



DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

Joy Unit #1

12-12S-19W Ellis, KS

Start Date: 2016.06.21 @ 14:08:46

End Date: 2016.06.21 @ 20:11:16

Job Ticket #: 58091 DST #: 1

Trilobite Testing, Inc
PO Box 362 Hays, KS 67601
ph: 785-625-4778 fax: 785-625-5620

Printed: 2016.06.23 @ 09:15:22



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58091

DST#: 1

Test Start: 2016.06.21 @ 14:08:46

GENERAL INFORMATION:

Formation: **Tor-LKC "D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 16:40:16

Time Test Ended: 20:11:16

Test Type: Conventional Bottom Hole (Initial)

Tester: Brannan Lonsdale

Unit No: 73

Interval: 3472.00 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: 2218.00 ft (KB)

2210.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 6651 Inside

Press@RunDepth: 17.86 psig @ 3490.00 ft (KB)

Start Date: 2016.06.21

End Date:

2016.06.21

Start Time: 14:08:47

End Time:

20:11:16

Capacity: 8000.00 psig

Last Calib.: 2016.06.21

Time On Btm: 2016.06.21 @ 16:39:46

Time Off Btm: 2016.06.21 @ 18:41:46

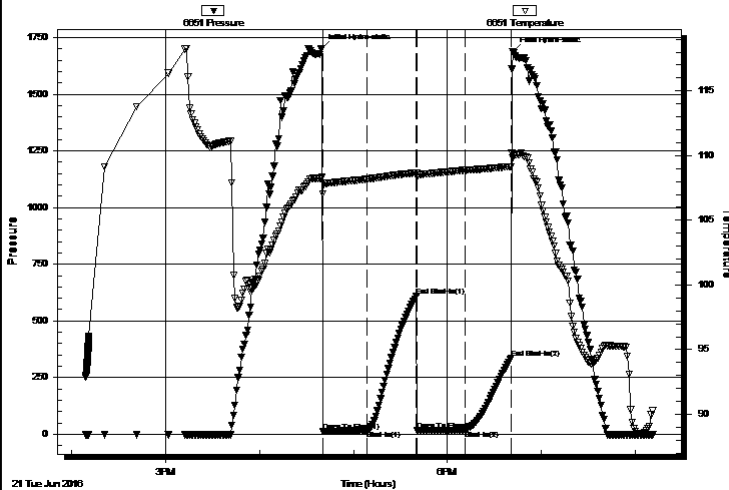
TEST COMMENT: 30- IF- Surface blow died 23mins

30- IS- No blow

30- FF- No blow

30- FSI- No blow

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1702.21	108.33	Initial Hydro-static
1	12.39	107.07	Open To Flow (1)
29	15.22	108.18	Shut-In(1)
61	609.09	108.66	End Shut-In(1)
61	15.85	108.33	Open To Flow (2)
92	17.86	108.86	Shut-In(2)
121	335.27	109.16	End Shut-In(2)
122	1686.56	109.84	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
15.00	M w / oil spots	0.21

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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DRILL STEM TEST REPORT

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58091

DST#: 1

Test Start: 2016.06.21 @ 14:08:46

GENERAL INFORMATION:

Formation: **Tor-LKC "D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 16:40:16

Time Test Ended: 20:11:16

Test Type: Conventional Bottom Hole (Initial)

Tester: Brannan Lonsdale

Unit No: 73

Interval: **3472.00 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: 2218.00 ft (KB)

2210.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 6839 Outside

Press@RunDepth: psig @ 3490.00 ft (KB)

Start Date: 2016.06.21

End Date:

2016.06.21

Start Time: 14:08:39

End Time:

20:11:08

Capacity: 8000.00 psig

Last Calib.:

2016.06.21

Time On Btm:

Time Off Btm:

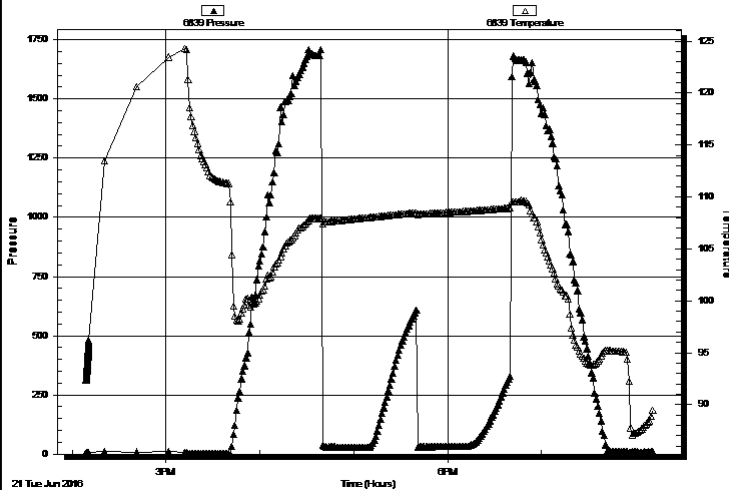
TEST COMMENT: 30- IF- Surface blow died 23mins

