - 3665 Total Pipe - 3666' Baffle - 3623' Centralizers - 1, 3, 88, 6, 8, 10, 11, 14 Basket - 2, 15	
	0130							Start Running Csg/Float Equip	
	0315							On Bottom, Hook up	
	0330							Break Circulation	
	0420	2	7					Plug Rat hole 30 SKS	
		2	5					Plug Mouse hole 20 SKS	
	0435	5	12			400		Pump Mudflush	
	0438	5	20			400		Pump KCL Spacer	
	0442	4	<del>27</del>			400		Start Cmt - 180 SKS standard	
	0455	4	27			300		Fin Cmt Drop Plug Washout P/L	
	0500	5				300		Start Displacement - 88.4 Bbl	
	0515	6	88.4			1300		Land Plug lift PSI 700 Land PSI 1300	
	0520					Ø		Release back, Held Wash up truck	
	0535							Rack up	
	0545							Job Complete	
								Thanks, Jon, Austin, Kirby	



## DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.  
Hays, KS 67601

ATTN: Herb Deines

### **Engel South #2**

### **21-15S-18W Ellis,KS**

Start Date: 2017.07.31 @ 16:46:05

End Date: 2017.07.31 @ 23:32:41

Job Ticket #: 63285                      DST #: 1

Trilobite Testing, Inc  
1515 Commerce Parkway Hays, KS 67601  
ph: 785-625-4778 fax: 785-625-5620

Printed: 2017.08.04 @ 08:40:50

TDI, Inc. 21-15S-18W Ellis,KS Engel South #2 DST # 1 Topoka - Oread 2017.07.31





**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

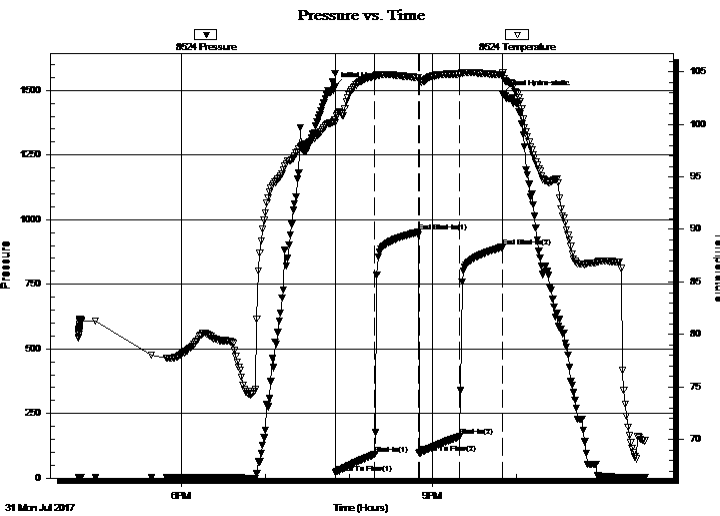
**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63285 **DST#: 1**  
Test Start: 2017.07.31 @ 16:46:05

## GENERAL INFORMATION:

Formation: **Topeka - Oread**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 19:50:11  
Time Test Ended: 23:32:41  
Interval: **3182.00 ft (KB) To 3199.00 ft (KB) (TVD)**  
Total Depth: 3199.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft  
Test Type: Conventional Bottom Hole (Initial)  
Tester: Brannan Lonsdale  
Unit No: 73

**Serial #: 8524 Outside**  
Press@RunDepth: 160.70 psig @ 3183.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.07.31 End Date: 2017.07.31 Last Calib.: 2017.07.31  
Start Time: 16:46:06 End Time: 23:32:41 Time On Btm: 2017.07.31 @ 19:49:41  
Time Off Btm: 2017.07.31 @ 21:50:11

TEST COMMENT: 30- IF- BOB 13 mins  
30- IS- No blow  
30- FF- BOB 17 mins  
30- FS- No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1515.87	100.38	Initial Hydro-static
1	19.88	100.13	Open To Flow (1)
29	92.95	104.55	Shut-In(1)
60	951.41	104.43	End Shut-In(1)
61	96.91	104.15	Open To Flow (2)
90	160.70	104.76	Shut-In(2)
120	892.76	104.69	End Shut-In(2)
121	1485.52	104.88	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
285.00	MW, 20%M 80%W	4.04

## Gas Rates

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



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis, KS**

**Engel South #2**

Job Ticket: 63285

**DST#: 1**

Test Start: 2017.07.31 @ 16:46:05

### GENERAL INFORMATION:

Formation: **Topeka - Oread**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:50:11

Time Test Ended: 23:32:41

Test Type: Conventional Bottom Hole (Initial)

Tester: Brannan Lonsdale

Unit No: 73

**Interval: 3182.00 ft (KB) To 3199.00 ft (KB) (TVD)**

Reference Elevations: 2019.00 ft (KB)

Total Depth: 3199.00 ft (KB) (TVD)

2009.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

**Serial #: 6771**

**Inside**

Press@RunDepth: psig @ 3183.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.07.31

End Date:

2017.07.31

Last Calib.:

2017.07.31

Start Time: 16:46:47

End Time:

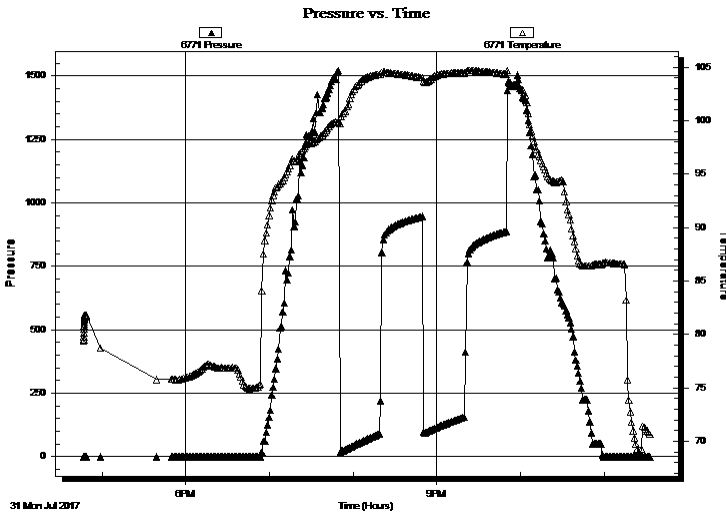
23:33:07

Time On Btm:

Time Off Btm:

TEST COMMENT: 30- IF- BOB 13 mins  
30- IS- No blow  
30- FF- BOB 17 mins  
30- FS- No blow

### PRESSURE SUMMARY



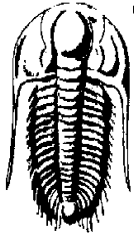
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

### Recovery

Length (ft)	Description	Volume (bbl)
285.00	MW, 20%M 80%W	4.04

### Gas Rates

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis,KS**  
**Engel South #2**  
Job Ticket: 63285      **DST#: 1**  
Test Start: 2017.07.31 @ 16:46:05

**Tool Information**

Drill Pipe:	Length: 3172.00 ft	Diameter: 3.82 inches	Volume: 44.96 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 2.25 inches	Volume: 0.00 bbl	Weight to Pull Loose:	55000.00 lb
			<u>Total Volume:</u> - bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:	10.00 ft			String Weight: Initial	41000.00 lb
Depth to Top Packer:	3182.00 ft			Final	44000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	17.00 ft				
Tool Length:	37.00 ft				
Number of Packers:	2	Diameter: 6.75 inches			

Tool Comments:

<b>Tool Description</b>	<b>Length (ft)</b>	<b>Serial No.</b>	<b>Position</b>	<b>Depth (ft)</b>	<b>Accum. Lengths</b>
-------------------------	--------------------	-------------------	-----------------	-------------------	-----------------------

Change Over Sub	1.00			3163.00	
Shut In Tool	5.00			3168.00	
Hydraulic tool	5.00			3173.00	
Packer	5.00			3178.00	20.00      Bottom Of Top Packer
Packer	4.00			3182.00	
Stubb	1.00			3183.00	
Recorder	0.00	6771	Inside	3183.00	
Recorder	0.00	8524	Outside	3183.00	
Perforations	13.00			3196.00	
Bullnose	3.00			3199.00	17.00      Bottom Packers & Anchor
<b>Total Tool Length:</b>	<b>37.00</b>				



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

## FLUID SUMMARY

TDI, Inc.

**21-15S-18W Ellis,KS**

1310 Bison Rd.  
Hays, KS 67601

**Engel South #2**

Job Ticket: 63285

**DST#: 1**

ATTN: Herb Deines

Test Start: 2017.07.31 @ 16:46:05

### Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

75000 ppm

Viscosity: 55.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.39 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2800.00 ppm

