Confidentiality Requested:
☑ Yes ☐ No

KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION

1233375

Form ACO-1
August 2013
Form must be Typed
Form must be Signed
All blanks must be Filled

WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE

OPERATOR: License # 4787
Name: TDI
Address 1: 1310 BISON RD
Address 2:
City: HAYS State: KS Zip: 67601 + 9696
Contact Person: Tom Denning
Phone: (785) 628-2593
CONTRACTOR: License # 33350
Name: Southwind Drilling, Inc.
Wellsite Geologist: Herb Deines
Purchaser: Coffeyville Resources

Designate Type of Completion:

☑ New Well ☐ Re-Entry ☐ Workover

☑ Oil ☐ WSW ☐ SWD ☐ SIOW
☐ Gas ☐ D&A ☐ ENHR ☐ SIGW
☐ OG ☐ GSW ☐ Temp. Abd.
☐ 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 ENHR ☐ Conv. to SWD
☐ Plug Back ☐ Conv. to GSW ☐ Conv. to Producer

☐ Commingled Permit #:
☐ Dual Completion Permit #:
☐ SWD Permit #:
☐ ENHR Permit #:
☐ GSW Permit #:

9/24/2014	9/29/2014	11/7/2014
Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date

API No. 15 - 15-051-26726-00-00
Spot Description:
NE - SW - SW - NE Sec. 21 Twp. 15 S. R. 18 ☐ East ☑ West
2015 Feet from ☑ North / ☐ South Line of Section
2225 Feet from ☑ East / ☐ West Line of Section

Footages Calculated from Nearest Outside Section Corner:
☑ NE ☐ NW ☐ SE ☐ SW

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

Datum: ☐ NAD27 ☐ NAD83 ☐ WGS84

County: Ellis
Lease Name: Engel North Well #: 2
Field Name: Schoenchen
Producing Formation: Arbuckle
Elevation: Ground: 2021 Kelly Bushing: 2031
Total Vertical Depth: 3725 Plug Back Total Depth:
Amount of Surface Pipe Set and Cemented at: 1194 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: 62000 ppm Fluid volume: 700 bbls
Dewatering method used: Evaporated

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: 11/28/2014
☑ **Confidential Release Date:** 12/01/2016
☑ **Wireline Log Received**
☑ **Geologist Report Received**
☐ **UIC Distribution**
ALT ☑ **I** ☐ **II** ☐ **III** **Approved by:** NAOMI JAMES **Date:** 12/01/2014

[redacted] 1233375

Operator Name: TDI Lease Name: Engel North Well #: 2

Sec. 21 Twp. 15 S. R. 18 ☐ East ☑ West County: Ellis

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. 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 ☑ Yes ☐ No
(Attach Additional Sheets)

Samples Sent to Geological Survey ☑ Yes ☐ No

Cores Taken ☐ Yes ☑ No

Electric Log Run ☑ Yes ☐ No

List All E. Logs Run:

Dual Induction Log
Dual Compensated Porosity Log
Microresistivity Log

☑ Log Formation (Top), Depth and Datum ☐ Sample

Name	Top	Datum
Anhydrite	1191'	+840'
Topeka	3009'	-978
Heebner	3273'	-1242'
Lansing/Kansas City	3323'	-1292'
Base Kansas City	3546'	-1515'
Arbuckle	3622'	-1591'

CASING RECORD ☑ New ☐ 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
Surface	12.25	8.625	23	1194	SMD	375	1/4# flo-seal
Production	7.875	5.5	14	3708	EA-2	175	

ADDITIONAL CEMENTING / SQUEEZE RECORD

Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
___ Perforate ___ Protect Casing ___ Plug Back TD ___ Plug Off Zone	-			
	-			

Did you perform a hydraulic fracturing treatment on this well? ☐ Yes ☑ No *(If No, skip questions 2 and 3)*

Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? ☐ Yes ☐ No *(If No, skip question 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)*

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated	Acid, Fracture, Shot, Cement Squeeze Record *(Amount and Kind of Material Used)*	Depth
4	3623'-3626'	200 gals. 15%	

TUBING RECORD: Size: 2.875 Set At: 3650' Packer At: Liner Run: ☐ Yes ☑ No

Date of First, Resumed Production, SWD or ENHR. 1/2/2015

Producing Method: ☐ Flowing ☑ Pumping ☐ Gas Lift ☐ Other *(Explain)* _____

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity

DISPOSITION OF GAS:
☐ Vented ☐ Sold ☐ Used on Lease
(If vented, Submit ACO-18.)

METHOD OF COMPLETION:
☐ Open Hole ☑ Perf. ☐ Dually Comp. *(Submit ACO-5)* ☐ Commingled *(Submit ACO-4)*
☐ Other *(Specify)* _____

PRODUCTION INTERVAL:
Arbuckle

Form	ACO1 - Well Completion
Operator	TDI
Well Name	Engel North 2
Doc ID	1233375

Casing

Purpose Of String	Size Hole Drilled	Size Casing Set	Weight	Setting Depth	Type Of Cement	Number of Sacks Used	Type and Percent Additives
Surface	12.25	8.625	23	1194	SMD	375	1/4# flo-seal
Production	7.875	5.5	14	3708	EA-2	175	

OPERATOR

Company:	TDI, INC.		
Address:	1310 BISON ROAD HAYS, KANSAS 67601		
Contact Geologist:	TOM DENNING		
Contact Phone Nbr:	785-628-2593		
Well Name:	ENGEL NORTH # 2		
Location:	NE SW SW NE, SEC.21-T15S-R18W		
API:	15-051-26,726-00-00		
Pool:		Field:	SCHOENCHEN
State:	KANSAS	Country:	USA

Scale 1:240 Imperial

Well Name:	ENGEL NORTH # 2		
Surface Location:	NE SW SW NE, SEC.21-T15S-R18W		
Bottom Location:			
API:	15-051-26,726-00-00		
License Number:	4787		
Spud Date:	9/24/2014	Time:	1:00 PM
Region:	ELLIS COUNTY		
Drilling Completed:	9/29/2014	Time:	10:05 PM
Surface Coordinates:	2015' FNL & 2225' FEL		
Bottom Hole Coordinates:			
Ground Elevation:	2021.00ft		
K.B. Elevation:	2031.00ft		
Logged Interval:	2900.00ft	To:	3725.00ft
Total Depth:	3725.00ft		
Formation:	ARBUCKLE		
Drilling Fluid Type:	CHEMICAL/FRESH WATER GEL		

SURFACE CO-ORDINATES

Well Type:	Vertical
Longitude:	-99.3272203
Latitude:	38.7349064
N/S Co-ord:	2015' FNL
E/W Co-ord:	2225' FEL

LOGGED BY

Company:	SOLUTIONS CONSULTING, INC.		
Address:	108 WEST 35TH STREET HAYS, KANSAS 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:	9/24/2014	Time:	1:00 PM
TD Date:	9/29/2014	Time:	10:05 PM