30- IS- No blow

30- FF- No blow

30- FSI- No blow

Pressure vs. Time



PRESSURE SUMMARY

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

Length (ft)	Description	Volume (bbl)
15.00	M w / oil spots	0.21

Gas Rates

Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

TOOL DIAGRAM

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58091

DST#: 1

Test Start: 2016.06.21 @ 14:08:46

Tool Information

Drill Pipe:	Length:	3484.00 ft	Diameter:	3.82 inches	Volume:	49.39 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:	56000.00 lb
					Total Volume:	- bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:		32.00 ft					String Weight: Initial	42000.00 lb
Depth to Top Packer:		3472.00 ft					Final	42000.00 lb
Depth to Bottom Packer:		ft						
Interval between Packers:		118.00 ft						
Tool Length:		138.00 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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Change Over Sub	1.00			3453.00	
Shut In Tool	5.00			3458.00	
Hydraulic tool	5.00			3463.00	
Packer	5.00			3468.00	20.00 Bottom Of Top Packer
Packer	4.00			3472.00	
Stubb	1.00			3473.00	
Perforations	17.00			3490.00	
Recorder	0.00	6651	Inside	3490.00	
Recorder	0.00	6839	Outside	3490.00	
Change Over Sub	1.00			3491.00	
Drill Pipe	95.00			3586.00	
Change Over Sub	1.00			3587.00	
Bullnose	3.00			3590.00	118.00 Bottom Packers & Anchor

Total Tool Length: 138.00



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

FLUID SUMMARY

TDI, Inc.

12-12S-19W Ellis, KS

1310 Bison Rd.
Hays, KS 67601

Joy Unit #1

Job Ticket: 58091

DST#: 1

ATTN: Herb Deines

Test Start: 2016.06.21 @ 14:08:46

Mud and Cushion Information

Mud Type: Gel Chem

Mud Weight: 9.00 lb/gal

Viscosity: 50.00 sec/qt

Water Loss: 6.79 in³

Resistivity: ohm.m

Salinity: 3300.00 ppm

Filter Cake: inches

Cushion Type:

Cushion Length:

Cushion Volume:

Gas Cushion Type:

Gas Cushion Pressure:

Oil API:

Water Salinity:

deg API

ppm

ft

bbl

psig

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
15.00	M w / oil spots	0.213