Filter Cake: inches

### Recovery Information

Recovery Table

Length ft	Description	Volume bbl
285.00	MW, 20%M 80%W	4.040

Total Length: 285.00 ft      Total Volume: 4.040 bbl

Num Fluid Samples: 0

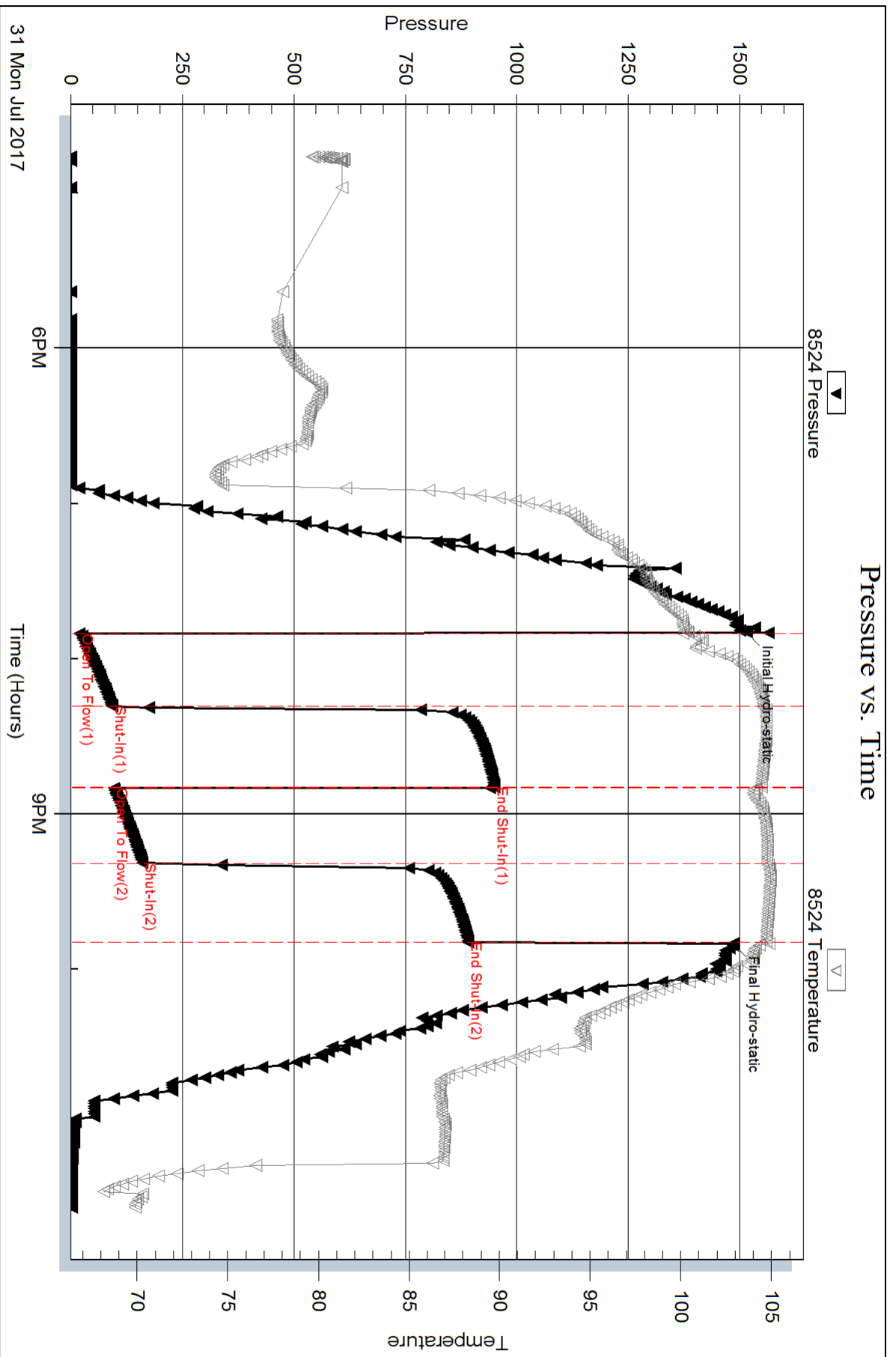
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW: .09@67deg



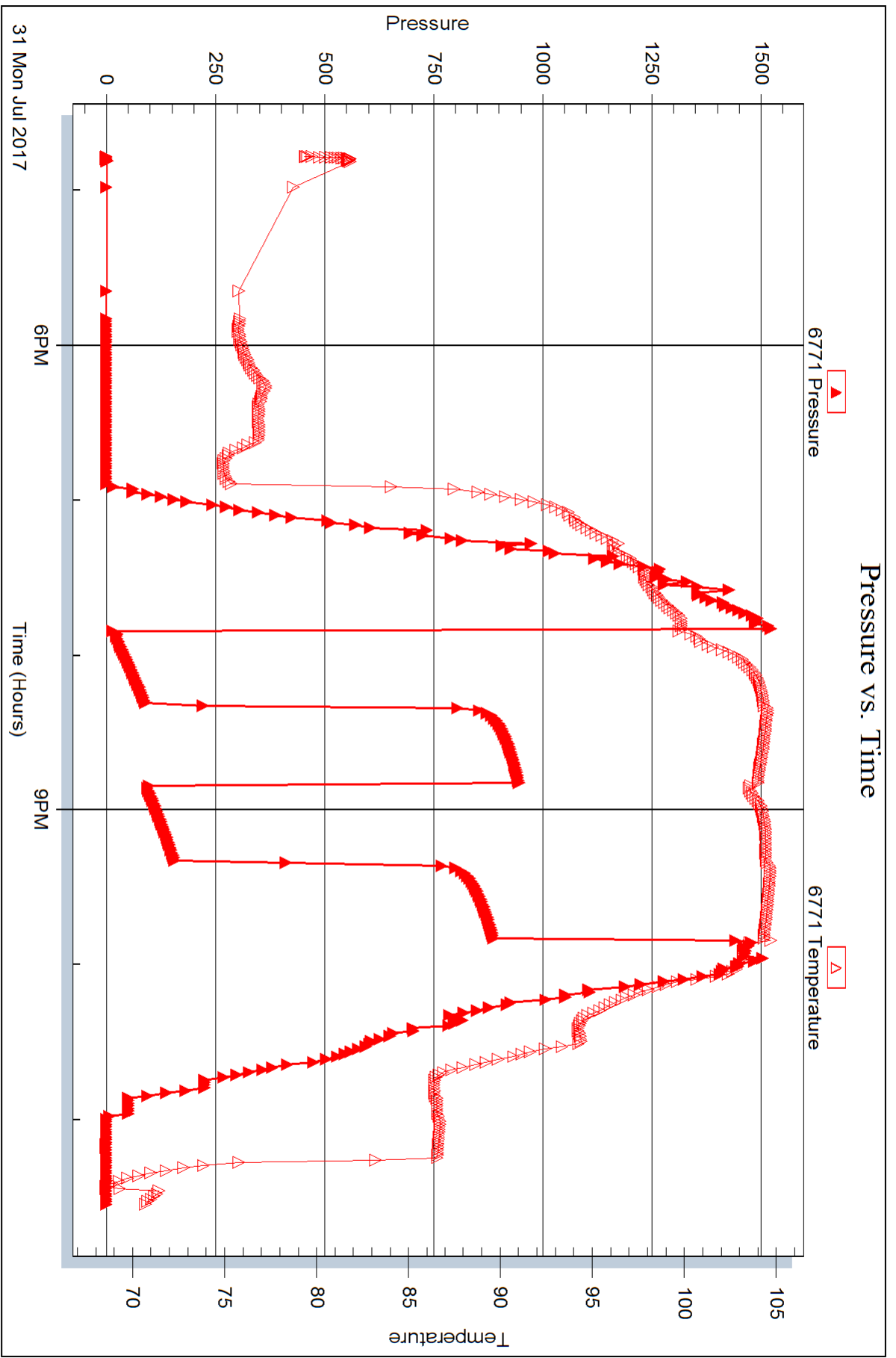
Serial #: 6771

Inside

TDI, Inc.

Engel South #2

DST Test Number: 1



Trilobite Testing, Inc

Ref. No: 63285

Printed: 2017.08.04 @ 08:40:51



## DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.  
Hays, KS 67601

ATTN: Herb Deines

### **Engel South #2**

#### **21-15S-18W Ellis,KS**

Start Date: 2017.08.02 @ 07:20:55

End Date: 2017.08.02 @ 14:11:16

Job Ticket #: 63286                      DST #: 2

Trilobite Testing, Inc  
1515 Commerce Parkway Hays, KS 67601  
ph: 785-625-4778 fax: 785-625-5620

Printed: 2017.08.04 @ 08:40:23



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

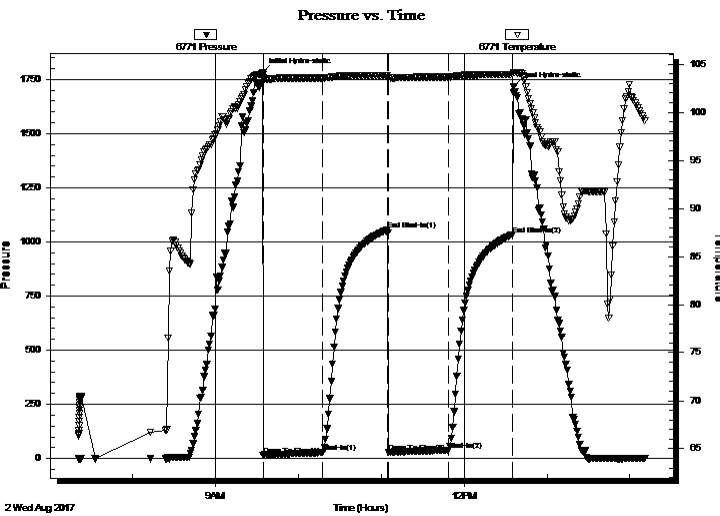
**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63286 **DST#: 2**  
Test Start: 2017.08.02 @ 07:20:55

## GENERAL INFORMATION:

Formation: **Conglomerate Sand**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 09:34:31  
Time Test Ended: 14:11:16  
Interval: **3529.00 ft (KB) To 3590.00 ft (KB) (TVD)**  
Total Depth: 3590.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft

**Serial #: 6771 Inside**  
Press@RunDepth: 37.96 psig @ 3530.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.08.02 End Date: 2017.08.02 Last Calib.: 2017.08.02  
Start Time: 07:20:56 End Time: 14:11:16 Time On Btm: 2017.08.02 @ 09:34:16  
Time Off Btm: 2017.08.02 @ 12:36:01

TEST COMMENT: 45- IF- Built very slow ly to 2 1/2"  
45- IS- No blow  
45- FF- No blow  
45- FSI- No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1782.41	103.95	Initial Hydro-static
1	16.04	103.56	Open To Flow (1)
44	27.54	103.56	Shut-In(1)
91	1056.08	103.85	End Shut-In(1)
92	28.40	103.59	Open To Flow (2)
135	37.96	103.67	Shut-In(2)
181	1033.75	103.93	End Shut-In(2)
182	1716.98	104.13	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	M	0.07
55.00	CO	0.64