Rig Release:	10/1/2014	Time:	1:30 AM

ELEVATIONS

K.B. Elevation:	2031.00ft	Ground Elevation:	2021.00ft
K.B. to Ground:	10.00ft		

NOTES

RECOMMENDATION TO RUN PRODUCTION CASING BASED ON FAVORABLE RESULTS OF DST # 1 AND LOG ANALYSIS

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

DRILL STEM TESTING BY TRILOBITE TESTING, INC: ONE (1) STRADDLE TEST

FORMATION TOPS COMPARISON

	ENGEL NORTH #2 NE SW SW NE SEC.21-15S-18W 2021'GL 2031'KB	ENGEL #6 E2 SW NE SEC.21-15-18W KB 1997'	ENGEL # 1 SW SW SE NE SEC.21-15-18W KB 1987'
FORMATION	LOG TOPS	LOG TOPS	LOG TOPS
Anhydrite	1191+ 840	+ 841	+ 840
B-Anhydrite	1227+ 804	+ 803	+ 806
Topeka	3009 - 978	- 967	- 965
Heebner Sh.	3273-1242	-1235	-1232
Toronto	3294-1263	-1252	-1252
LKC	3323-1292	-1285	-1282
BKC	3546-1515	-1511	-1507
Rework Arbuckle	3606-1575		
Arbuckle	3622-1591	-1585	-1578
RTD	3725-1694	-1690	-1663

SUMMARY OF DAILY ACTIVITY

9-24-14	RU, spud 1:00 PM
9-25-14	1177', set 8 5/8" surface casing to 1194' w/ 375 sxs SMD, slope 3/4 degree, plug down 3:45PM, WOC 12 hrs
9-26-14	1200', rig repair
9-27-14	1806', drilling
9-28-14	2750', drilling, displaced 2850'-2885'
9-29-14	3375', drilling, CFS 3375', RTD 3725' @ 10:05 PM, CCH, short trip
9-30-13	3725', TOWB, slope 1 degree, logs, Straddle DST # 1 3520' to 3634' Arbuckle, TIWB, LDDP, run production casing
10-01-14	3725', finish running casing and cementing, RD

10-01-14 3725', finish running casing and cementing, RD

DST # 1 TEST SUMMARY

TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

TDI INC

1310 Bison Rd.
Hays KS 67601

ATTN: Herb

21-15s-18w-Ellis Co

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 09:55:58
Time Test Ended: 14:40:17

Test Type: Conventional Straddle (Initial)
Tester: Tate Lang
Unit No: 77

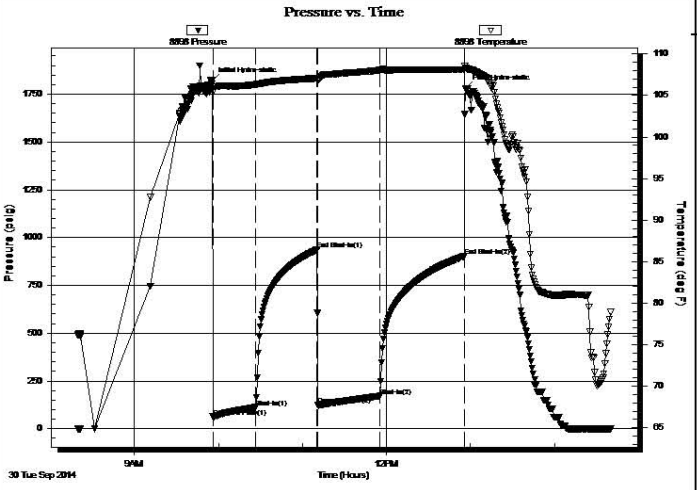
Interval: 3530.00 ft (KB) To 3634.00 ft (KB) (TVD)
Total Depth: 3634.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 2031.00 ft (KB)
2021.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 8898 **Outside**
Press@RunDepth: 170.95 psig @ 3527.00 ft (KB)
Start Date: 2014.09.30 End Date: 2014.09.30
Start Time: 08:19:39 End Time: 14:40:18

Capacity: 8000.00 psig
Last Calib.: 2014.09.30
Time On Btm: 2014.09.30 @ 09:55:48
Time Off Btm: 2014.09.30 @ 12:56:38

TEST COMMENT: 30-B.O.B. in 15 mins
45-Weak surface blow
45-B.O.B. in 19 mins
60-Weak surface blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1821.26	106.38	Initial Hydro-static
1	63.18	105.42	Open To Flow (1)
31	112.57	106.31	Shut-In(1)
75	935.67	107.06	End Shut-In(1)
75	123.37	106.75	Open To Flow (2)
120	170.95	108.06	Shut-In(2)
180	902.38	108.13	End Shut-In(2)
181	1781.37	108.31	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)

Gas Rates

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

136.00	GO 25%G 75%O	1.91
126.00	MCO 50%M 50%O	1.77
63.00	MCGO 10%M 30%G 60%O	0.88
0.00	175 GIP	0.00

ROCK TYPES

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

ACCESSORIES

MINERAL
- Chert, dark
- Pyrite

FOSSIL
- Oolite
- Oomoldic
- Fussilinid

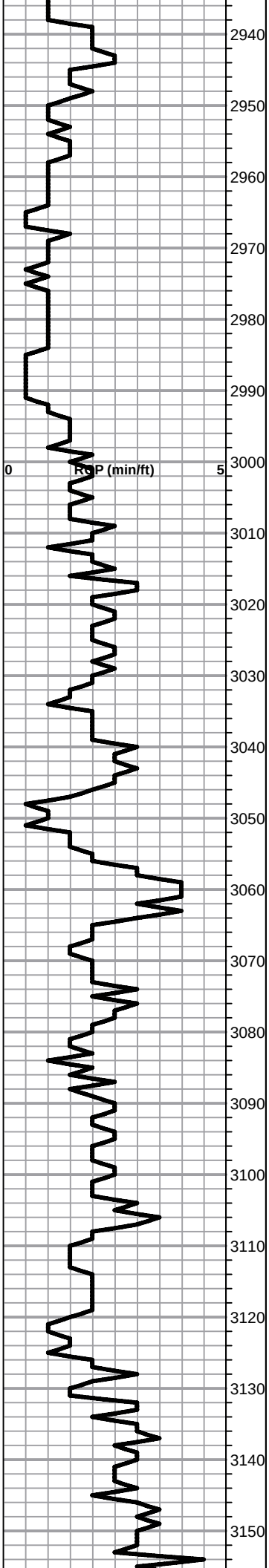
OTHER SYMBOLS

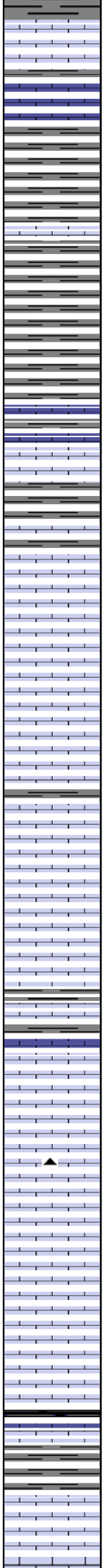
Oil Show
- Good Show
- Fair Show
- Poor Show
- Spotted or Trace
- Questionable Stn
- Dead Oil Stn
- Fluorescence
- Gas