Total Length: 15.00 ft

Total Volume: 0.213 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

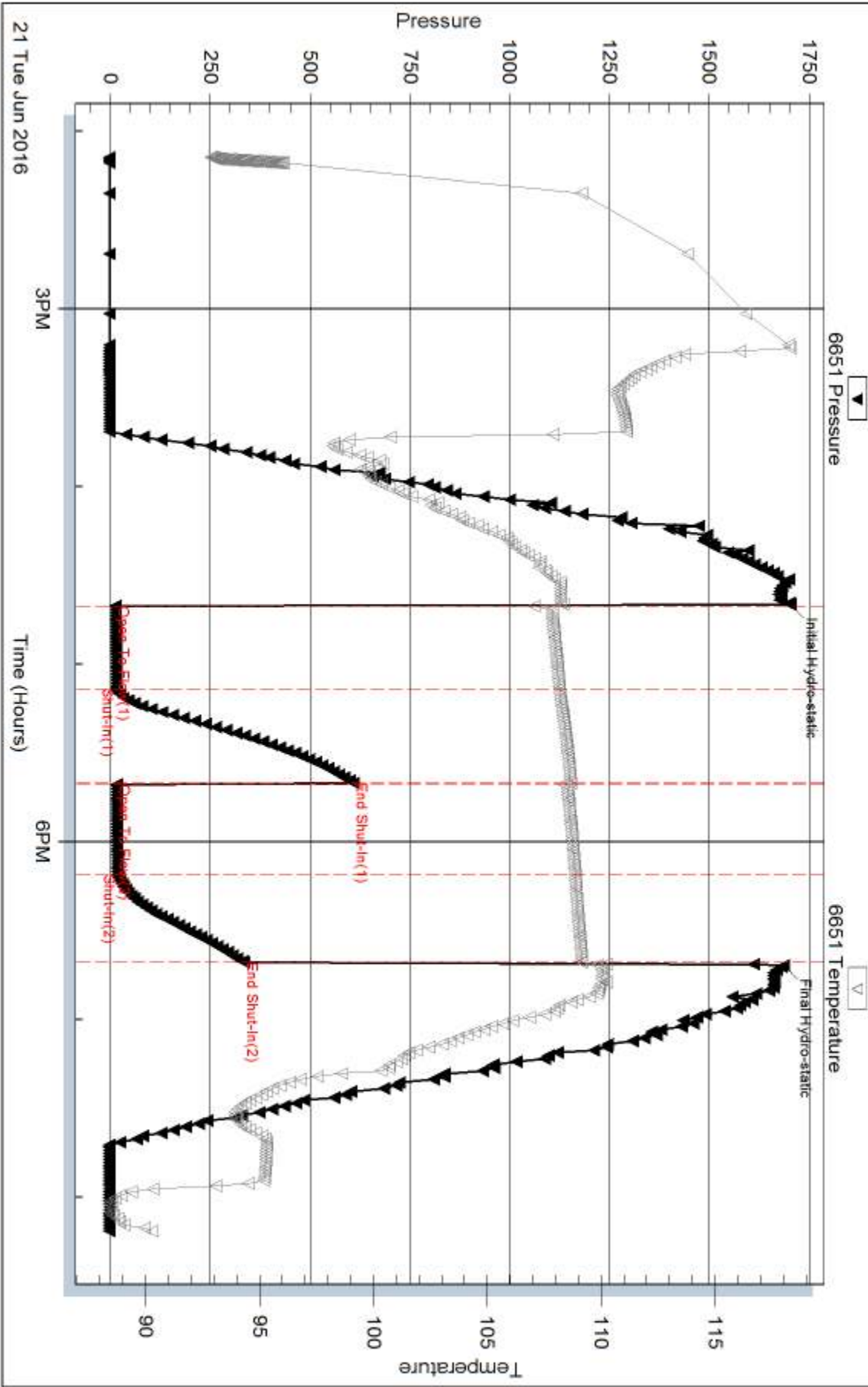
Serial #: 6651

Inside TDI, Inc.

