



DRILL STEM TEST REPORT

Prepared For: **TDI Inc.**

1310 Bison Rd
Hays, KS 67601+9696

ATTN: Herb Dienes

Furthmyer #4

23-14S-16W Ellis,KS

Start Date: 2018.11.15 @ 08:40:00

End Date: 2018.11.15 @ 14:40:02

Job Ticket #: 64559 DST #: 1

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

Printed: 2018.11.16 @ 11:19:23



TRILOBITE TESTING, INC.

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23-14S-16W Ellis,KS
Furthmyer #4
Job Ticket: 64559 **DST#: 1**
Test Start: 2018.11.15 @ 08:40:00

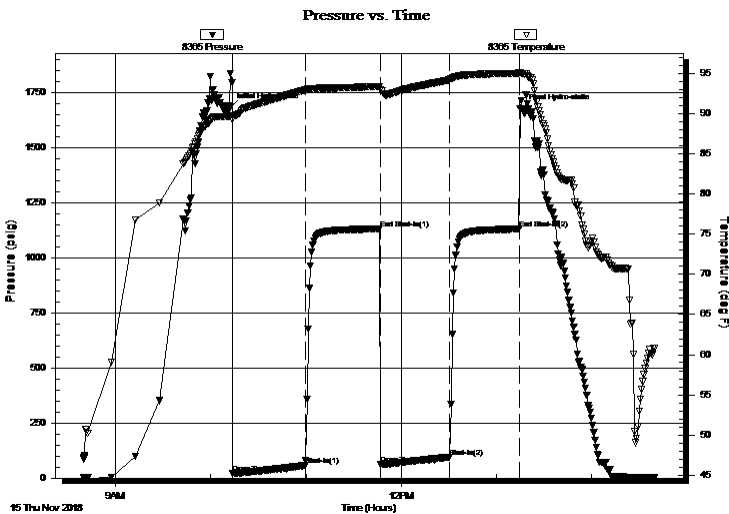
GENERAL INFORMATION:

Formation: **Arbuckle**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 10:13:47
Time Test Ended: 14:40:02
Interval: **3356.00 ft (KB) To 3428.00 ft (KB) (TVD)**
Total Depth: 3428.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Fair
Test Type: Conventional Bottom Hole (Initial)
Tester: Ken Swinney
Unit No: 72
Reference Elevations: 1893.00 ft (KB)
1888.00 ft (CF)
KB to GR/CF: 5.00 ft

Serial #: 8365 **Inside**
Press@RunDepth: 95.84 psig @ 3357.00 ft (KB) Capacity: psig
Start Date: 2018.11.15 End Date: 2018.11.15 Last Calib.: 2018.11.15
Start Time: 08:40:01 End Time: 14:40:02 Time On Btm: 2018.11.15 @ 10:12:02
Time Off Btm: 2018.11.15 @ 13:16:17

TEST COMMENT: IFP 45 Minutes/ Blow built to BOB in 45 minutes
ISI 45 Minutes/ No blow back
FFP 45 Minutes/ Blow built to 9 inches
FSI 45 Minutes/ No blow back

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1683.85	89.64	Initial Hydro-static
2	19.76	89.22	Open To Flow (1)
48	57.86	92.94	Shut-In(1)
95	1132.04	93.36	End Shut-In(1)
95	63.57	93.02	Open To Flow (2)
139	95.84	94.19	Shut-In(2)
183	1132.34	95.04	End Shut-In(2)
185	1678.85	94.97	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
124.00	OCWM 10%O 40%W 50%M	1.74
36.00	MWCO 30%M 30%W 40%O	0.50
10.00	SMWCO 10%M 10%W 80%O	0.14

Gas Rates

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



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Hays, KS 67601+9696
ATTN: Herb Dienes

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Furthmyer #4
Job Ticket: 64559 **DST#: 1**
Test Start: 2018.11.15 @ 08:40:00