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

Printed by GEOstrip VC Striplog version 4.0.8.9 (www.grsi.ca)

Curve Track #1 ROP (min/ft) 1:240 Imperial	Depth | Intervals (Cored Interval, DST Interval)	DST	Lithology	Oil Show	Geological Descriptions	TG, C1 - C5 1:240 Imperial
0 ROP (min/ft) 5	2890				BEGIN 1' DRILL TIME FROM 2900' TO RTD BEGIN 10' WET AND DRY SAMPLES FROM 2950' TO RTD **ANHYDRITE TOP 1191+840** **ANHYDRITE BASE 1227+804**	**8 5/8" SURFACE CASING SET TO 1194' W/ 375 SXS SMD, WOC 12 HRS** **SLOPE 3/4 DEGREE @1200'**
	2900					
	2910					
	2920				Lime, lt gray, fnxln-granular, slightly fossiliferous	
	2930				Lime, lt-med gray, fnxln	





Lime, med brn-gray, fnxln-granular, gray mottling in part

Shale, lt-med gray, soft mud to soft blocky

Shale, dove gray-med gray, soft mud to soft blocky

Lime, med-dark brn, fnxln becoming lt-med brn, fnxln with depth

TOPEKA ELog 3009-978

Lime, lt-med brn, fnxln, thin fossil beds in part

Lime, lt brn, fnxln, chalky matrix with white chalk wash

Lime, lt-med brn, fnxln-granular, chalk matrix with white chalk matrix, slightly fossiliferous

Lime, lt brn, fnxln, slight bedded chalk, slightly fossiliferous-fusulinids

Lime, lt brn-lt grayish brn, fnxln-granular,lt chalk matrix in part with bedded chalk, NS

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

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

Lime, lt-med brn, fnxln, lt chalk wash in bedded chalk

Lime, crm-lt brn, granular with chalk matrix with bedded chalk in part

Lime, lt-med brn, fnxln-granular, slight bedded chalk, slightly fossiliferous
Chert, lt gray, fresh, sharp

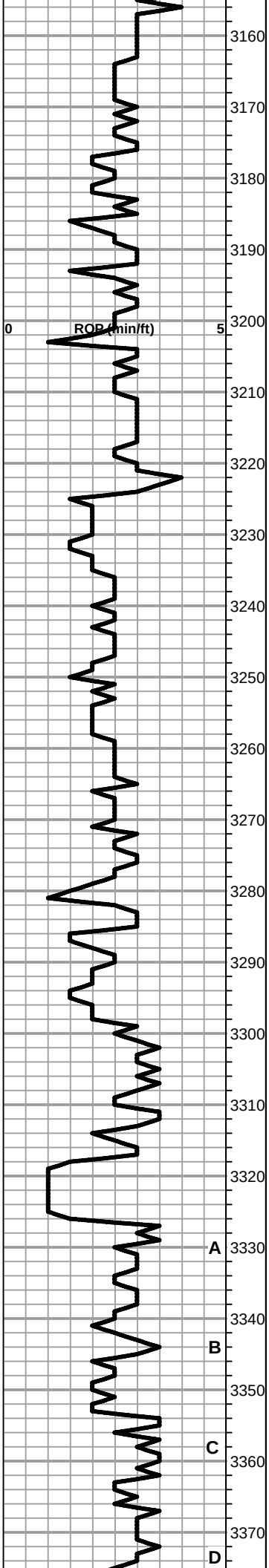
Lime, lt brn, granular, bedded chalk with sticky clumping, slightly fossiliferous

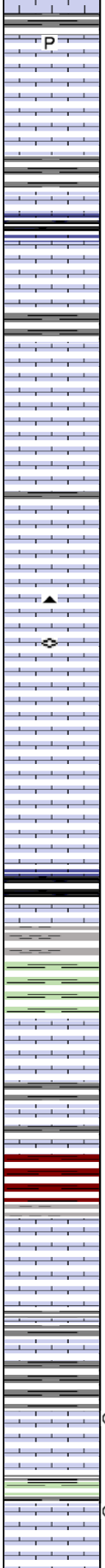
Lime, lt-med brn, fn-micro xln

Shale, gray-black carbonaceous, blocky

Lime, crm-lt brn, fn-vfxln, lithographic

Lime, crm-tan with graying tinting near shale boundary,





fnxln

Lime, crm-lt brn, fnxln, slightly fossiliferous, slight bedded chalk, scattered xln pyrite

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

Lime, lt-med brn, fnxln

Shale, black carbonaceous, blocky

Lime, lt-med brn, fnxln-granular, bedded chalk

Lime, lt brn-med grayish brn, fnxln

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

Lime, lt brn, fnxln, bedded chalk with white chalky wash

Lime, tan-lt brn, granular, bedded chalk with lt chalk wash

Lime, tan-lt brn, granular, chalk matrix with bedded chalk, scattered fusulinids

Lime, tan-lt-med brn, fnxln-granular, bedded chalk

Lime, tan-lt brn, fnxln-granular, slight bedded chalk

HEEBNER SHALE SPL 3277-1246 ELog 3273-1242

Shale, black carbonaceous, fissile, blocky
Lime, med brn, fn-vfxln

Shale, dove gray-lime green, soft mud

TORONTO SPL 3298-1267 ELog 3294-1263

Lime, crm, fn-vfxln, slight bedded chalk, NS

Lime, crm-lt brn, fn-vfxln, slight bedded chalk in part

Shale, red-med brn, soft mud with lt red wash

LKC SPL 3225-1294 ELog 3323-1292

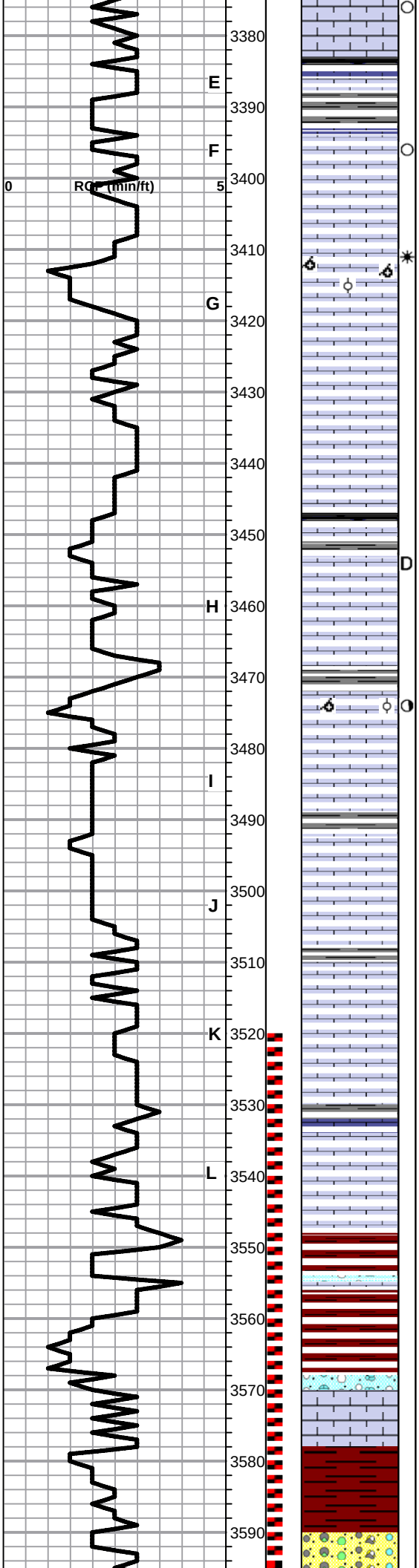
Lime, crm-lt brn, fn-micro xln slight bedded chalk, NS