Joy Unit #1

DST Test Number: 1

Pressure vs. Time

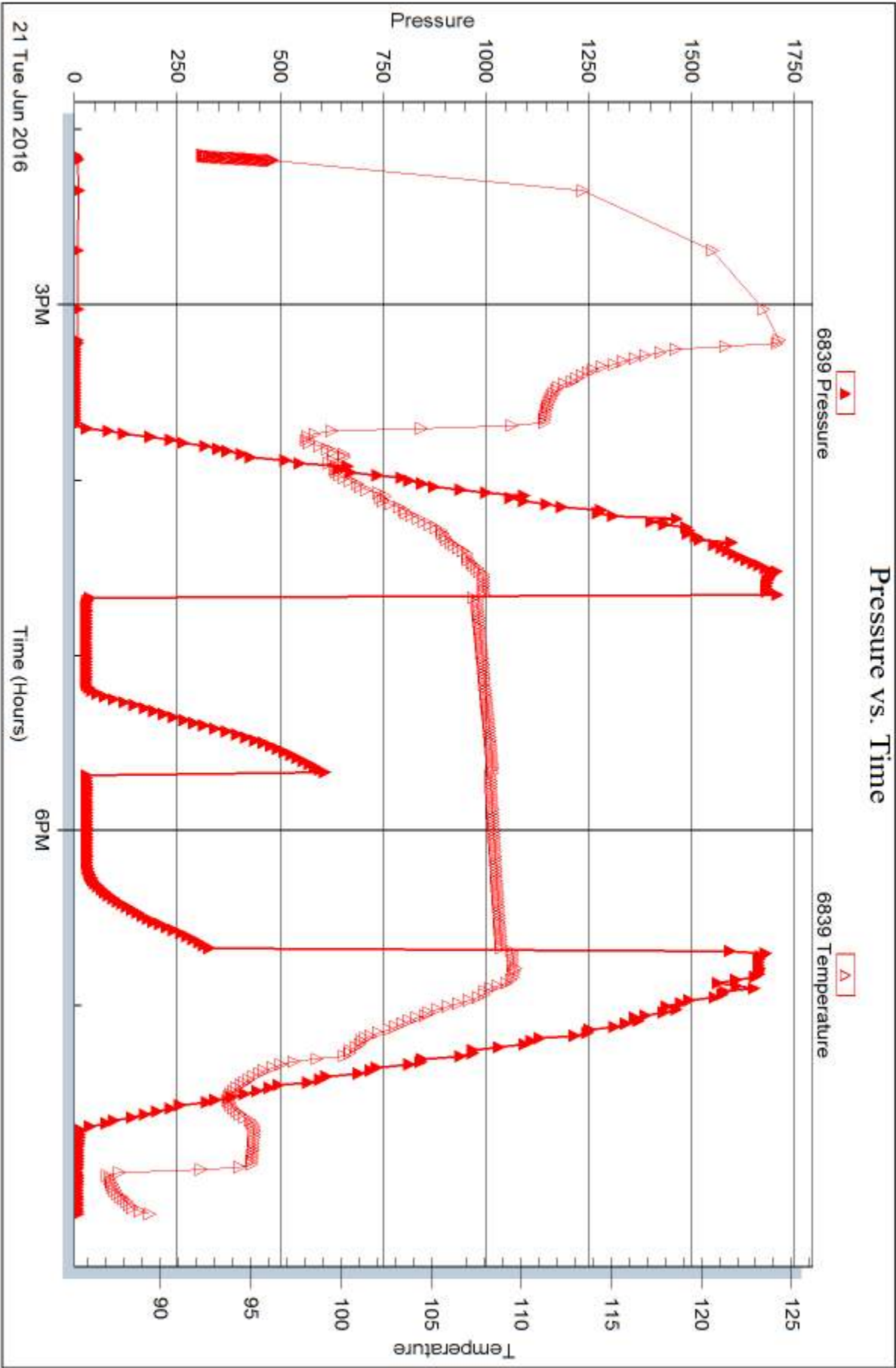


Serial #: 6839

Outside TDI, Inc.

Joy Unit #1

DST Test Number: 1





DRILL STEM TEST REPORT

Prepared For: **TDI, Inc.**

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

Joy Unit #1

12-12S-19W Ellis, KS

Start Date: 2016.06.22 @ 08:12:59

End Date: 2016.06.22 @ 14:11:29

Job Ticket #: 58092 DST #: 2

Trilobite Testing, Inc
PO Box 362 Hays, KS 67601
ph: 785-625-4778 fax: 785-625-5620

Printed: 2016.06.23 @ 09:14:47

TDI, Inc.
12-12S-19W Ellis, KS
Joy Unit #1
DST # 2
LKC "J"
2016.06.22



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58092

DST#: 2

Test Start: 2016.06.22 @ 08:12:59

GENERAL INFORMATION:

Formation: **LKC "J"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:46:29

Time Test Ended: 14:11:29

Test Type: Conventional Bottom Hole (Reset)

Tester: Brannan Lonsdale

Unit No: 73

Interval: 3688.00 ft (KB) To 3710.00 ft (KB) (TVD)

Total Depth: 3710.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Fair

Reference Elevations: 2218.00 ft (KB)

2210.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 6651 Inside

Press@RunDepth: 63.24 psig @ 3707.00 ft (KB)

Start Date: 2016.06.22

End Date:

2016.06.22

Start Time: 08:13:00

End Time:

14:11:29

Capacity: 8000.00 psig

Last Calib.: 2016.06.22

Time On Btm: 2016.06.22 @ 09:45:59

Time Off Btm: 2016.06.22 @ 12:47:29

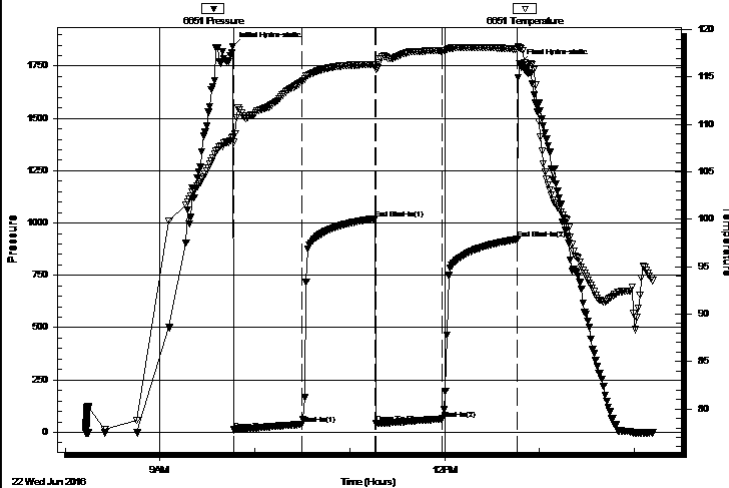
TEST COMMENT: 45- IF- Slow ly built to 4.5"