\* Recovery from multiple tests

## Gas Rates

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





**TRILOBITE TESTING, INC.**

**DRILL STEM TEST REPORT**

TDI, Inc.  
 1310 Bison Rd.  
 Hays, KS 67601  
 ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
 Job Ticket: 63286 **DST#: 2**  
 Test Start: 2017.08.02 @ 07:20:55

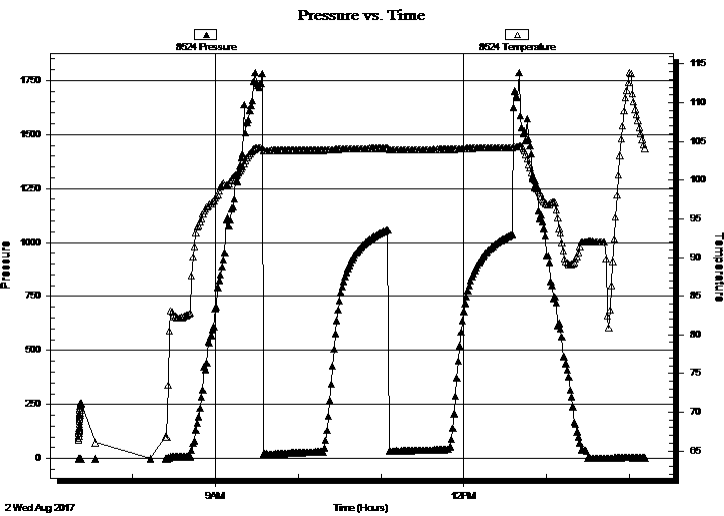
**GENERAL INFORMATION:**

Formation: **Conglomerate Sand**  
 Deviated: No Whipstock: ft (KB) Test Type: Conventional Bottom Hole (Reset)  
 Time Tool Opened: 09:34:31 Tester: Brannan Lonsdale  
 Time Test Ended: 14:11:16 Unit No: 73  
**Interval: 3529.00 ft (KB) To 3590.00 ft (KB) (TVD)** Reference Elevations: 2019.00 ft (KB)  
 Total Depth: 3590.00 ft (KB) (TVD) 2009.00 ft (CF)  
 Hole Diameter: 7.88 inches Hole Condition: Fair KB to GR/CF: 10.00 ft

**Serial #: 8524 Outside**

Press@RunDepth: psig @ 3530.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.08.02 End Date: 2017.08.02 Last Calib.: 2017.08.02  
 Start Time: 07:21:08 End Time: 14:11:43 Time On Btm:  
 Time Off Btm:

**TEST COMMENT:** 45- IF- Built very slow ly to 2 1/2"  
 45- ISI- No blow  
 45- FF- No blow  
 45- FSI- No blow



**PRESSURE SUMMARY**

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

**Recovery**

Length (ft)	Description	Volume (bbl)
15.00	M	0.07
55.00	CO	0.64

\* Recovery from multiple tests

**Gas Rates**

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



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis,KS**  
**Engel South #2**  
Job Ticket: 63286 **DST#: 2**  
Test Start: 2017.08.02 @ 07:20:55

**Tool Information**

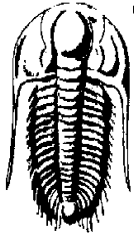
Drill Pipe:	Length: 3490.00 ft	Diameter: 3.82 inches	Volume: 49.47 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 66000.00 lb
			<u>Total Volume: - bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	11.00 ft			String Weight: Initial 48000.00 lb
Depth to Top Packer:	3529.00 ft			Final 49000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	61.00 ft			
Tool Length:	81.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

<b>Tool Description</b>	<b>Length (ft)</b>	<b>Serial No.</b>	<b>Position</b>	<b>Depth (ft)</b>	<b>Accum. Lengths</b>
-------------------------	--------------------	-------------------	-----------------	-------------------	-----------------------

Change Over Sub	1.00			3510.00	
Shut In Tool	5.00			3515.00	
Hydraulic tool	5.00			3520.00	
Packer	5.00			3525.00	20.00 Bottom Of Top Packer
Packer	4.00			3529.00	
Stubb	1.00			3530.00	
Recorder	0.00	6771	Inside	3530.00	
Recorder	0.00	8524	Outside	3530.00	
Perforations	24.00			3554.00	
Change Over Sub	1.00			3555.00	
Drill Pipe	31.00			3586.00	
Change Over Sub	1.00			3587.00	
Bullnose	3.00			3590.00	61.00 Bottom Packers & Anchor

**Total Tool Length: 81.00**



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

**FLUID SUMMARY**

TDI, Inc.

**21-15S-18W Ellis,KS**

1310 Bison Rd.  
Hays, KS 67601

**Engel South #2**

Job Ticket: 63286

**DST#: 2**

ATTN: Herb Deines

Test Start: 2017.08.02 @ 07:20:55

### Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

30 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 56.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.79 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 7300.00 ppm

Filter Cake: inches

### Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
15.00	M	0.074
55.00	CO	0.641

Total Length: 70.00 ft      Total Volume: 0.715 bbl

Num Fluid Samples: 0

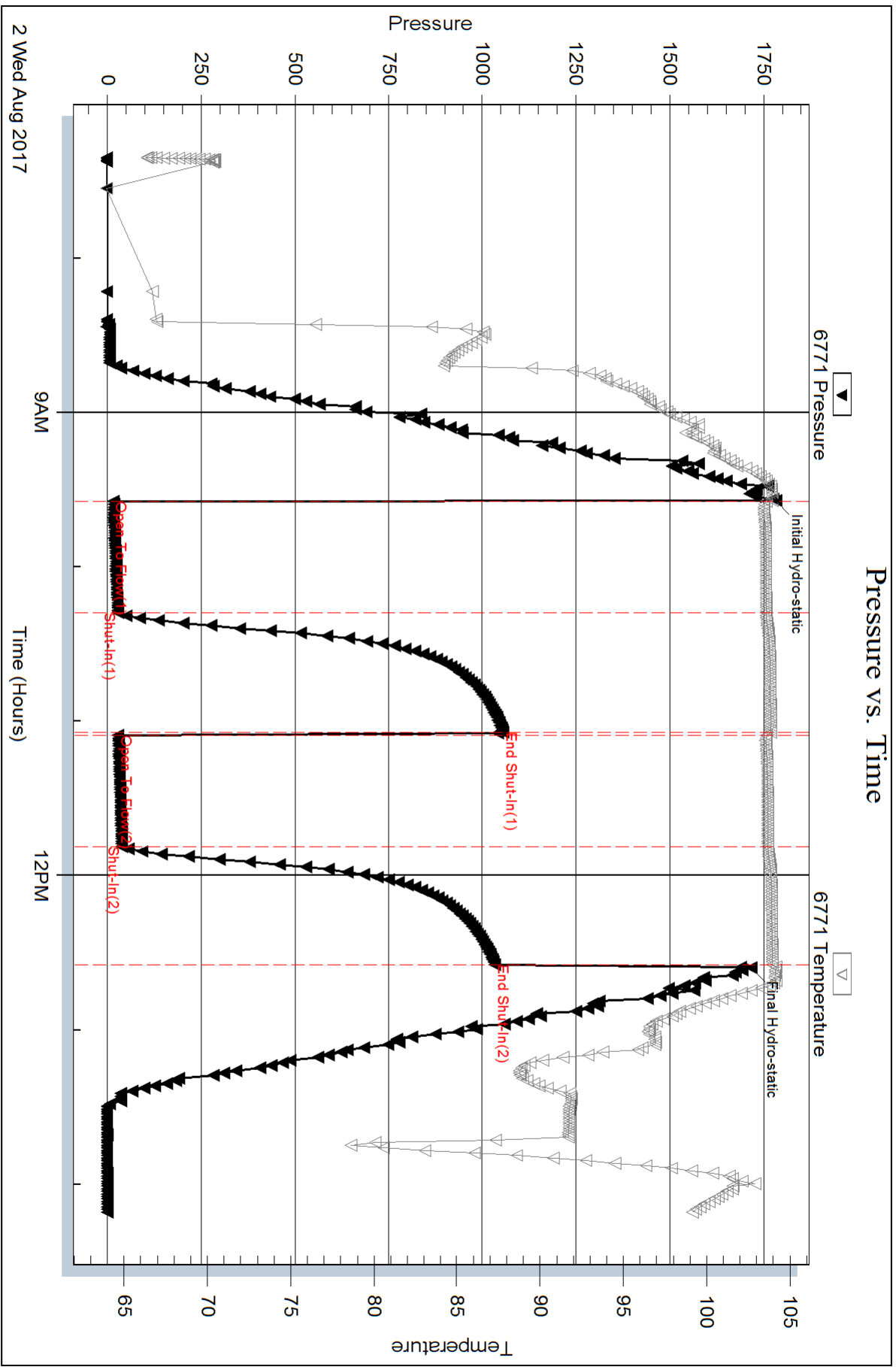
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: Gravity: 35 @ 110deg