Lime, lt-med brn, fnxln-vfxln
Shale, med gray with gray wash

Lime, tan-crm, fnxln, lot of bedded chalk, few chips with trace of lt staining, NFO, No Odor

Lime, crm-tan-lt brn, fnxln
Shale, med green, soft sticky clumps

Lime, tan-lt brn, fnxln-granular in part, bedded chalk trace of lt spotty stain, NFO, No Odor in poorly developed porosity zone



CFS 3375

Lime, tan, fnxln, trace of staining, NFO, VLT Odor, spotty staining in fossil casts and fine vug porosity

Shale, black carbonaceous
Lime, lt brn with lt gray tint, fnxln

Lime, tan-lt gray, fnxln, few chips with trace of stain, NFO, No Odor

Lime, crm-tan, fnxln, moderate bedded chalk, NS

Lime, crm-tan, fnxln, slight bedded chalk

Lime, crm-tan, oomoldic in part, no detected staining or SFO but had lite odor, most chips barren of staining

Lime, tan-lt brn, fnxln, slight bedded chalk

Lime, crm-lt brn, fn-vfxln, moderate bedded chalk

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

Lime, tan-lt brn with increasing darker brn near shale boundary

Lime, med-dark brn, fnxln

Lime, crm-tan, fnxln,slight bedded chalk, scattered flaky gilsonitic deposits, NFO, No Odor

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

Lime, crm-tan, fnxln, thin oomoldic zone with saturated staining, NFO, No Odor

Lime, tan-lt brn, fnxln, slight bedded chalk

Lime, crm-tan, fnxln, moderate bedded chalk ,NS

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

Shale, gray-black, soft blocky

Lime, crm, fn-vfxln-slightly granular in part, NS, No Odor

Lime, crm-lt brn, fnxln,slight bedded chalk, NS

Shale, brn-gray, sot-firm blocky

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

Lime, lt brn with gray tint, vf-micro xln

BKC SPL 3550-1519 ELog 3546-1515

Shale, red-brn, soft with lt red wash

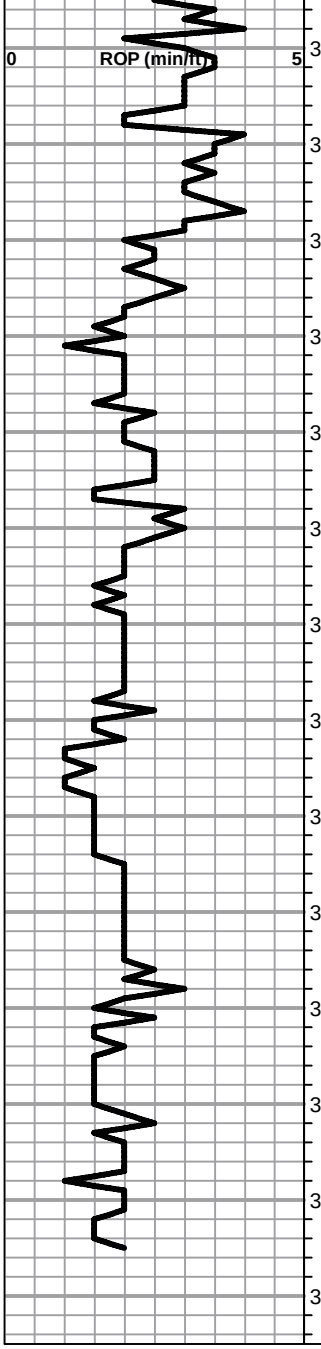
Shale, vari color, soft-sticky clumping in part

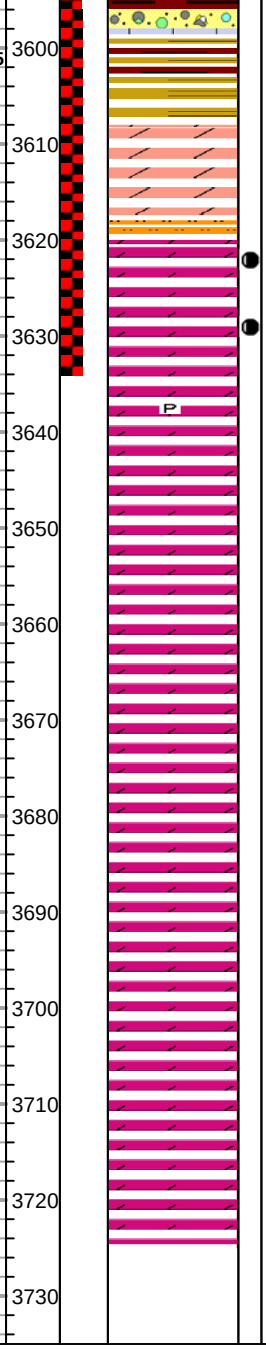
Lime, lt brn, granular, moderately chalky with white chalk wash, clastic lime mix in part

Shale, reds, browns, maroon, soft-firm blocky

Shale, vari color with chert nodules

DST # 1 STRADDLE TEST
3520' TO 3634' SEE HEADER
FOR TEST SUMMARY





Cherts, vari color, fresh sharp, scattered flaky gilsonitic deposits, NFO, No odor, lt red shale wash

REWORKED ARBUCKLE ELog 3606-1575

Dolomite, ivory-crm, granular but lacking visible porosity, very lt odor, clumps of white sticky clay and siltstone

ARBUCKLE SPL 3620-1589 ELog 3622-1591

Dolomite, lt brn, granular, euhedral in part, good odor with lt saturated staining,

Dolomite, lt brn, granular, med to coarse xln rhombic, fair odor with saturated staining

Dolomite, ivory, med-coarse granular, lt odor, lt chalky wash, scattered xln pyrite

Dolomite, ivory-crm, granular, scattered quartz grain inclusions in part

Dolomite, lt brn, fnxln-granular, soft sticky clumps of dolomitic chalk,

Dolomite, crm-lt brn, granular, scattered sucrosic chips

Dolomite, ivory-crm, granular, fn-med grained, chalky white wash

Dolomite, crm-lt brn, fnxln-granular, white chalk wash

Dolomite, crm, fnxln-granular, sticky chalk clumping

Dolomite, crm, fnxln-granular, bedded sticky dolomitic chalk,

Dolomite, crm, granular, white chalk wash

Dolomite, crm, granular, white chalk wash

RTD 3725-1694 LTD 3723-1692

5 1/2" 14# PRODUCTION CASING SET TO 3708' W/ 175 SXS EA2, MH W/ 20 SXS, RH W/ 30 SXS

SLOPE 1 DEGREE @ 3725'

JOB LOG

SWIFT Services, Inc.