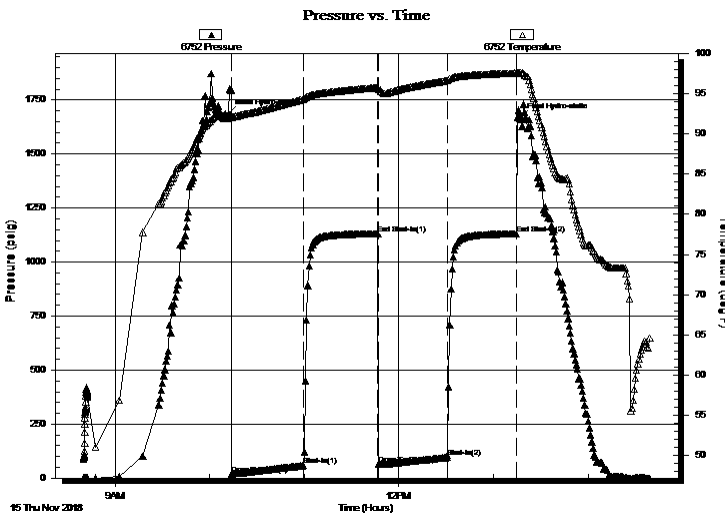
GENERAL INFORMATION:

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Time Test Ended: 14:40:02
Interval: **3356.00 ft (KB) To 3428.00 ft (KB) (TVD)**
Total Depth: 3428.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Fair
Test Type: Conventional Bottom Hole (Initial)
Tester: Ken Swinney
Unit No: 72
Reference Elevations: 1893.00 ft (KB)
1888.00 ft (CF)
KB to GR/CF: 5.00 ft

Serial #: 6752 Outside
Press@RunDepth: 1131.15 psig @ 3358.00 ft (KB) Capacity: psig
Start Date: 2018.11.15 End Date: 2018.11.15 Last Calib.: 2018.11.15
Start Time: 08:40:01 End Time: 14:39:02 Time On Btm: 2018.11.15 @ 10:12:02
Time Off Btm: 2018.11.15 @ 13:16:47

TEST COMMENT: IFP 45 Minutes/ Blow built to BOB in 45 minutes
ISI 45 Minutes/ No blow back
FFP 45 Minutes/ Blow built to 9 inches
FSI 45 Minutes/ No blow back

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1684.82	92.32	Initial Hydro-static
2	19.35	92.12	Open To Flow (1)
48	58.32	94.36	Shut-In(1)
95	1130.77	95.75	End Shut-In(1)
95	64.58	95.55	Open To Flow (2)
139	95.82	96.68	Shut-In(2)
183	1131.15	97.61	End Shut-In(2)
185	1666.15	97.67	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
124.00	OCWM 10%O 40%W 50%M	1.74
36.00	MWCO 30%M 30%W 40%O	0.50
10.00	SMWCO 10%M 10%W 80%O	0.14

Gas Rates

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



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TOOL DIAGRAM

TDI Inc.
1310 Bison Rd
Hays, KS 67601+9696
ATTN: Herb Dienes

23-14S-16W Ellis,KS
Furthmyer #4
Job Ticket: 64559 **DST#: 1**
Test Start: 2018.11.15 @ 08:40:00

Tool Information

Drill Pipe:	Length: 3361.00 ft	Diameter: 3.80 inches	Volume: 47.15 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer:	20000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose:	45000.00 lb
			<u>Total Volume: 47.15 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial	43000.00 lb
Depth to Top Packer:	3356.00 ft			Final	43000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	71.68 ft				
Tool Length:	91.68 ft				
Number of Packers:	2	Diameter: 6.75 inches			

Tool Comments:

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
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Shut-In Tool	5.00			3341.00	
Hydraulic tool	5.00			3346.00	
Top Packer	5.00			3351.00	
Packer	5.00			3356.00	20.00 Bottom Of Top Packer
Recorder	1.00	8365	Inside	3357.00	
Recorder	1.00	6752	Outside	3358.00	
Anchor	33.00			3391.00	
Change Over Sub	1.00			3392.00	
Drill Pipe	31.68			3423.68	
Change Over Sub	1.00			3424.68	
Bullnose	3.00			3427.68	71.68 Anchor Tool