45- IS- No blow

45- FF- Slow ly built to 2"

45- FS- No blow

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1843.99	108.64	Initial Hydro-static
1	11.48	108.13	Open To Flow (1)
44	38.09	114.51	Shut-In(1)
90	1021.15	116.28	End Shut-In(1)
91	41.09	115.85	Open To Flow (2)
132	63.24	117.76	Shut-In(2)
180	922.59	117.91	End Shut-In(2)
182	1762.02	118.07	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
95.00	MW, 15%M 85%W	1.35

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



**TRILOBITE
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DRILL STEM TEST REPORT

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58092

DST#: 2

Test Start: 2016.06.22 @ 08:12:59

GENERAL INFORMATION:

Formation: **LKC "J"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:46:29

Time Test Ended: 14:11:29

Test Type: Conventional Bottom Hole (Reset)

Tester: Brannan Lonsdale

Unit No: 73

Interval: 3688.00 ft (KB) To 3710.00 ft (KB) (TVD)

Total Depth: 3710.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Fair

Reference Elevations: 2218.00 ft (KB)

2210.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 6839 Outside

Press@RunDepth: psig @ 3707.00 ft (KB)

Start Date: 2016.06.22

End Date:

2016.06.22

Start Time: 08:12:23

End Time:

14:10:52

Capacity: 8000.00 psig

Last Calib.:

2016.06.22

Time On Btm:

Time Off Btm:

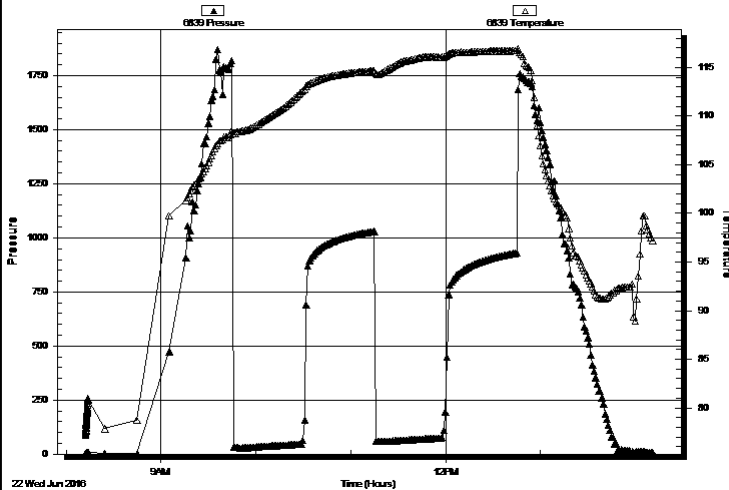
TEST COMMENT: 45- IF- Slow ly built to 4.5"

45- IS- No blow

45- FF- Slow ly built to 2"

45- FS- No blow

Pressure vs. Time



PRESSURE SUMMARY

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

Length (ft)	Description	Volume (bbl)
95.00	MW, 15%M 85%W	1.35

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

TDI, Inc.

1310 Bison Rd.
Hays, KS 67601

ATTN: Herb Deines

12-12S-19W Ellis, KS

Joy Unit #1

Job Ticket: 58092

DST#: 2

Test Start: 2016.06.22 @ 08:12:59

Tool Information

Drill Pipe:	Length:	3672.00 ft	Diameter:	3.82 inches	Volume:	52.05 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:	50000.00 lb
					Total Volume:	- bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:		4.00 ft					String Weight: Initial	42000.00 lb
Depth to Top Packer:		3688.00 ft					Final	42000.00 lb
Depth to Bottom Packer:		ft						
Interval between Packers:		22.00 ft						
Tool Length:		42.00 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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Change Over Sub	1.00			3669.00	
Shut In Tool	5.00			3674.00	
Hydraulic tool	5.00			3679.00	
Packer	5.00			3684.00	20.00 Bottom Of Top Packer
Packer	4.00			3688.00	
Stubb	1.00			3689.00	
Perforations	18.00			3707.00	
Recorder	0.00	6651	Inside	3707.00	
Recorder	0.00	6839	Outside	3707.00	
Bullnose	3.00			3710.00	22.00 Bottom Packers & Anchor
Total Tool Length:	42.00				



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

FLUID SUMMARY

TDI, Inc.