DATE 9-25-14 | PAGE NO. 1

CUSTOMER	WELL NO.	LEASE	JOB TYPE	TICKET NO.
TDI	#2	Engel North	Deep Surface	26802

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS T	PUMPS C	PRESSURE (PSI) TUBING	PRESSURE (PSI) CASING	DESCRIPTION OF OPERATION AND MATERIALS
	1130							on loc w/ FE
								RTD 1200'
								8 5/8" x 23# x 1194' x 41'
	1245							start FE
	1415							Break Circ
	1455	5	0				150	start 500gal Mudflush
		5	12/0				150	start 20 bbl KCl flush
		5	20/0				150	start 125sks SMD @ 11.8#
		5	57/0				150	" 100sks " " 12.5#
		5	38/0				150	" 75 " " " 13.5#
		5	23/0				150	" " " " " 14.5#
	1525		20					End Cement
								Drop Plug
	1530	6	0				150	start Displacement
	1540	5	47				250	Circ Cement
	1545		74				~~250~~ 900	Land Plug
								Shut In
								Circ 60 sks to pit
								Thank you
								Nick, Austin, Craig, & Roger

JOB LOG

SWIFT Services, Inc.

DATE 9-30-14 | PAGE NO. 1

CUSTOMER	WELL NO.	LEASE	JOB TYPE	TICKET NO.
TDI	#2	Engel North	long string	26807

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS T	PUMPS C	PRESSURE (PSI) TUBING	PRESSURE (PSI) CASING	DESCRIPTION OF OPERATION AND MATERIALS
	2120							on loc w/ FE
								RTD 3725' LTD' 3713'
								5½" x 14# x 3715' x 42'
								Cent. 1, 91, 4, 6, 7, 9, 12, 14
								Bask 91, 10
	2210							Start FE
	2330							Break Circ.
	0045	2	7/4					Plug RH & MH 30/15 sks EA-2
	0055	5	0				200	Start 500 gal Mudflush
		5	12/0				200	Stat 20 bbl KCL flush
		5	20/0				200	Start 130 sks EA-2 Cement
	0105		32					End Cement
								Wash Pt L
								Drop L.D. Plug
	0115	6	0				200	Start Displacement
	0125	5	61				250	Catch Cement
	0130		90				900/1300	Land Plug
								Release Pressure
								Float Held
								Thank you
								Nick, David E., Austin, Jared Tyler

TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Prepared For: **TDI**

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

Engel North #2

21-15s-18w Ellis,KS

Start Date: 2014.09.30 @ 08:19:38

End Date: 2014.09.30 @ 14:40:17

Job Ticket #: 60520 DST #: 1

Trilobite Testing, Inc

1515 Commerce Parkway Hays, KS 67601

ph: 785-625-4778 fax: 785-625-5620

Printed: 2014.10.03 @ 09:59:26

DRILL STEM TEST REPORT

TDI

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

21-15s-18w Ellis,KS

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 09:55:58
Time Test Ended: 14:40:17

Test Type: Conventional Straddle (Initial)
Tester: Tate Lang
Unit No: 77

Interval: 3530.00 ft (KB) To 3634.00 ft (KB) (TVD)
Total Depth: 3634.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

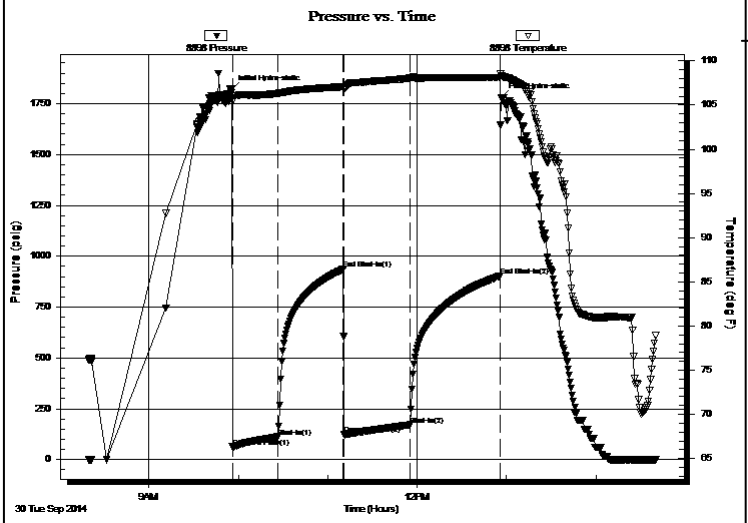
Reference Elevations: 2031.00 ft (KB)
2021.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 8898 **Outside**

Press@RunDepth: 170.95 psig @ 3527.00 ft (KB)
Start Date: 2014.09.30 End Date: 2014.09.30
Start Time: 08:19:39 End Time: 14:40:18

Capacity: 8000.00 psig
Last Calib.: 2014.09.30
Time On Btm: 2014.09.30 @ 09:55:48
Time Off Btm: 2014.09.30 @ 12:56:38

TEST COMMENT: 30-B.O.B. in 15 mins
45-Weak surface blow
45-B.O.B. in 19 mins
60-Weak surface blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1821.26	106.38	Initial Hydro-static
1	63.18	105.42	Open To Flow (1)
31	112.57	106.31	Shut-In(1)
75	935.67	107.06	End Shut-In(1)
75	123.37	106.75	Open To Flow (2)
120	170.95	108.06	Shut-In(2)
180	902.38	108.13	End Shut-In(2)
181	1781.37	108.31	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
136.00	GO 25%G 75%O	1.91
126.00	MCO 50%M 50%O	1.77
63.00	MCGO 10%M 30%G 60%O	0.88
0.00	175 GIP	0.00

Gas Rates

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

DRILL STEM TEST REPORT

TDI

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

21-15s-18w Ellis,KS

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 09:55:58
Time Test Ended: 14:40:17

Test Type: Conventional Straddle (Initial)
Tester: Tate Lang
Unit No: 77

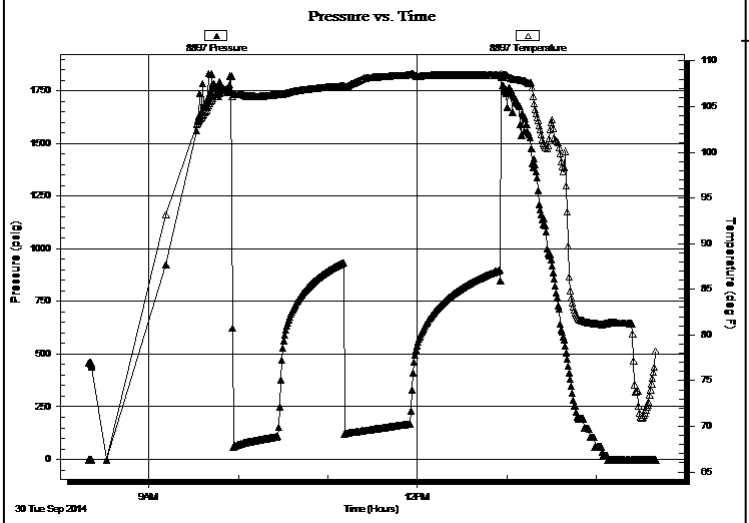
Interval: 3530.00 ft (KB) To 3634.00 ft (KB) (TVD)
Total Depth: 3634.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 2031.00 ft (KB)
2021.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 8897 **Inside**
Press@RunDepth: psig @ 3527.00 ft (KB)
Start Date: 2014.09.30 End Date: 2014.09.30
Start Time: 08:19:32 End Time: 14:40:11