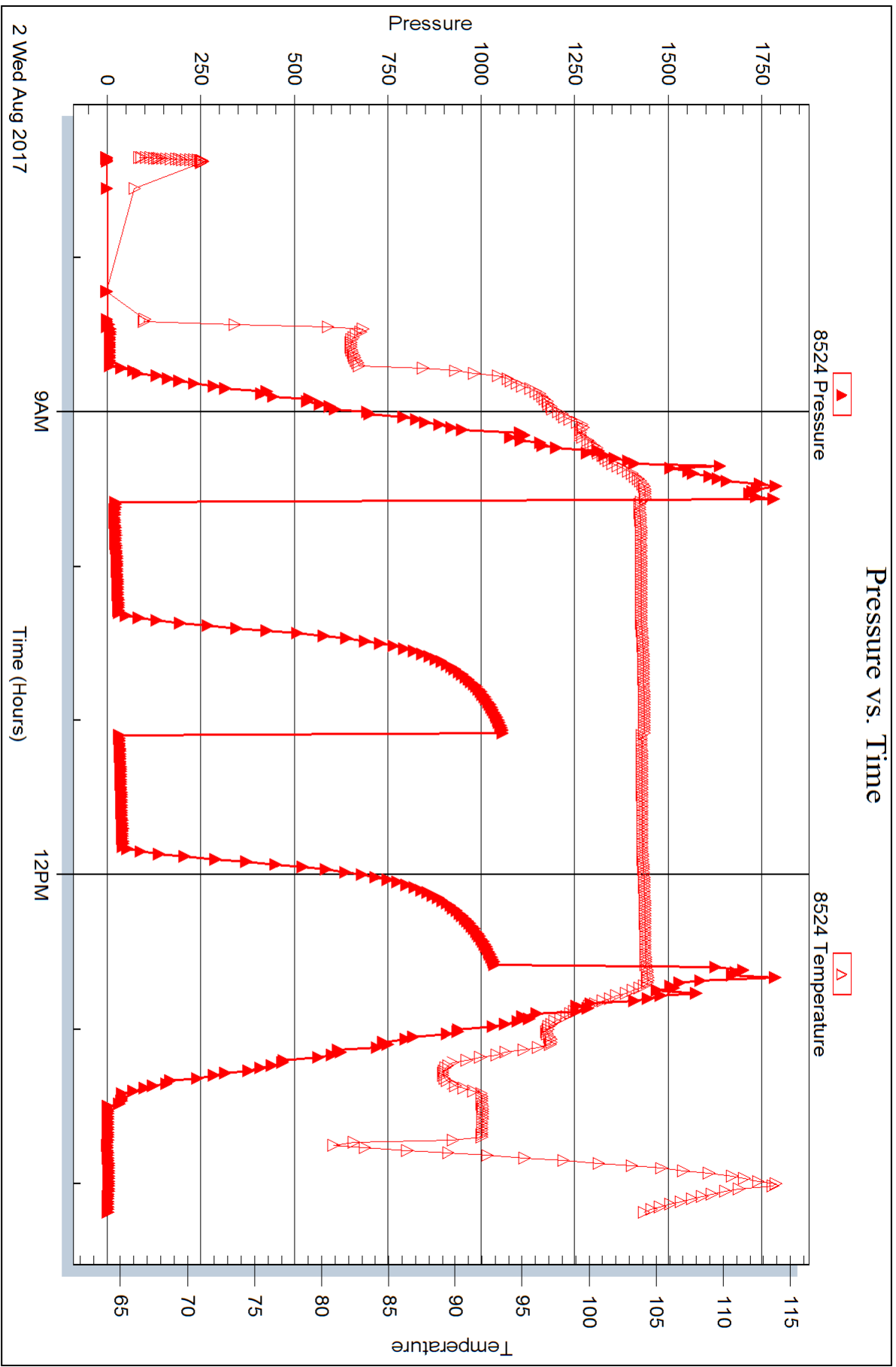


Serial #: 8524

Outside TDI, Inc.

Engel South #2

DST Test Number: 2



Trilobite Testing, Inc

Ref. No: 63286

Printed: 2017.08.04 @ 08:40:24



## DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.  
Hays, KS 67601

ATTN: Herb Deines

### **Engel South #2**

#### **21-15S-18W Ellis,KS**

Start Date: 2017.08.02 @ 18:27:58

End Date: 2017.08.03 @ 00:34:19

Job Ticket #: 63287                      DST #: 3

Trilobite Testing, Inc  
1515 Commerce Parkway Hays, KS 67601  
ph: 785-625-4778 fax: 785-625-5620

Printed: 2017.08.04 @ 08:39:51



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

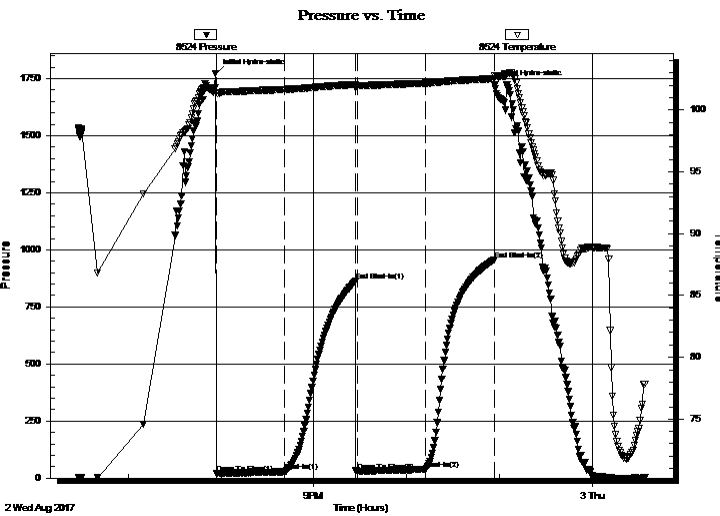
**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63287 **DST#: 3**  
Test Start: 2017.08.02 @ 18:27:58

## GENERAL INFORMATION:

Formation: **Conglomerate Sand**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 19:57:19  
Time Test Ended: 00:34:19  
Interval: **3508.00 ft (KB) To 3599.00 ft (KB) (TVD)**  
Total Depth: 3599.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft

**Serial #: 8524 Outside**  
Press@RunDepth: 39.72 psig @ 3509.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.08.02 End Date: 2017.08.03 Last Calib.: 2017.08.03  
Start Time: 18:27:59 End Time: 00:34:19 Time On Btm: 2017.08.02 @ 19:56:49  
Time Off Btm: 2017.08.02 @ 22:57:04

TEST COMMENT: 45- IF- Built very slow ly to 2 1/2"  
45- IS- No blow  
45- FF- Built very slow ly to 1 1/2"  
45- FS- No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1772.83	101.84	Initial Hydro-static
1	21.32	101.42	Open To Flow (1)
45	27.79	101.66	Shut-In(1)
91	862.76	102.06	End Shut-In(1)
92	28.34	101.95	Open To Flow (2)
136	39.72	102.17	Shut-In(2)
180	955.64	102.53	End Shut-In(2)
181	1721.87	102.74	Final Hydro-static

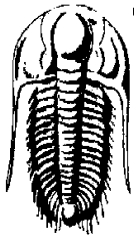
## Recovery

Length (ft)	Description	Volume (bbl)
30.00	M	0.43
40.00	CO	0.57

\* Recovery from multiple tests

## Gas Rates

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



# TRILOBITE TESTING, INC.

## DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63287      **DST#: 3**  
Test Start: 2017.08.02 @ 18:27:58

### GENERAL INFORMATION:

Formation: **Conglomerate Sand**  
Deviated: No      Whipstock:      ft (KB)  
Time Tool Opened: 19:57:19  
Time Test Ended: 00:34:19  
Interval: **3508.00 ft (KB) To 3599.00 ft (KB) (TVD)**  
Total Depth: 3599.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches      Hole Condition: Fair  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft

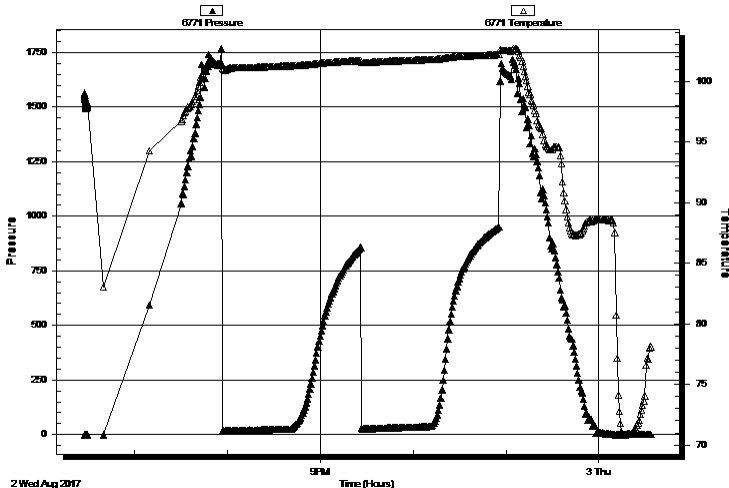
### Serial #: 6771

Inside

Press@RunDepth:      psig @ 3509.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2017.08.02      End Date: 2017.08.03      Last Calib.: 2017.08.03  
Start Time: 18:27:27      End Time: 00:33:32      Time On Btm:  
Time Off Btm:

TEST COMMENT: 45- IF- Built very slow ly to 2 1/2"  
45- IS- No blow  
45- FF- Built very slow ly to 1 1/2"  
45- FS- No blow

Pressure vs. Time



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

### Recovery

Length (ft)	Description	Volume (bbl)
30.00	M	0.43
40.00	CO	0.57

### Gas Rates

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

\* Recovery from multiple tests





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis,KS**  
**Engel South #2**  
Job Ticket: 63287      **DST#: 3**  
Test Start: 2017.08.02 @ 18:27:58

**Tool Information**

Drill Pipe:	Length: 3520.00 ft	Diameter: 3.82 inches	Volume: 49.90 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 2.25 inches	Volume: 0.00 bbl	Weight to Pull Loose:	70000.00 lb
			<u>Total Volume:</u> - bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:	32.00 ft			String Weight: Initial	48000.00 lb
Depth to Top Packer:	3508.00 ft			Final	48000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	91.00 ft				
Tool Length:	111.00 ft				
Number of Packers:	2	Diameter: 6.75 inches			

Tool Comments:

<b>Tool Description</b>	<b>Length (ft)</b>	<b>Serial No.</b>	<b>Position</b>	<b>Depth (ft)</b>	<b>Accum. Lengths</b>
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Change Over Sub	1.00			3489.00	
Shut In Tool	5.00			3494.00	
Hydraulic tool	5.00			3499.00	
Packer	5.00			3504.00	20.00      Bottom Of Top Packer
Packer	4.00			3508.00	
Stubb	1.00			3509.00	
Recorder	0.00	6771	Inside	3509.00	
Recorder	0.00	8524	Outside	3509.00	
Perforations	22.00			3531.00	
Change Over Sub	1.00			3532.00	
Drill Pipe	63.00			3595.00	
Change Over Sub	1.00			3596.00	
Bullnose	3.00			3599.00	91.00      Bottom Packers & Anchor

**Total Tool Length: 111.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63287      **DST#: 3**  
Test Start: 2017.08.02 @ 18:27:58

## Mud and Cushion Information

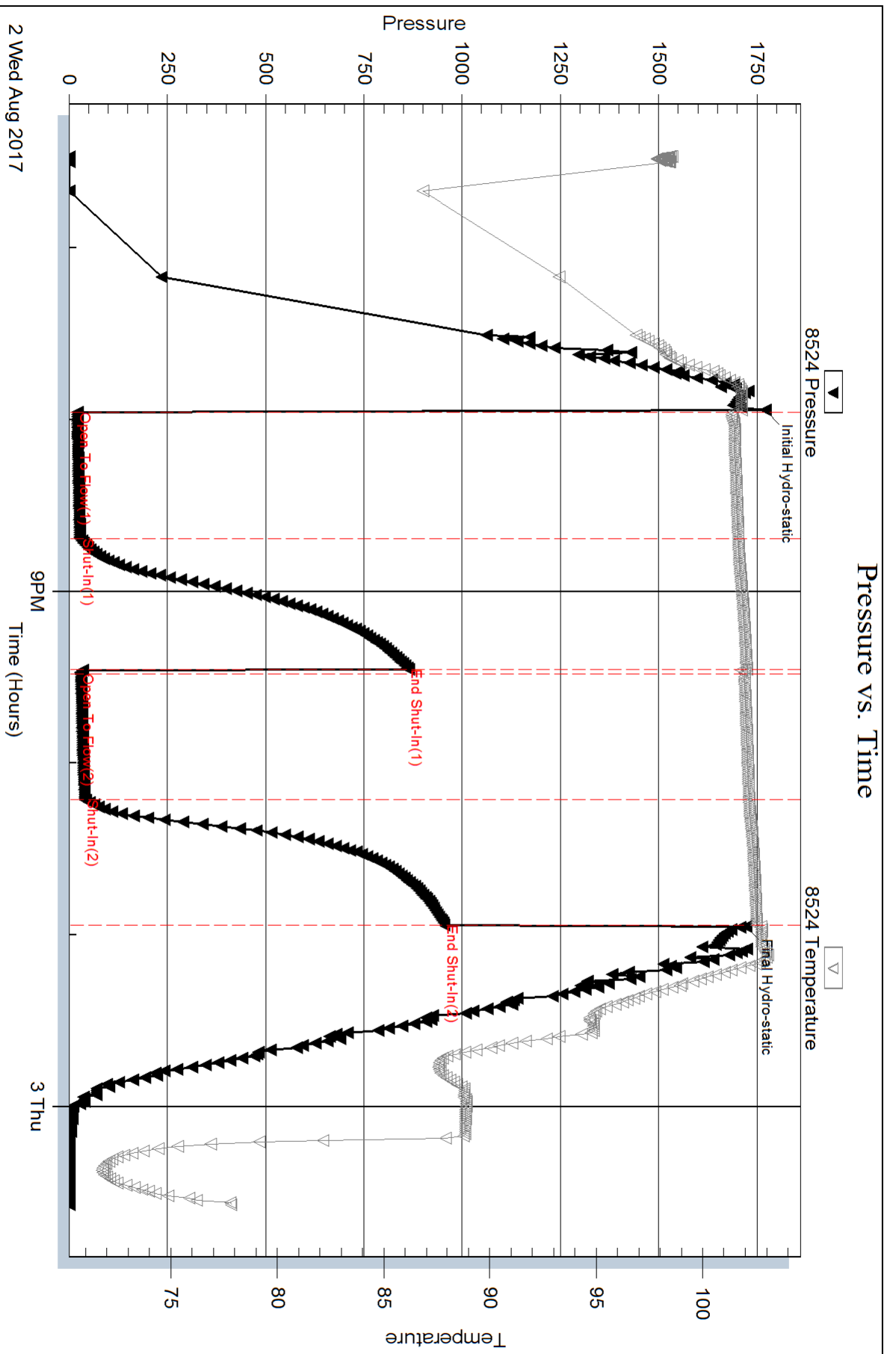
Mud Type: Gel Chem	Cushion Type:	Oil API: 30 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 56.00 sec/qt	Cushion Volume: bbl	
Water Loss: 6.79 in <sup>3</sup>	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 7300.00 ppm		
Filter Cake: inches		

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
30.00	M	0.425
40.00	CO	0.567

Total Length: 70.00 ft      Total Volume: 0.992 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:







## DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.  
Hays, KS 67601

ATTN: Herb Deines

### **Engel South #2**

#### **21-15S-18W Ellis,KS**

Start Date: 2017.08.03 @ 12:30:26

End Date: 2017.08.03 @ 18:28:02

Job Ticket #: 63288                      DST #: 4

Trilobite Testing, Inc  
1515 Commerce Parkway Hays, KS 67601  
ph: 785-625-4778 fax: 785-625-5620

Printed: 2017.08.04 @ 08:38:50



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63288 **DST#: 4**  
Test Start: 2017.08.03 @ 12:30:26

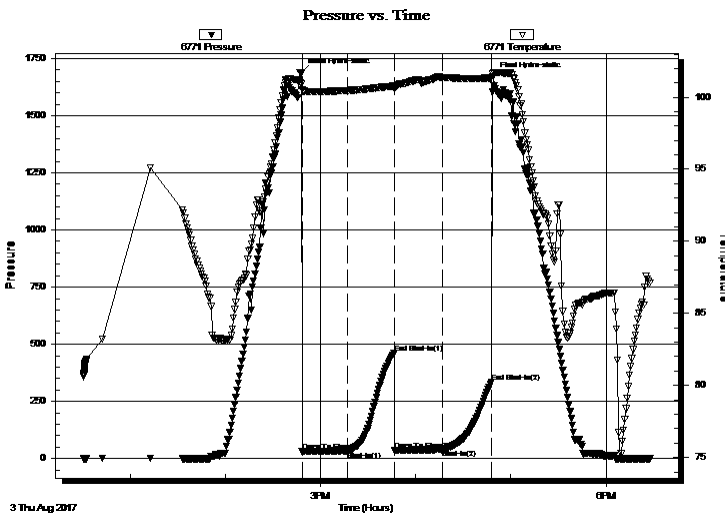
## GENERAL INFORMATION:

Formation: **LKC "C - D"**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 14:48:17  
Time Test Ended: 18:28:02  
Interval: **3299.00 ft (KB) To 3345.00 ft (KB) (TVD)**  
Total Depth: 3670.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Straddle (Reset)  
Tester: Brannan Lonsdale  
Unit No: 73  
Reference Elevations: 2019.00 ft (KB)  
2009.00 ft (CF)  
KB to GR/CF: 10.00 ft

**Serial #: 6771 Inside**  
Press@RunDepth: 39.24 psig @ 3300.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2017.08.03 End Date: 2017.08.03 Last Calib.: 2017.08.03  
Start Time: 12:30:27 End Time: 18:28:02 Time On Btm: 2017.08.03 @ 14:48:02  
Time Off Btm: 2017.08.03 @ 16:48:47

**TEST COMMENT:** 30- IF- Surface blow died in 7 mins  
30- IS- No blow  
30- FF- No blow  
30- FSI- No blow

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1688.92	100.90	Initial Hydro-static
1	29.57	100.53	Open To Flow (1)
29	33.70	100.47	Shut-In(1)
59	460.46	100.77	End Shut-In(1)
59	35.18	100.57	Open To Flow (2)
89	39.24	101.36	Shut-In(2)
120	334.75	101.34	End Shut-In(2)
121	1671.01	101.65	Final Hydro-static

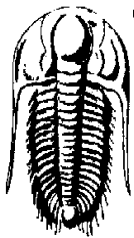
## Recovery

Length (ft)	Description	Volume (bbl)
3.00	Mw / few oil spots	0.01

\* Recovery from multiple tests

## Gas Rates

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



# TRILOBITE TESTING, INC.

## DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

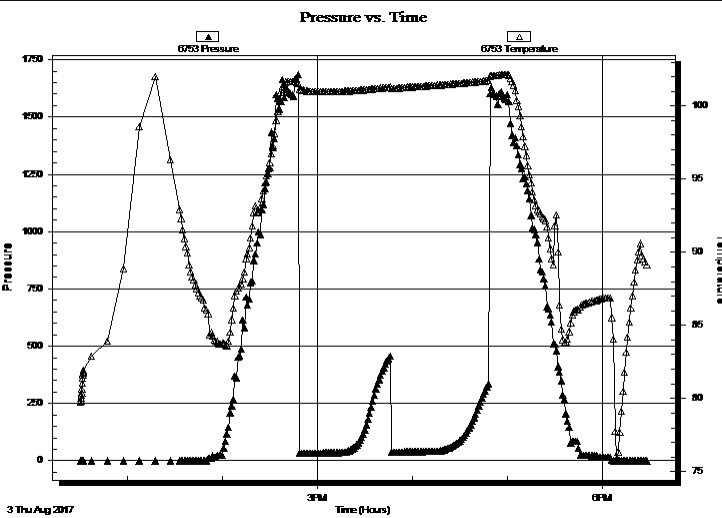
**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63288      **DST#: 4**  
Test Start: 2017.08.03 @ 12:30:26