12-12S-19W Ellis, KS

1310 Bison Rd.
Hays, KS 67601

Joy Unit #1

Job Ticket: 58092

DST#: 2

ATTN: Herb Deines

Test Start: 2016.06.22 @ 08:12:59

Mud and Cushion Information

Mud Type: Gel Chem

Mud Weight: 9.00 lb/gal

Viscosity: 50.00 sec/qt

Water Loss: 7.20 in³

Resistivity: ohm.m

Salinity: 3900.00 ppm

Filter Cake: inches

Cushion Type:

Cushion Length:

Cushion Volume:

Gas Cushion Type:

Gas Cushion Pressure:

Oil API:

deg API

Water Salinity: 86000 ppm

ft

bbl

psig

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
95.00	MW, 15%M 85%W	1.347

Total Length: 95.00 ft

Total Volume: 1.347 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

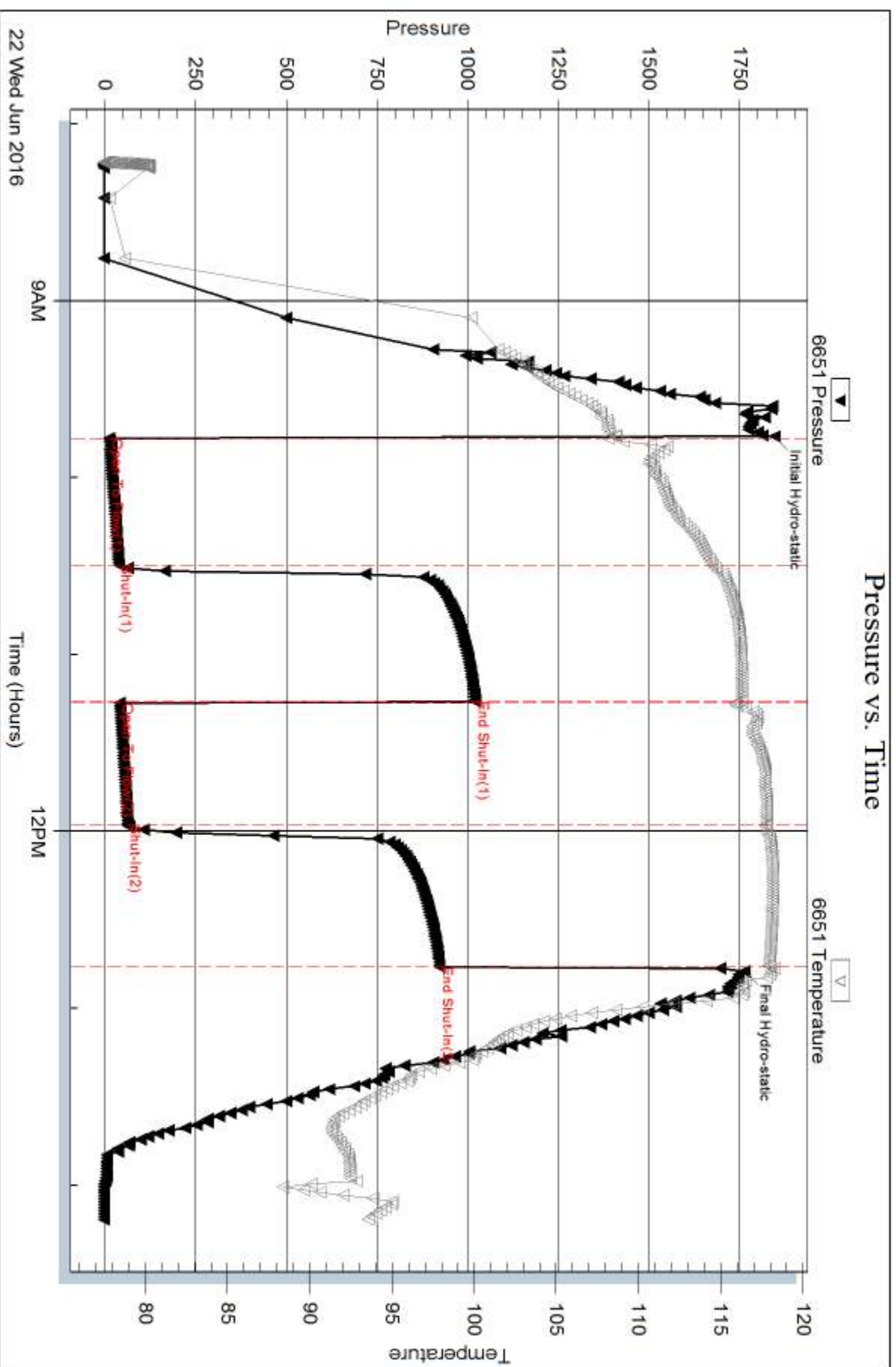
Serial #: 6651

Inside

TDI, Inc.