Capacity: 8000.00 psig
Last Calib.: 2014.09.30
Time On Btm:
Time Off Btm:

TEST COMMENT: 30-B.O.B. in 15 mins
45-Weak surface blow
45-B.O.B. in 19 mins
60-Weak surface blow



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
136.00	GO 25%G 75%O	1.91
126.00	MCO 50%M 50%O	1.77
63.00	MCGO 10%M 30%G 60%O	0.88
0.00	175 GIP	0.00

Gas Rates

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

DRILL STEM TEST REPORT

TDI

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

21-15s-18w Ellis,KS

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 09:55:58
Time Test Ended: 14:40:17

Test Type: Conventional Straddle (Initial)
Tester: Tate Lang
Unit No: 77

Interval: 3530.00 ft (KB) To 3634.00 ft (KB) (TVD)
Total Depth: 3634.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good

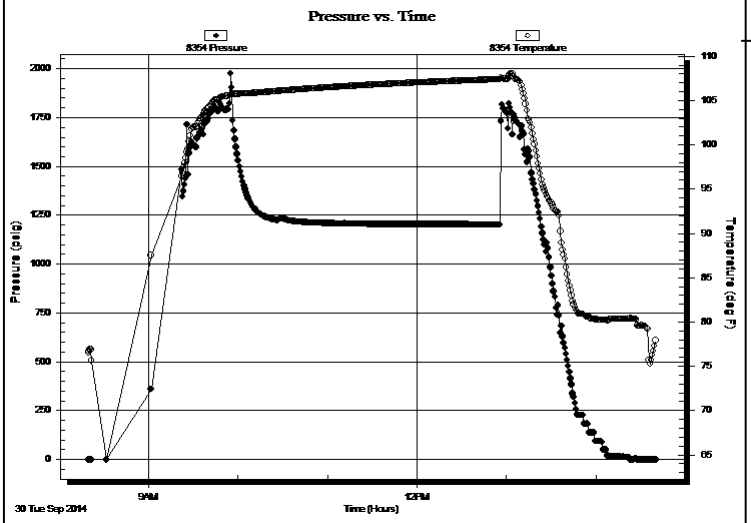
Reference Elevations: 2031.00 ft (KB)
2021.00 ft (CF)
KB to GR/CF: 10.00 ft

Serial #: 8354 **Below (Straddle)**

Press@RunDepth: psig @ 3661.00 ft (KB)
Start Date: 2014.09.30 End Date: 2014.09.30
Start Time: 08:19:52 End Time: 14:40:16

Capacity: 8000.00 psig
Last Calib.: 2014.09.30
Time On Btm:
Time Off Btm:

TEST COMMENT: 30-B.O.B. in 15 mins
45-Weak surface blow
45-B.O.B. in 19 mins
60-Weak surface blow



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
136.00	GO 25%G 75%O	1.91
126.00	MCO 50%M 50%O	1.77
63.00	MCGO 10%M 30%G 60%O	0.88
0.00	175 GIP	0.00

Gas Rates

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

DRILL STEM TEST REPORT

TOOL DIAGRAM

TDI

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

21-15s-18w Ellis,KS

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

Tool Information

Drill Pipe:	Length:	3524.00 ft	Diameter:	3.80 inches	Volume:	49.43 bbl	Tool Weight:		2200.00 lb
Heavy Wt. Pipe:	Length:	0.00 ft	Diameter:	0.00 inches	Volume:	0.00 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:		60000.00 lb
					Total Volume:	49.43 bbl	Tool Chased		0.00 ft
Drill Pipe Above KB:		24.00 ft					String Weight:	Initial	41000.00 lb
Depth to Top Packer:		3520.00 ft						Final	44000.00 lb
Depth to Bottom Packer:		3634.00 ft							
Interval betw een Packers:		114.00 ft							
Tool Length:		228.00 ft							
Number of Packers:		3	Diameter:	6.75 inches					

Tool Comments:

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths	
Shut In Tool	5.00			3505.00		
Hydraulic tool	5.00			3510.00		
Packer	5.00			3515.00	20.00	Bottom Of Top Packer
Packer	5.00			3520.00		
Stubb	1.00			3521.00		
Perforations	5.00			3526.00		
Change Over Sub	1.00			3527.00		
Recorder	0.00	8897	Inside	3527.00		
Recorder	0.00	8898	Outside	3527.00		
Drill Pipe	95.00			3622.00		
Change Over Sub	1.00			3623.00		
Perforations	6.00			3629.00		
Blank Off Sub	1.00			3630.00		
Blank Spacing	4.00			3634.00	114.00	Tool Interval
Packer	5.00			3639.00		
Stubb	1.00			3640.00		
Perforations	21.00			3661.00		
Recorder	0.00	8354	Below	3661.00		
Change Over Sub	1.00			3662.00		
Drill Pipe	62.00			3724.00		
Change Over Sub	1.00			3725.00		
Bullnose	3.00			3728.00	94.00	Bottom Packers & Anchor
Total Tool Length:	**228.00**					

DRILL STEM TEST REPORT

FLUID SUMMARY

TDI

1310 Bison Rd.
Hays KS 67601

ATTN: Herb Deines

21-15s-18w Ellis,KS

Engel North #2

Job Ticket: 60520 **DST#: 1**

Test Start: 2014.09.30 @ 08:19:38

Mud and Cushion Information

Mud Type:	Gel Chem	Cushion Type:		Oil API:	29 deg API
Mud Weight:	9.00 lb/gal	Cushion Length:	ft	Water Salinity:	ppm
Viscosity:	54.00 sec/qt	Cushion Volume:	bbl		
Water Loss:	7.59 in³	Gas Cushion Type:			
Resistivity:	ohm.m	Gas Cushion Pressure:	psig		
Salinity:	2300.00 ppm				
Filter Cake:	1.00 inches				