### GENERAL INFORMATION:

Formation: <b>LKC "C - D"</b>	Test Type: Conventional Straddle (Reset)
Deviated: No Whipstock: ft (KB)	Tester: Brannan Lonsdale
Time Tool Opened: 14:48:17	Unit No: 73
Time Test Ended: 18:28:02	Reference Elevations: 2019.00 ft (KB)
Interval: <b>3299.00 ft (KB) To 3345.00 ft (KB) (TVD)</b>	2009.00 ft (CF)
Total Depth: 3670.00 ft (KB) (TVD)	KB to GR/CF: 10.00 ft
Hole Diameter: 7.88 inches Hole Condition: Fair	

<b>Serial #: 6753</b> <b>Outside</b>	
Press@RunDepth:                  psig @      3300.00 ft (KB)	Capacity:                                  8000.00 psig
Start Date:                                  2017.08.03      End Date:                                  2017.08.03	Last Calib.:                                  2017.08.03
Start Time:                                  12:30:14      End Time:                                  18:27:38	Time On Btm:
	Time Off Btm:

TEST COMMENT: 30- IF- Surface blow died in 7 mins  
30- IS- No blow  
30- FF- No blow  
30- FSI- No blow



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

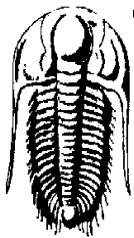
### Recovery

Length (ft)	Description	Volume (bbl)
3.00	Mw / few oil spots	0.01

### Gas Rates

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

\* Recovery from multiple tests



**TRILOBITE**  
**TESTING, INC.**

# DRILL STEM TEST REPORT

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

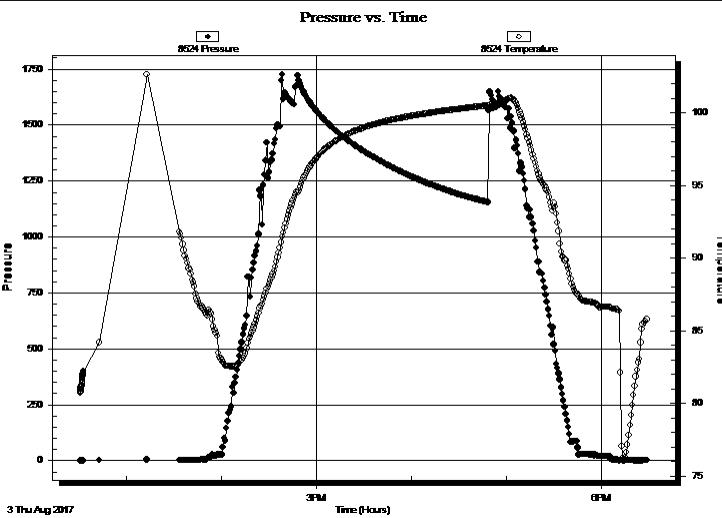
**21-15S-18W Ellis, KS**  
**Engel South #2**  
Job Ticket: 63288      **DST#: 4**  
Test Start: 2017.08.03 @ 12:30:26

## GENERAL INFORMATION:

Formation: **LKC "C - D"**  
 Deviated: No Whipstock: ft (KB)      Test Type: Conventional Straddle (Reset)  
 Time Tool Opened: 14:48:17      Tester: Brannan Lonsdale  
 Time Test Ended: 18:28:02      Unit No: 73  
 Interval: **3299.00 ft (KB) To 3345.00 ft (KB) (TVD)**      Reference Elevations: 2019.00 ft (KB)  
 Total Depth: 3670.00 ft (KB) (TVD)      2009.00 ft (CF)  
 Hole Diameter: 7.88 inches Hole Condition: Fair      KB to GR/CF: 10.00 ft

**Serial #: 8524      Below (Straddle)**  
 Press@RunDepth: psig @ 3347.00 ft (KB)      Capacity: 8000.00 psig  
 Start Date: 2017.08.03      End Date: 2017.08.03      Last Calib.: 2017.08.03  
 Start Time: 12:30:50      End Time: 18:28:40      Time On Btm:  
    Time Off Btm:

**TEST COMMENT:** 30- IF- Surface blow died in 7 mins  
 30- IS- No blow  
 30- FF- No blow  
 30- FS- No blow



PRESSURE SUMMARY			
Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation

Recovery		
Length (ft)	Description	Volume (bbl)
3.00	Mw / few oil spots	0.01

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

\* Recovery from multiple tests





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis,KS**  
**Engel South #2**  
Job Ticket: 63288 **DST#: 4**  
Test Start: 2017.08.03 @ 12:30:26

**Tool Information**

Drill Pipe:	Length: 3266.00 ft	Diameter: 3.82 inches	Volume: 46.30 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: ft	Diameter: inches	Volume: - bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose:	53000.00 lb
			<u>Total Volume: - bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	17.00 ft			String Weight: Initial	51000.00 lb
Depth to Top Packer:	3299.00 ft			Final	51000.00 lb
Depth to Bottom Packer:	3345.00 ft				
Interval between Packers:	46.00 ft				
Tool Length:	391.00 ft				
Number of Packers:	3	Diameter: 6.75 inches			

Tool Comments:

**Tool Description                      Length (ft)   Serial No.   Position   Depth (ft)   Accum. Lengths**

Change Over Sub	1.00			3280.00	
Shut In Tool	5.00			3285.00	
Hydraulic tool	5.00			3290.00	
Packer	5.00			3295.00	20.00      Bottom Of Top Packer
Packer	4.00			3299.00	
Stubb	1.00			3300.00	
Recorder	0.00	6771	Inside	3300.00	
Recorder	0.00	6753	Outside	3300.00	
Perforations	2.00			3302.00	
Change Over Sub	1.00			3303.00	
Drill Pipe	32.00			3335.00	
Change Over Sub	1.00			3336.00	
Perforations	5.00			3341.00	
Blank Off Sub	1.00			3342.00	
Blank Spacing	3.00			3345.00	46.00      Tool Interval
Packer	1.00			3346.00	
Stubb	1.00			3347.00	
Recorder	0.00	8524	Below	3347.00	
Change Over Sub	1.00			3348.00	
Drill Pipe	318.00			3666.00	
Change Over Sub	1.00			3667.00	
Bullnose	3.00			3670.00	325.00      Bottom Packers & Anchor

**Total Tool Length: 391.00**



**TRILOBITE  
TESTING, INC.**

**DRILL STEM TEST REPORT**

**FLUID SUMMARY**

TDI, Inc.  
1310 Bison Rd.  
Hays, KS 67601  
ATTN: Herb Deines

**21-15S-18W Ellis,KS**  
**Engel South #2**  
Job Ticket: 63288      **DST#: 4**  
Test Start: 2017.08.03 @ 12:30:26

**Mud and Cushion Information**

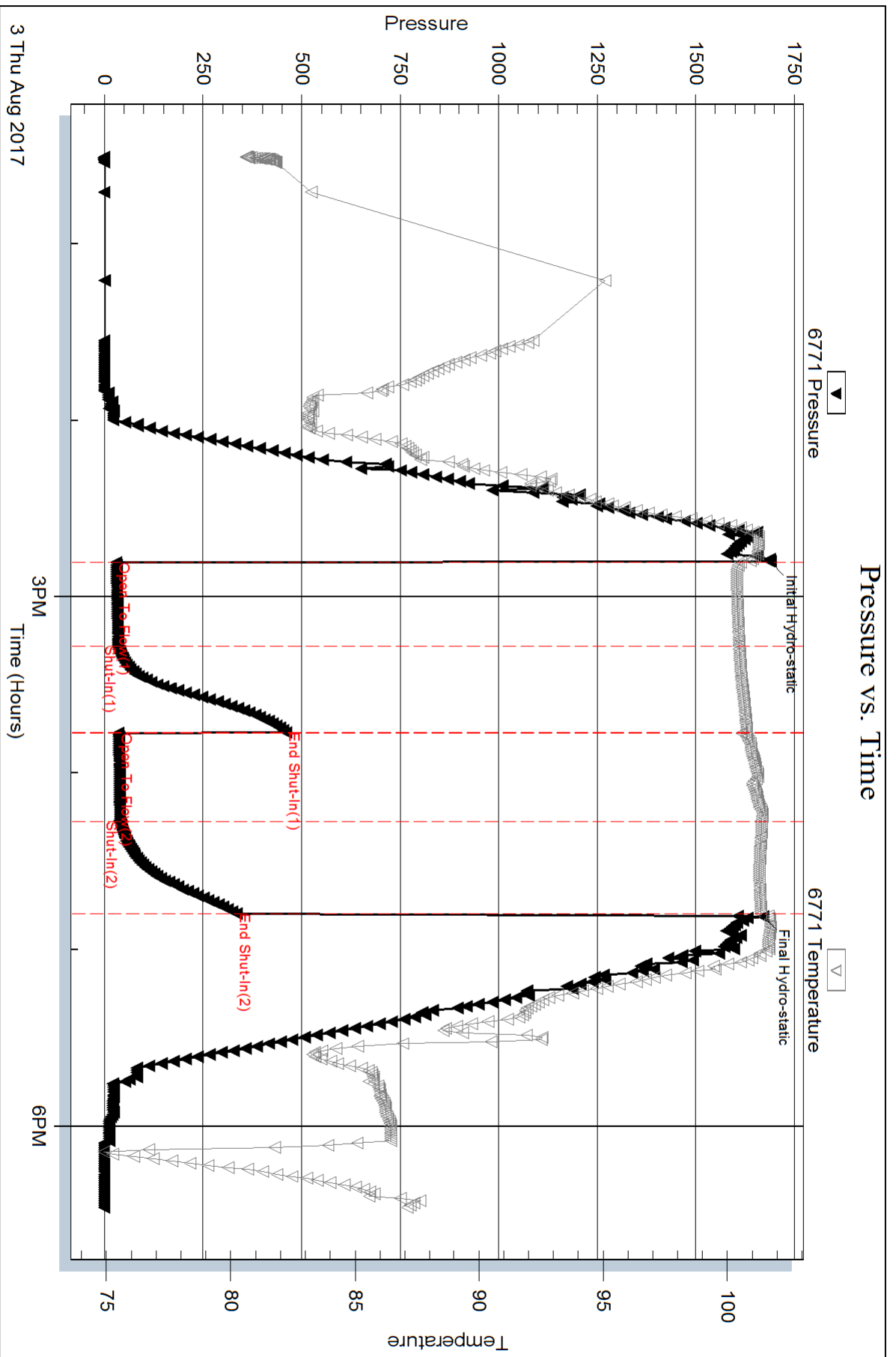
Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 51.00 sec/qt	Cushion Volume: bbl		
Water Loss: 6.38 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 6700.00 ppm			
Filter Cake: inches			