Joy Unit #1

DST Test Number: 2

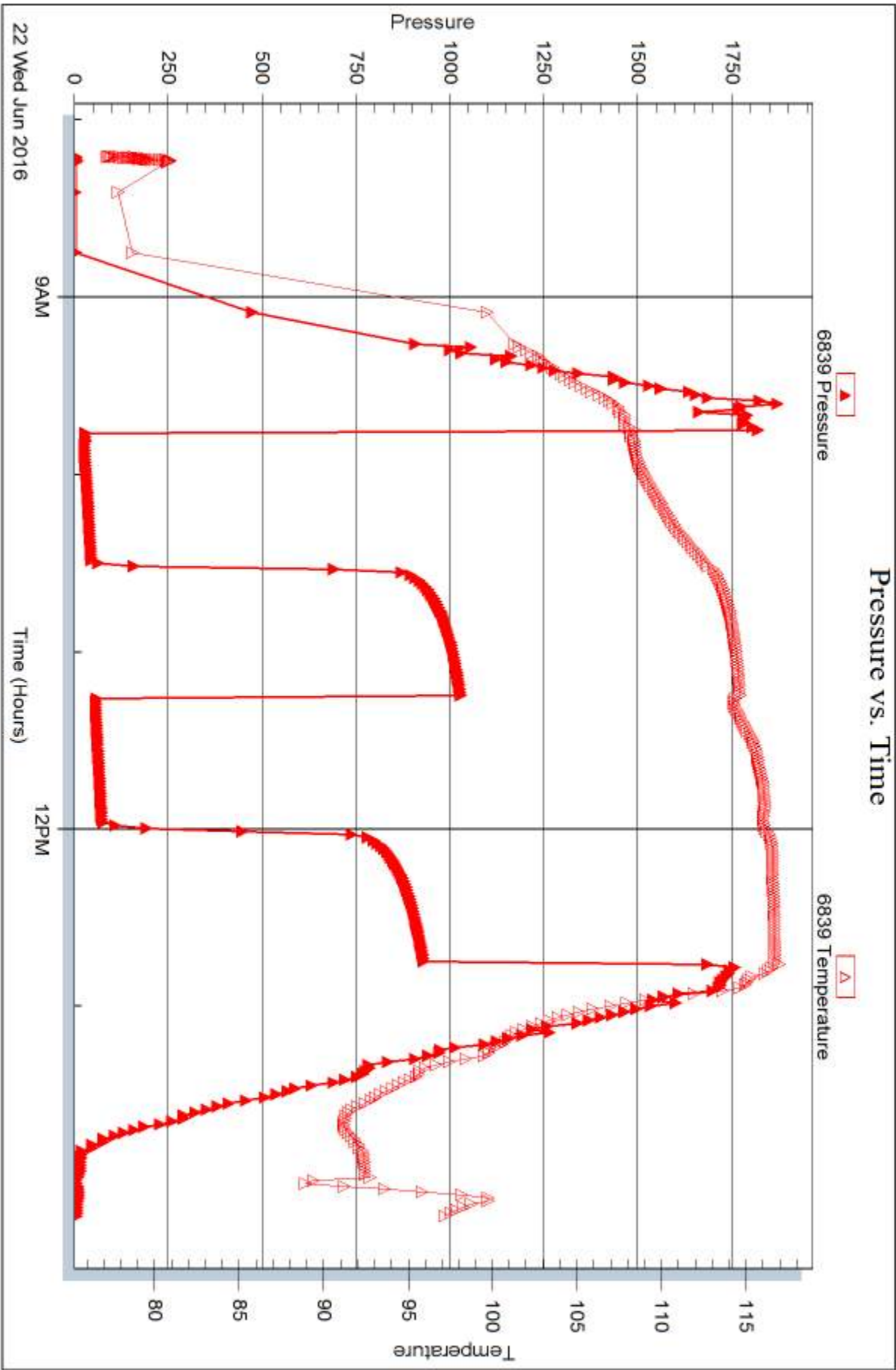


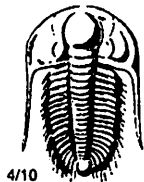
Serial #: 6839

Outside TDI, Inc.