Total Tool Length: 91.68



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FLUID SUMMARY

TDI Inc. **23-14S-16W Ellis,KS**
 1310 Bison Rd **Furthmyer #4**
 Hays, KS 67601+9696 Job Ticket: 64559 **DST#: 1**
 ATTN: Herb Dienes Test Start: 2018.11.15 @ 08:40:00

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:	26000 ppm
Viscosity: 52.00 sec/qt	Cushion Volume: bbl		
Water Loss: 5.99 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 4600.00 ppm			
Filter Cake: 1.00 inches			

Recovery Information

Recovery Table

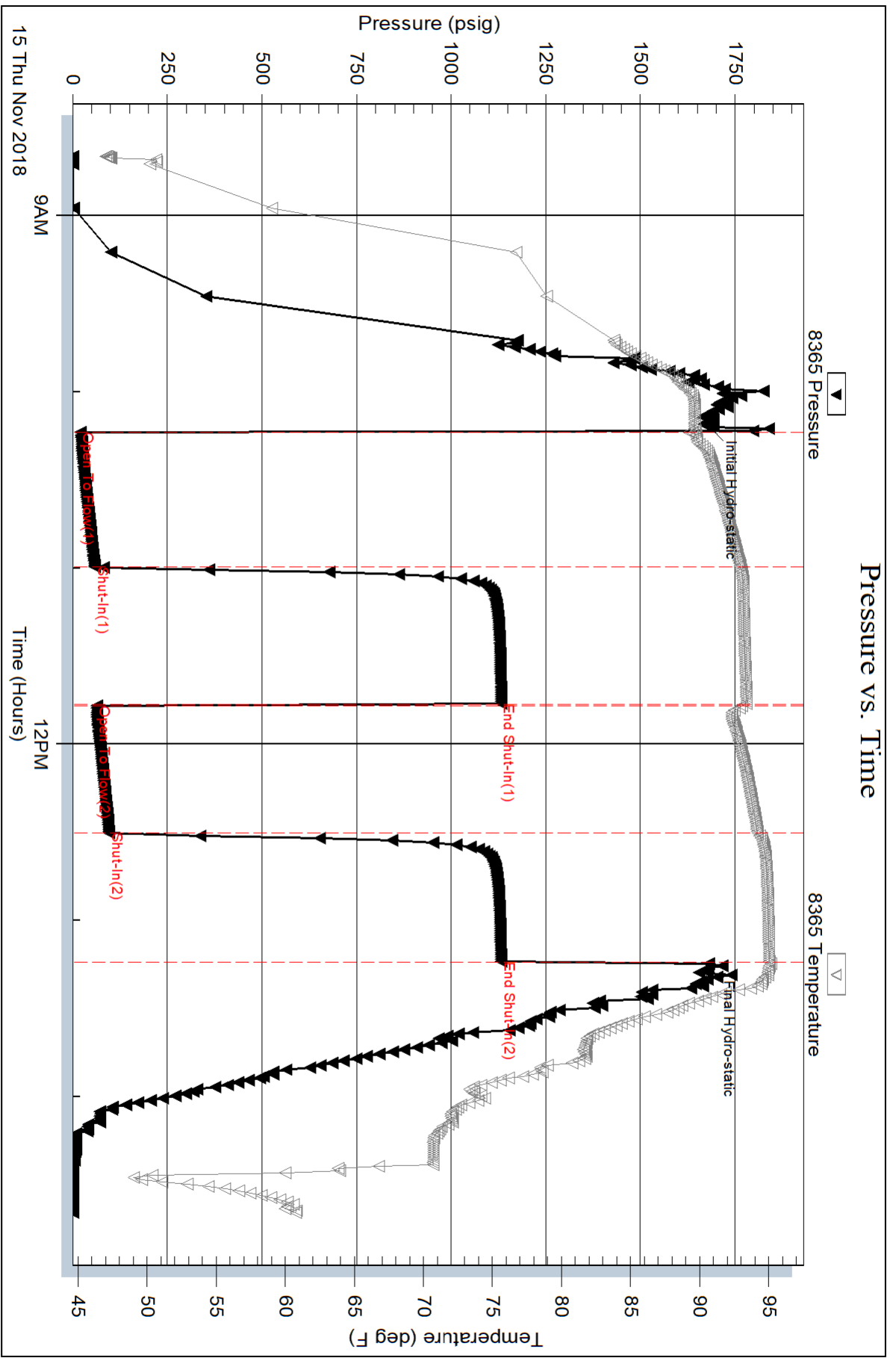
Length ft	Description	Volume bbl
124.00	OCWM 10%O 40%W 50%M	1.739
36.00	MWCO 30%M 30%W 40%O	0.505
10.00	SMWCO 10%M 10%W 80%O	0.140