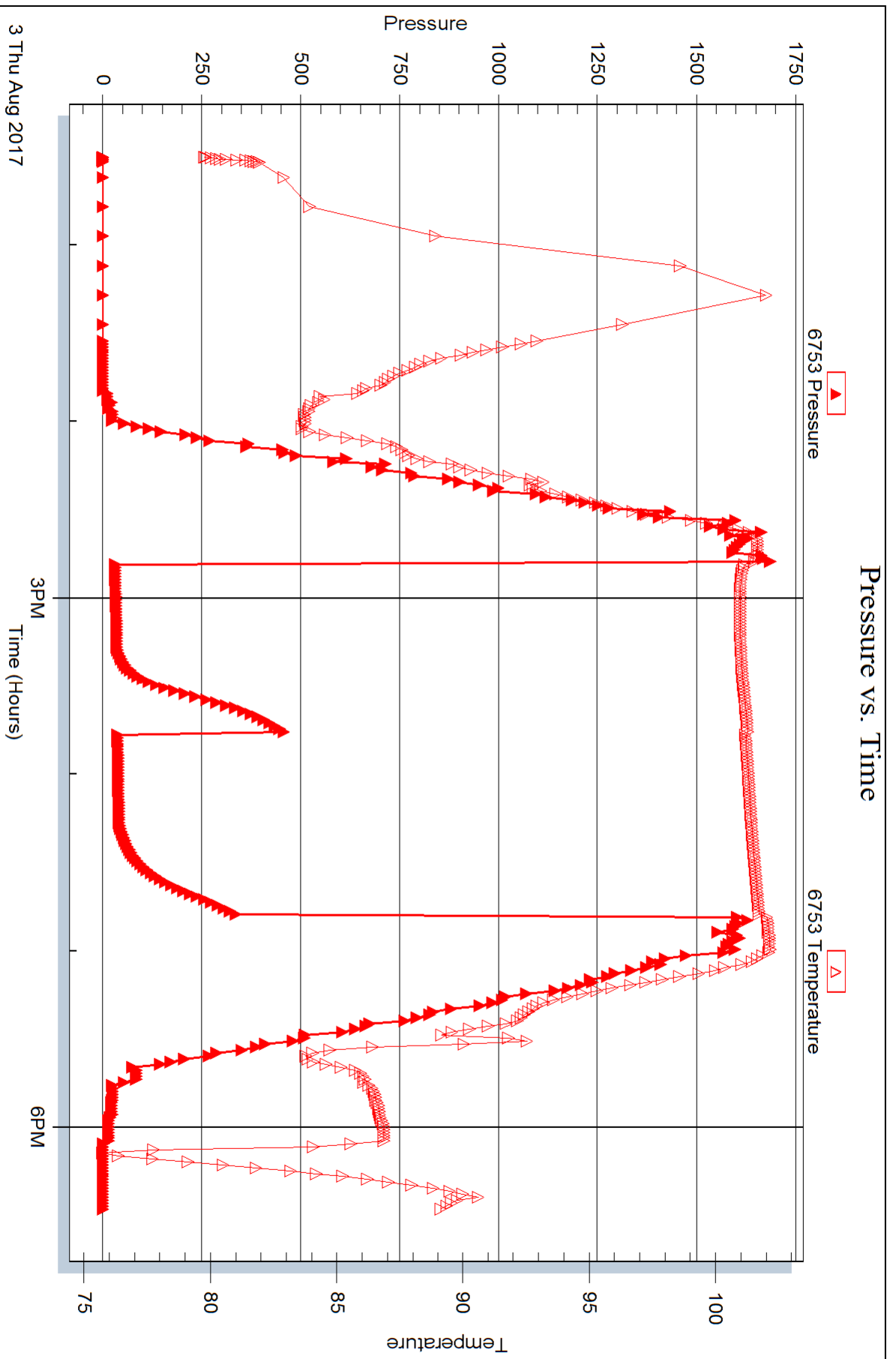
**Recovery Information**

Recovery Table

Length ft	Description	Volume bbl
3.00	Mw / few oil spots	0.015

Total Length: 3.00 ft      Total Volume: 0.015 bbl  
 Num Fluid Samples: 0      Num Gas Bombs: 0      Serial #:  
 Laboratory Name:      Laboratory Location:  
 Recovery Comments:



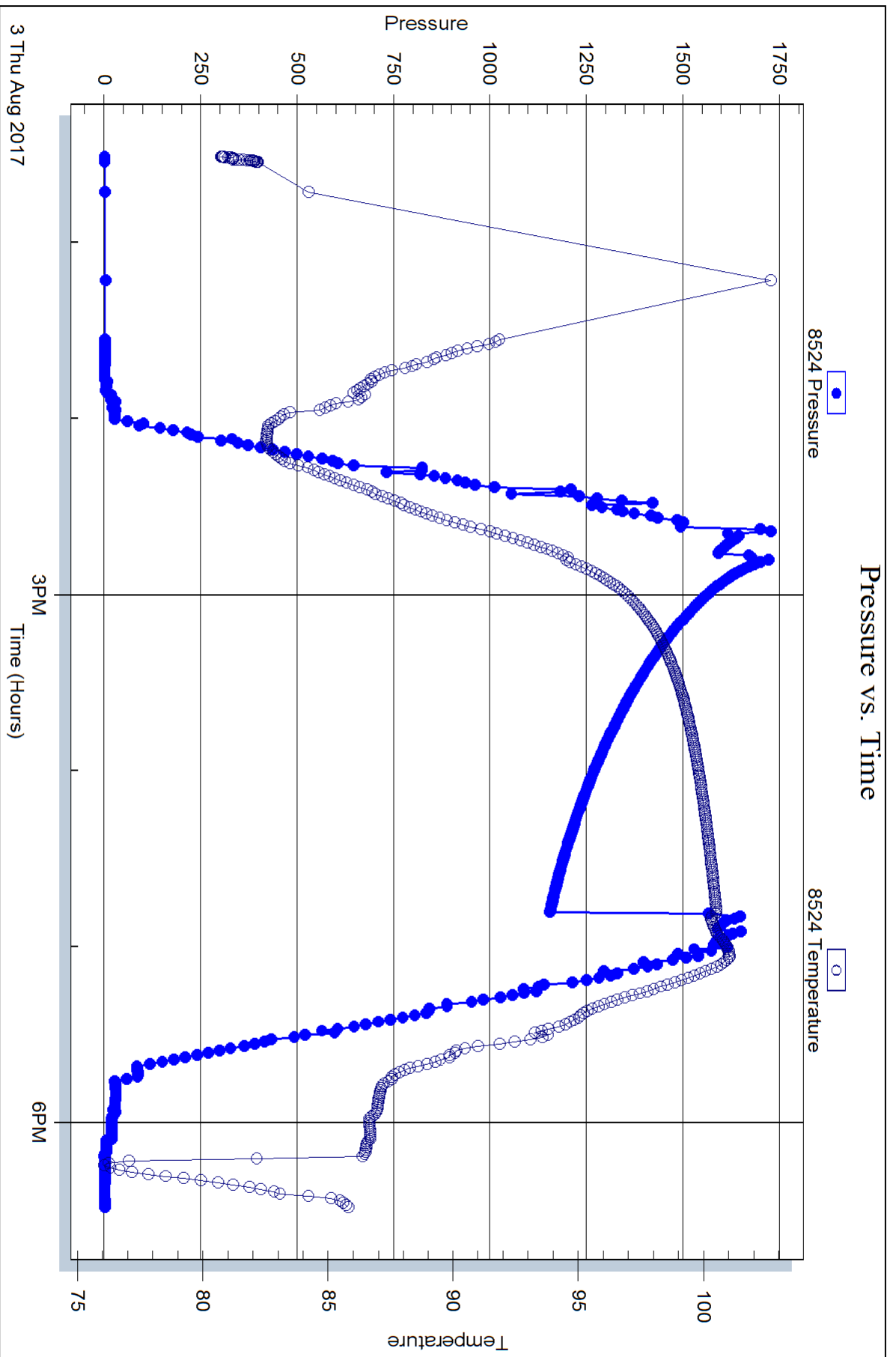


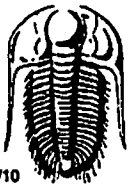
Serial #: 8524

Below (Stratall)lp.