Joy Unit #1

DST Test Number: 2





TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 58091

Well Name & No. Joy Unit #1 Test No. 1 Date 6/21/16
 Company TDE, Inc. Elevation 2218 KB 2210 GL
 Address 1316 Bison Rd. Hays, KS 67601
 Co. Rep / Geo. Herb Deines Rig Southwind #3
 Location: Sec. 12 Twp. 12 S Rge. 19 W Co. Ellis State KS

Interval Tested 3472-3590 Zone Tested Top-LKC "D"
 Anchor Length 118' Drill Pipe Run 3484 Mud Wt. 9.1
 Top Packer Depth 3467 Drill Collars Run — Vis 50
 Bottom Packer Depth 3472 Wt. Pipe Run — WL 6.8
 Total Depth 3590 Chlorides 3,300 ppm System LCM 2"

Blow Description IF - Surface down dead in 23 mins
PSI - No blow
FF - No blow
PSI - No blow

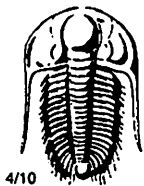
Rec	Feet of	%gas	%oil	%water	%mud
<u>15</u>	<u>M/W oil spots</u>				
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 15' BHT 109 Gravity — API RW — @ — °F Chlorides — ppm
 (A) Initial Hydrostatic 1702 ☒ Test 1050 T-On Location 1343
 (B) First Initial Flow 12 ☐ Jars — T-Started 1408
 (C) First Final Flow 15 ☐ Safety Joint — T-Open 1640
 (D) Initial Shut-In 609 ☐ Circ Sub — T-Pulled 1840
 (E) Second Initial Flow 16 ☐ Hourly Standby — T-Out 2011
 (F) Second Final Flow 18 ☒ Mileage 36 RT²⁷ Comments —
 (G) Final Shut-In 335 ☐ Sampler —
 (H) Final Hydrostatic 1687 ☐ Straddle —

☐ Ruined Shale Packer —
☐ Ruined Packer —
☐ Extra Copies —
 Initial Open 30 ☐ Shale Packer —
 Initial Shut-In 30 ☐ Extra Packer —
 Final Flow 30 ☐ Extra Recorder —
 Final Shut-In 30 ☐ Day Standby —
☐ Accessibility —
 Sub Total 1077 Sub Total 0
 Total 1077 MP/DST Disc't —

Approved By — Our Representative Brannon 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. 58092

Well Name & No. Joy Hart #1 Test No. 2 Date 6/22/16
Company TDI, Inc. Elevation 2218 KB 2210 GL
Address 1310 Bison Rd. Hays, KS 67601
Co. Rep / Geo. Herb Domes Rig Southwind #3
Location: Sec. 12 Twp. 12 S Rge. 19 W Co. Ellis State KS

Interval Tested 3688 - 3710 Zone Tested LKC "J"
Anchor Length 22' Drill Pipe Run 2672 Mud Wt. 9.1
Top Packer Depth 3683 Drill Collars Run — Vis 50
Bottom Packer Depth 3688 Wt. Pipe Run — WL 7.2
Total Depth 3710 Chlorides 3900 ppm System LCM 1#

Blow Description IF - Built slowly to 4' 1/2"

ISI - No blow

FF - Built slowly to 2"

PSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>95</u>	<u>MW</u>			<u>85</u>	<u>15</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 95' BHT 118° Gravity 1050 API RW .06 @ 87 °F Chlorides 86000 ppm

(A) Initial Hydrostatic 1844 ☒ Test 1050

(B) First Initial Flow 11 ☐ Jars —

(C) First Final Flow 38 ☐ Safety Joint —

(D) Initial Shut-In 1021 ☐ Circ Sub —

(E) Second Initial Flow 41 ☐ Hourly Standby —

(F) Second Final Flow 63 ☒ Mileage 36 RT x 2

(G) Final Shut-In 923 ☐ Sampler 27+27

(H) Final Hydrostatic 1762 ☐ Straddle —

☐ Shale Packer —

☐ Extra Packer —

☐ Extra Recorder —

☐ Day Standby —

☐ Accessibility —

Sub Total 1104

T-On Location 0759

T-Started 0812

T-Open 0945

T-Pulled 1245

T-Out 1411

Comments Loaded tools

6/22 @ 2330

☐ Ruined Shale Packer —

☐ Ruined Packer —

☐ Extra Copies —

Sub Total 0

Total 1104

MP/DST Disc't —

Approved By —

Our Representative Braman 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.