Recovery Information

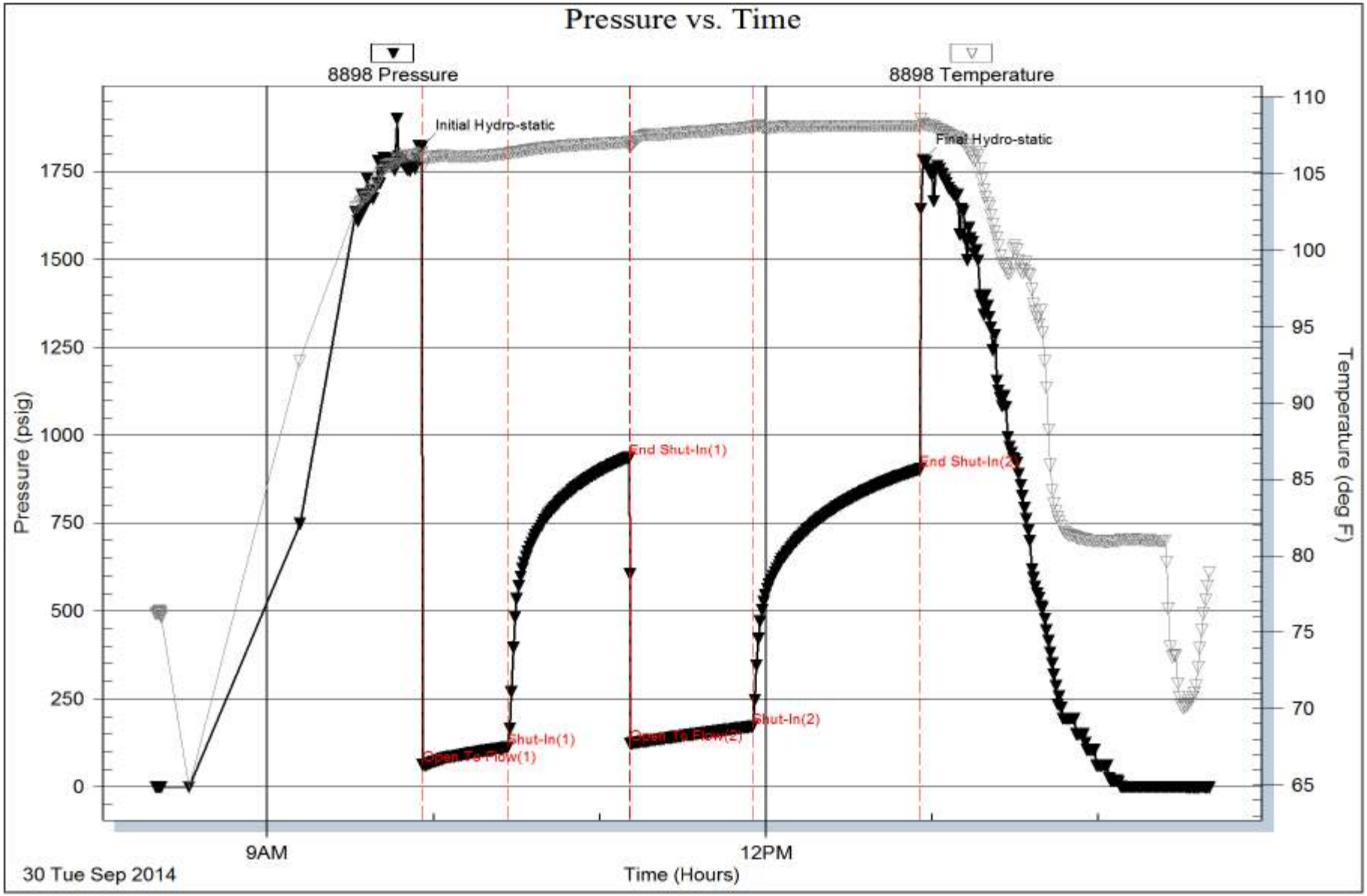
Recovery Table

Length ft	Description	Volume bbl
136.00	GO 25%G 75%O	1.908
126.00	MCO 50%M 50%O	1.767
63.00	MCGO 10%M 30%G 60%O	0.884
0.00	175 GIP	0.000

Total Length: 325.00 ft Total Volume: 4.559 bbl

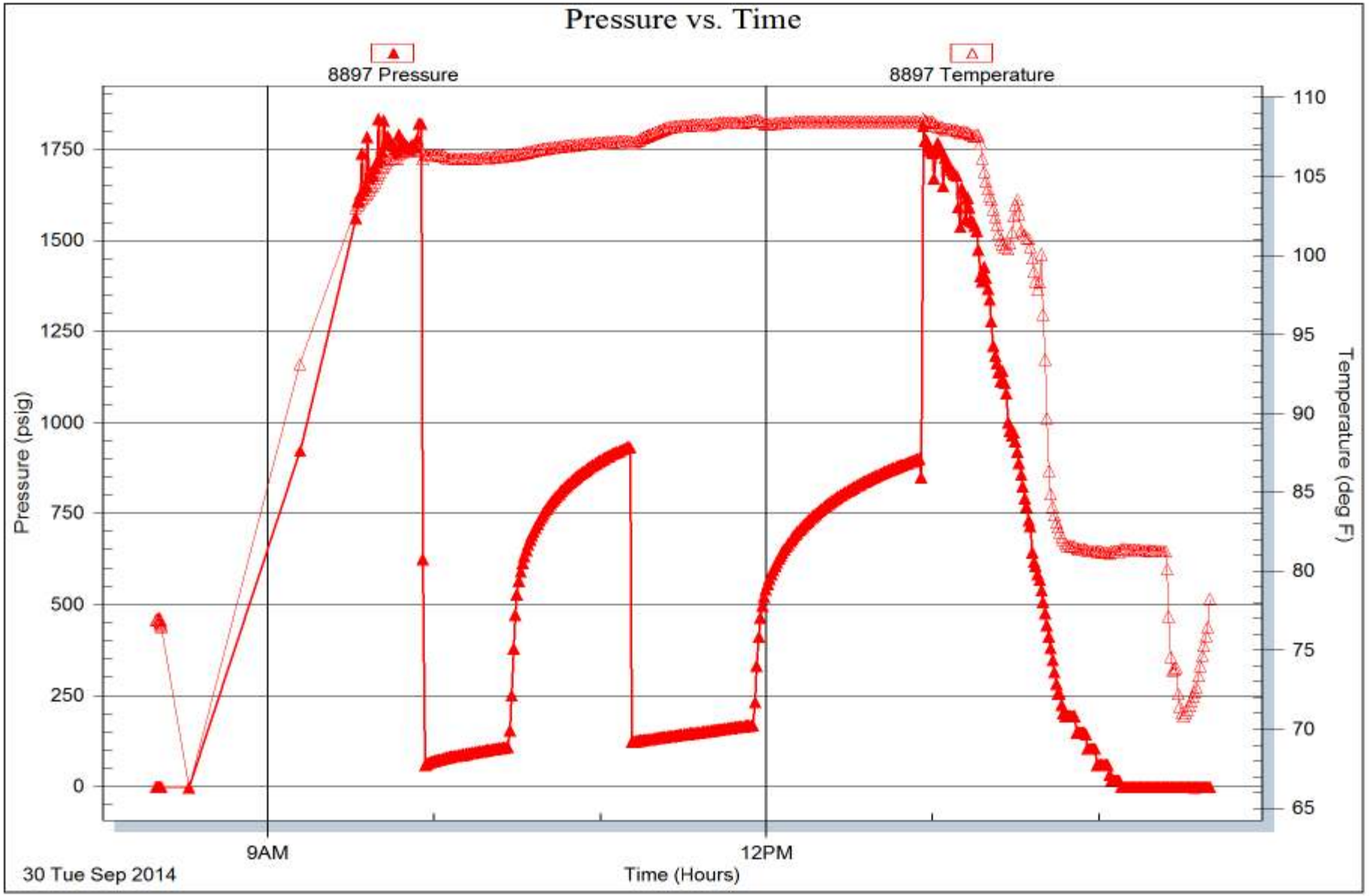
Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
Laboratory Name: Laboratory Location:
Recovery Comments:

Serial #: 8898 **Outside** TDI Engel North #2 DST Test Number: 1



Trilobite Testing, Inc Ref. No: 60520 Printed: 2014.10.03 @ 09:59:28

Serial #: 8897 **Inside** TDI Engel North #2 DST Test Number: 1



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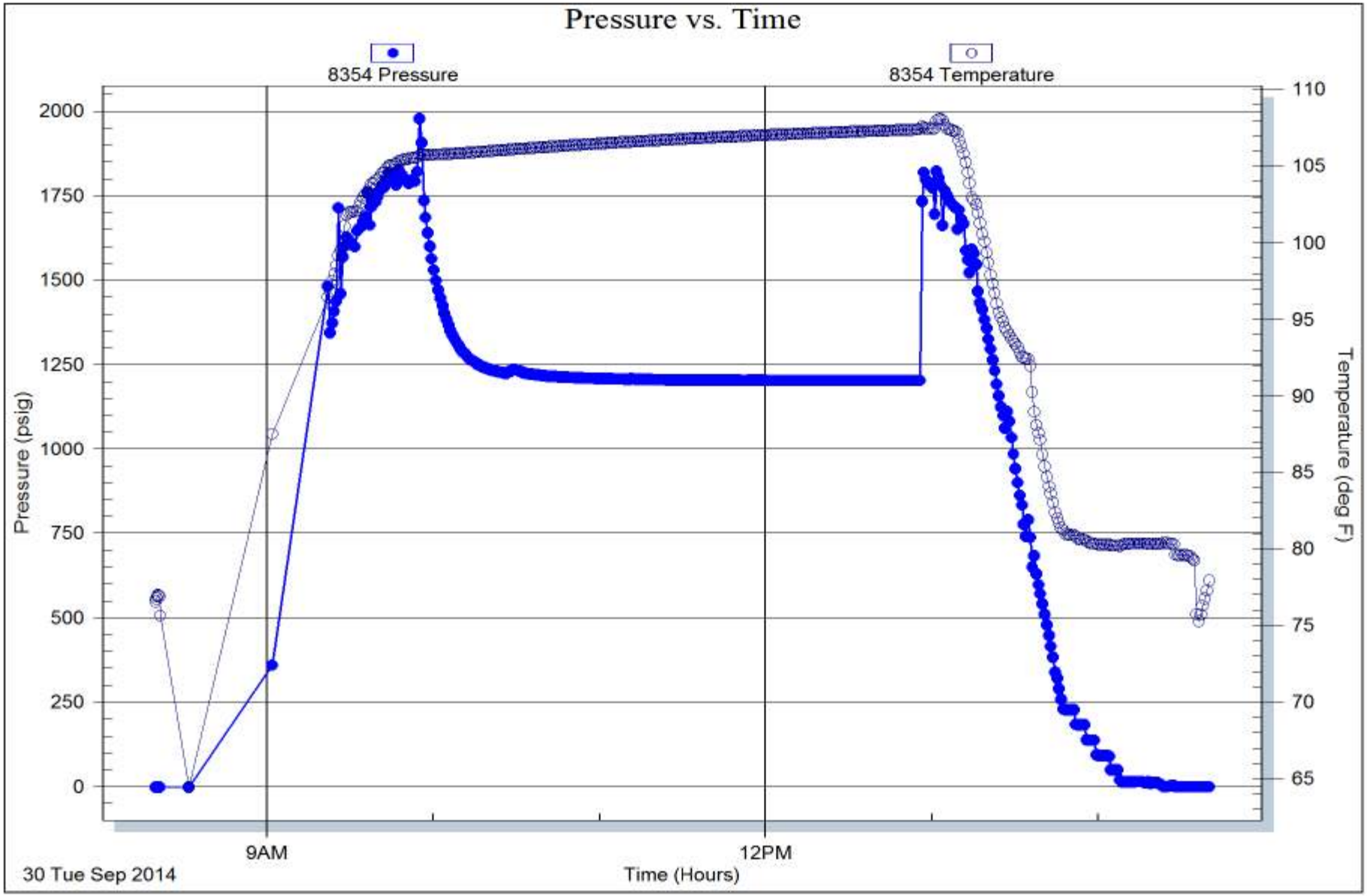
Serial #: 8354 Below (Straddle) Engel North #2 DST Test Number: 1



Trilobite Testing, Inc Ref. No: 60520 Printed: 2014.10.03 @ 09:59:28

TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

4/10

Test Ticket

NO. 60520

Well Name & No. Engel North #2 Test No. 1 Date 9-30-14

Company TDI INC Elevation 2031 KB 2021 GL

Address 1310 Bison Rd Hays KS 67601

Co. Rep / Geo. Herb Rig Southwind #21

Location: Sec. 21 Twp. 15S Rge. 18W Co. Ellis State KS

Interval Tested 3520 3634 Zone Tested Arbuckle

Anchor Length 114 89 Tail Drill Pipe Run 3524 Mud Wt. 9.3

Top Packer Depth 3515 Drill Collars Run 0 Vis 56

Bottom Packer Depth 3520 Wt. Pipe Run 0 WL 7.6

Total Depth 3723 Chlorides 2300 ppm System LCM 2#

Blow Description B.O.B. IN 15 mins
Weak surface blow
B.O.B. IN 19 mins
Weak Surface blow

Rec	Feet of	%gas	%oil	%water	%mud	
Rec 126	Feet of GO	25 %gas	25 %oil	%water	%mud	
Rec 126	Feet of MCO	%gas	50 %oil	%water	50 %mud	
Rec 63	Feet of MCGO	30 %gas	60 %oil	%water	10 %mud	
Rec 0	Feet of 175 GIP	%gas	%oil	%water	%mud	

Rec Total 325 BHT 108 Gravity 29 API RW 31 @ 80 °F Chlorides ppm

(A) Initial Hydrostatic 1821	☒ Test 1150	T-On Location 0620
(B) First Initial Flow 63	☐ Jars	T-Started 0819
(C) First Final Flow ~~113~~ 113	☐ Safety Joint	T-Open 0955
(D) Initial Shut-In 936	☐ Circ Sub	T-Pulled 1255
(E) Second Initial Flow 123	☐ Hourly Standby	T-Out 1440
(F) Second Final Flow 171	☒ Mileage 20 R/T 31	Comments
(G) Final Shut-In 902	☐ Sampler	
(H) Final Hydrostatic 1781	☒ Straddle 600	☐ Ruined Shale Packer
	☐ Shale Packer	☐ Ruined Packer
Initial Open 30	☐ Extra Packer	☐ Extra Copies
Initial Shut-In 45	☐ Extra Recorder	Sub Total 0
Final Flow 45	☐ Day Standby	Total 1781
Final Shut-In 60	☐ Accessibility	MP/DST Disc't
	Sub Total 1781	

Approved By Our Representative

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 sustained 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.