Engel South #2

DST Test Number: 4





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63285

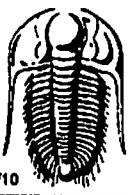
Well Name & No. Engel South #2 Test No. 1 Date 7/31/17  
 Company TDI, Inc. Elevation 2019 KB 2009 GL  
 Address 1310 Bison Rd Hays, KS 67601  
 Co. Rep / Geo. Herb Deines Rig Southwell #B  
 Location: Sec. 21 Twp. 15 S Rge. 18 W Co. E/15 State KS

Interval Tested 3182-3199 Zone Tested Topeka + Oread  
 Anchor Length 17' Drill Pipe Run 3172 Mud Wt. 8.6  
 Top Packer Depth 3177 Drill Collars Run — Vis 55  
 Bottom Packer Depth 3182 Wt. Pipe Run — WL 6.4  
 Total Depth 3199 Chlorides 2800 ppm System LCM 2#  
 Blow Description IF - BOB 13 mins  
ESI - No blow  
FF - BOB 17 mins  
ESI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>285</u>	<u>MW</u>			<u>80</u>	<u>20</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 285' BHT 105° Gravity — API RW .09 @ 67° F Chlorides 25000 ppm  
 (A) Initial Hydrostatic 1516  Test 1050 T-On Location 1645  
 (B) First Initial Flow 20  Jars — T-Started 1646  
 (C) First Final Flow 93  Safety Joint — T-Open 1950  
 (D) Initial Shut-In 951  Circ Sub — T-Pulled 2150  
 (E) Second Initial Flow 97  Hourly Standby — T-Out 2333  
 (F) Second Final Flow 161  Mileage 24 RT 18  
 (G) Final Shut-In 893  Sampler —  
 (H) Final Hydrostatic 1486  Straddle —  
 Shale Packer —  
 Shale Packer —  
 Extra Packer —  
 Extra Recorder —  
 Day Standby —  
 Accessibility —  
 Initial Open 30  
 Initial Shut-In 30  
 Final Flow 30  
 Final Shut-In 30  
 Sub Total 0  
 Total 1068  
 MP/DST Disc't —  
 Sub Total 1068

Approved By \_\_\_\_\_ Our Representative Bannan Lonsdale  
 TriLOBITE TESTING Inc. shall not be liable for damaged of any kind of 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 statements or opinion concerning the results 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.



# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63286

Well Name & No. Engel South #2 Test No. 2 Date 8/2/17  
 Company TDE, Inc. Elevation 2019 KB 2609 GL  
 Address 1310 Bison Rd. Hays, KS 67601  
 Co. Rep / Geo. Herb Deines Rig Southwind #1  
 Location: Sec. 21 Twp. 15 S Rge. 18 W Co. Ellis State KS

Interval Tested 3529-3590 Zone Tested Cong. Sand  
 Anchor Length 61' Drill Pipe Run 3520 Mud Wt. 9.1  
 Top Packer Depth 3524 Drill Collars Run --- Vis 56  
 Bottom Packer Depth 3529 Wt. Pipe Run --- WL 6.8  
 Total Depth 3590 Chlorides 7,300 ppm System LCM 1#  
 Blow Description IF- Built very slowly to 2 1/2"  
FSI- No blow  
FF- No blow  
FSI- No blow

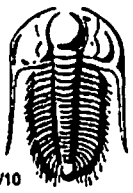
Rec	Feet of	%gas	%oil	%water	%mud
<u>15</u>	<u>M</u>				
<u>55</u>	<u>CO</u>				

Rec Total 20' BHT 104° Gravity 30 API RW ---@ ---° F Chlorides --- ppm

(A) Initial Hydrostatic <u>1782</u>	<input checked="" type="checkbox"/> Test <u>1050</u>	T-On Location <u>0715</u>
(B) First Initial Flow <u>16</u>	<input type="checkbox"/> Jars <u>---</u>	T-Started <u>0721</u>
(C) First Final Flow <u>28</u>	<input type="checkbox"/> Safety Joint <u>---</u>	T-Open <u>0934</u>
(D) Initial Shut-In <u>1056</u>	<input type="checkbox"/> Circ Sub <u>---</u>	T-Pulled <u>1234</u>
(E) Second Initial Flow <u>28</u>	<input type="checkbox"/> Hourly Standby <u>---</u>	T-Out <u>1411</u>
(F) Second Final Flow <u>38</u>	<input checked="" type="checkbox"/> Mileage <u>24 RT</u> 18	Comments <u>---</u>
(G) Final Shut-In <u>1034</u>	<input type="checkbox"/> Sampler <u>---</u>	
(H) Final Hydrostatic <u>1717</u>	<input type="checkbox"/> Straddle <u>---</u>	
	<input type="checkbox"/> Shale Packer <u>---</u>	<input type="checkbox"/> Ruined Shale Packer <u>---</u>
	<input type="checkbox"/> Extra Packer <u>---</u>	<input type="checkbox"/> Ruined Packer <u>---</u>
	<input type="checkbox"/> Extra Recorder <u>---</u>	<input type="checkbox"/> Extra Copies <u>---</u>
Initial Open <u>45</u>	<input type="checkbox"/> Day Standby <u>---</u>	Sub Total <u>0</u>
Initial Shut-In <u>45</u>	<input type="checkbox"/> Accessibility <u>---</u>	Total <u>1068</u>
Final Flow <u>45</u>		MP/DST Disc't <u>---</u>
Final Shut-In <u>45</u>		

Sub Total 1068

Approved By \_\_\_\_\_ Our Representative Branner Lonsdale  
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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63287

Well Name & No. Engel South #2 Test No. 3 Date 8/2/17  
 Company TDI, Inc. Elevation 2019 KB 2009 GL  
 Address 310 Bison Rd. Hays, KS 67601  
 Co. Rep / Geo. Herb Deines Rig Southwind #1  
 Location: Sec. 21 Twp. 15 S Rge. 18 W Co. Ellis State KS

Interval Tested 3508-3599 Zone Tested Long Sand  
 Anchor Length 91' Drill Pipe Run 3520 Mud Wt. 9.1  
 Top Packer Depth 3503 Drill Collars Run — Vis 56  
 Bottom Packer Depth 3508 Wt. Pipe Run — WL 6.8  
 Total Depth 3599 Chlorides 7300 ppm System LCM 1#  
 Blow Description IF - Built very slowly to 2 1/2"  
IFT - No blow  
FF - Built very slowly to 1 1/2"  
FST - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>30</u>	<u>M</u>				
<u>40</u>	<u>CO</u>				

Rec Total 70' BHT 103° Gravity 30 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 1773  Test 1050 T-On Location 1825  
 (B) First Initial Flow 21  Jars — T-Started 1827  
 (C) First Final Flow 28  Safety Joint — T-Open 1956  
 (D) Initial Shut-In 863  Circ Sub — T-Pulled 2256  
 (E) Second Initial Flow 28  Hourly Standby — T-Out 8/3 0034  
 (F) Second Final Flow 40  Mileage 24 RT 18  
 (G) Final Shut-In 956  Sampler —  
 (H) Final Hydrostatic 1723  Straddle —  
 Ruined Shale Packer  
 Ruined Packer  
 Extra Packer  
 Extra Recorder  
 Extra Copies  
 Day Standby  
 Accessibility

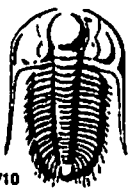
Initial Open 45  
 Initial Shut-In 45  
 Final Flow 45  
 Final Shut-In 45

Sub Total 1068  
 Total 1068  
 MP/DST Disc't —

Approved By \_\_\_\_\_ Our Representative Brannan Lonsdale

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63288

Well Name & No. Engel South #2 Test No. 4 Date 8/3/17  
 Company TDI, Inc. Elevation 2019 KB 2009GL  
 Address 1310 Bison Rd. Hays, KS 67601  
 Co. Rep / Geo. Herb Deines Rig Southwind #1  
 Location: Sec. 21 Twp. 15 S. Rge. 18 W. Co. Ellis State KS

Interval Tested 3299-3345 Zone Tested LKC "C&D"  
 Anchor Length 46' Tail: 325' Drill Pipe Run 3266 Mud Wt. 9.0  
 Top Packer Depth 3294-3299 Drill Collars Run 30 Vis 51  
 Bottom Packer Depth 3345 Wt. Pipe Run — WL 6.4  
 Total Depth 3670 Chlorides 6760 ppm System LCM 2<sup>nd</sup>

Blow Description IF - Surface blow died in 7mins  
IST - No blow  
FF - No blow  
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>3'</u>	<u>M w/ few oil spots</u>				
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 3' BHT 101° Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic <u>1689</u>	<input checked="" type="checkbox"/> Test <u>1050</u>	T-On Location <u>1225</u>
(B) First Initial Flow <u>30</u>	<input type="checkbox"/> Jars <u>—</u>	T-Started <u>1230</u>
(C) First Final Flow <u>34</u>	<input type="checkbox"/> Safety Joint <u>—</u>	T-Open <u>1447</u>
(D) Initial Shut-In <u>460</u>	<input type="checkbox"/> Circ Sub <u>—</u>	T-Pulled <u>1647</u>
(E) Second Initial Flow <u>35</u>	<input type="checkbox"/> Hourly Standby <u>—</u>	T-Out <u>1828</u>
(F) Second Final Flow <u>39</u>	<input checked="" type="checkbox"/> Mileage <u>24 RT</u> 18	Comments <u>—</u>
(G) Final Shut-In <u>335</u>	<input type="checkbox"/> Sampler <u>—</u>	
(H) Final Hydrostatic <u>1671</u>	<input checked="" type="checkbox"/> Straddle <u>600</u>	<input type="checkbox"/> Ruined Shale Packer <u>—</u>
	<input type="checkbox"/> Shale Packer <u>—</u>	<input type="checkbox"/> Ruined Packer <u>—</u>
Initial Open <u>30</u>	<input type="checkbox"/> Extra Packer <u>—</u>	<input type="checkbox"/> Extra Copies <u>—</u>
Initial Shut-In <u>30</u>	<input type="checkbox"/> Extra Recorder <u>—</u>	Sub Total <u>0</u>
Final Flow <u>30</u>	<input type="checkbox"/> Day Standby <u>—</u>	Total <u>1668</u>
Final Shut-In <u>30</u>	<input type="checkbox"/> Accessibility <u>—</u>	MP/DST Disc't <u>—</u>
	Sub Total <u>1668</u>	

Approved By — Our Representative Brannan Lonsdale

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