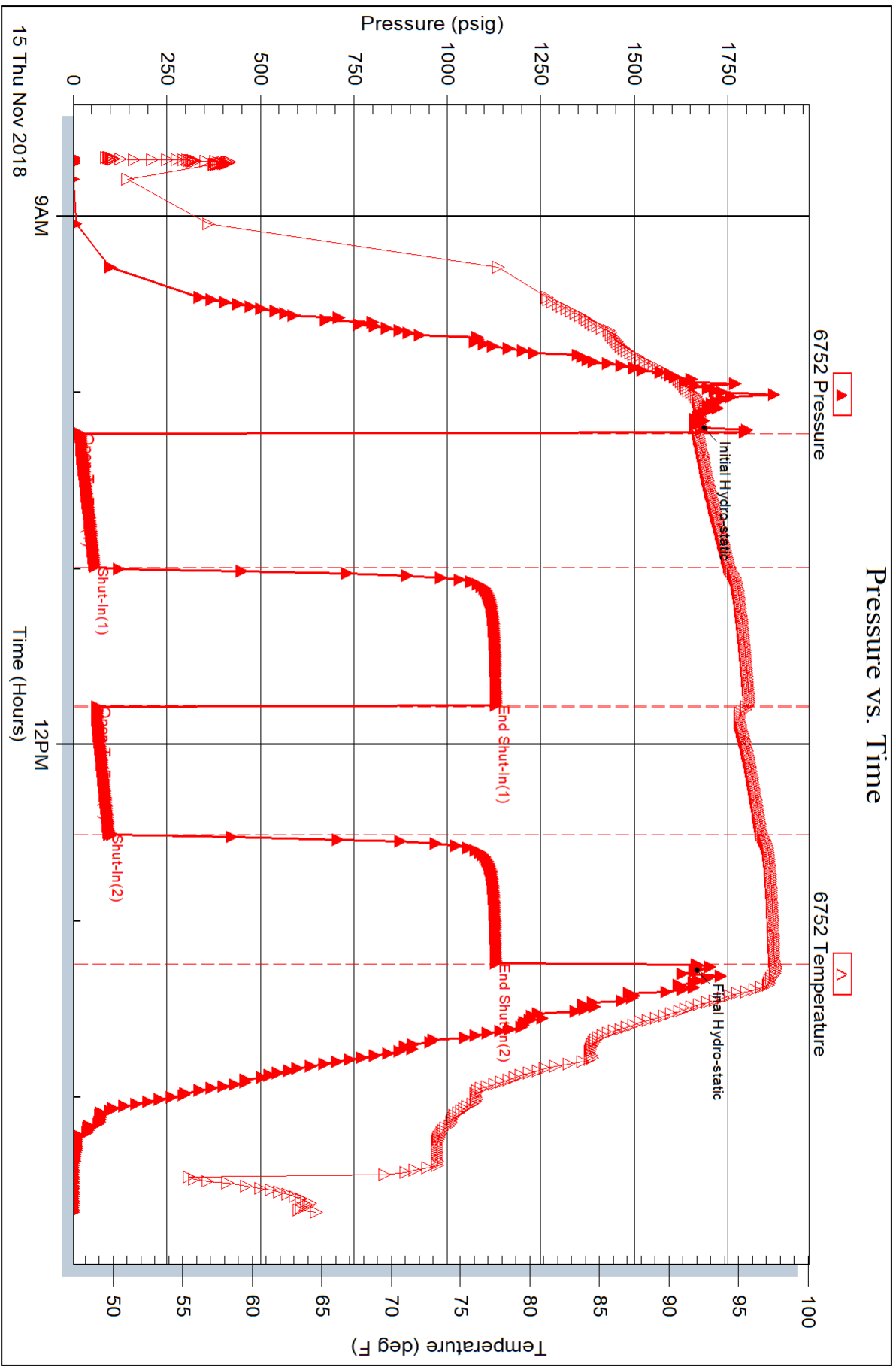
Total Length: 170.00 ft Total Volume: 2.384 bbl

Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:

Laboratory Name: Laboratory Location:

Recovery Comments: Recovery Resistivity .273 ohms @66 deg.







TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64559**

Well Name & No. Furthmyer #4 Test No. 1 Date 15 Nov 18
 Company TDI Inc. Elevation 1893 KB 1888 GL
 Address 1310 Bison Rd Hays Kansas 67601-9696
 Co. Rep / Geo. Herb Dienes Rig White Knight
 Location: Sec. 23 Twp 14S Rge. 16W Co. Ellis State KS

Interval Tested 3356-3428 Zone Tested Arbuckle
 Anchor Length 72 Drill Pipe Run 3361 Mud Wt. 9.0
 Top Packer Depth 3351 Drill Collars Run - Vls 52
 Bottom Packer Depth 3356 Wt. Pipe Run - WL 6.0
 Total Depth 3428 Chlorides 4600 ppm System LCM 2#

Blow Description I.F. Blow built to BOD in 45 minutes
I.S.I. No blow back
F.F. Blow built to 9 inches
F.S.I. No blow back

Rec	Feet of	%gas	%oil	%water	%mud
<u>10</u>	<u>Mud & Water cut 0.1</u>	<u>80</u>	<u>10</u>	<u>10</u>	<u>10</u>
<u>360</u>	<u>muddy Watery Oil</u>	<u>40</u>	<u>30</u>	<u>30</u>	<u>30</u>
<u>124</u>	<u>Oil cut Watery Mud</u>	<u>10</u>	<u>40</u>	<u>50</u>	<u>50</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 170 BHT 95 Gravity _____ API RW .273 @ 1.6 °F Chlorides 26000 ppm

(A) Initial Hydrostatic 1683 Test 1050 T-On Location 7:42 am
 (B) First Initial Flow 19 Jars _____ T-Started 8:40 am
 (C) First Final Flow 57 Safety Joint _____ T-Open 10:14 am
 (D) Initial Shut-In 1132 Circ Sub _____ T-Pulled 1:14 pm
 (E) Second Initial Flow 63 Hourly Standby _____ T-Out 2:40 pm
 (F) Second Final Flow 95 Mileage 30 30 Comments _____
 (G) Final Shut-In 1132 Sampler _____
 (H) Final Hydrostatic 1678 Straddle _____ Ruined Shale Packer _____
 Shale Packer _____ Ruined Packer _____
 Extra Packer _____ Extra Copies _____
 Initial Open 45 Extra Recorder _____ Sub Total 0
 Initial Shut-In 45 Day Standby _____ Total 1080
 Final Flow 45 Accessibility _____ MP/DST Disc't _____
 Final Shut-In 45 Sub Total 1080

Approved By [Signature] Our Representative [Signature]

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