



## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co., Inc.**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Rocky Milford

### **Munn #2-12**

#### **12-2s-38w Cheyenne KS**

Start Date: 2017.04.17 @ 06:00:00

End Date: 2017.04.17 @ 13:20:15

Job Ticket #: 65439                      DST #: 1

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

Printed: 2017.04.24 @ 09:20:59



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.  
 250 N. Water STE 300  
 Wichita, KS 67202  
 ATTN: Rocky Milford

**12-2s-38w Cheyenne KS**

**Munn #2-12**

Job Ticket: 65439

**DST#: 1**

Test Start: 2017.04.17 @ 06:00:00

## GENERAL INFORMATION:

Formation: **Topeka**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 08:22:45

Time Test Ended: 13:20:15

Test Type: Conventional Bottom Hole (Initial)

Tester: James Winder

Unit No: 83

Interval: **3967.00 ft (KB) To 4014.00 ft (KB) (TVD)**

Reference Elevations: 3278.00 ft (KB)

Total Depth: 4014.00 ft (KB) (TVD)

3273.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

**Serial #: 6625**

**Inside**

Press@RunDepth: 21.19 psig @ 3968.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.17

End Date:

2017.04.17

Last Calib.: 2017.04.17

Start Time: 06:00:05

End Time:

13:20:14

Time On Btm: 2017.04.17 @ 08:22:30

Time Off Btm: 2017.04.17 @ 11:25:00

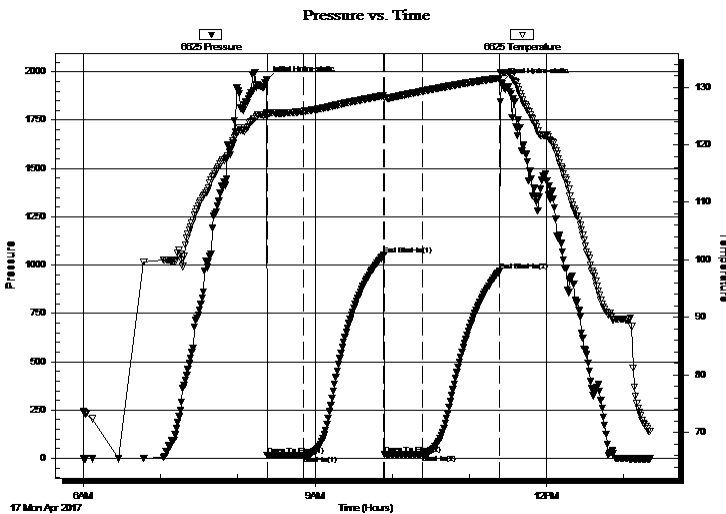
TEST COMMENT: 30 - IF: Blow built to 1/2", died back to weak surface blow at close

60 - IS: No blow

30 - FF: No blow

60 - FS: No blow

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1956.90	125.62	Initial Hydro-static
1	15.99	125.13	Open To Flow (1)
29	16.92	125.82	Shut-In(1)
91	1052.05	128.54	End Shut-In(1)
92	19.63	128.24	Open To Flow (2)
122	21.19	129.31	Shut-In(2)
181	969.59	131.57	End Shut-In(2)
183	1943.35	132.44	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud w /Oil spots 96%m, 4%o	0.07

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65439

**DST#: 1**

ATTN: Rocky Milford

Test Start: 2017.04.17 @ 06:00:00

## Tool Information

Drill Pipe:	Length: 3746.00 ft	Diameter: 3.80 inches	Volume: 52.55 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 66000.00 lb
			<u>Total Volume: 53.56 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	13.00 ft			String Weight: Initial 62000.00 lb
Depth to Top Packer:	3967.00 ft			Final 62000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	47.00 ft			
Tool Length:	76.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

## Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			3939.00	
Shut In Tool	5.00			3944.00	
Hydraulic tool	5.00			3949.00	
Jars	5.00			3954.00	
Safety Joint	3.00			3957.00	
Packer	5.00			3962.00	29.00 Bottom Of Top Packer
Packer	5.00			3967.00	
Packer - Shale	0.00			3967.00	
Stubb	1.00			3968.00	
Recorder	0.00	6625	Inside	3968.00	
Recorder	0.00	8017	Outside	3968.00	
Perforations	10.00			3978.00	
Blank Spacing	33.00			4011.00	
Bullnose	3.00			4014.00	47.00 Bottom Packers & Anchor

**Total Tool Length: 76.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

## FLUID SUMMARY

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65439

**DST#: 1**

ATTN: Rocky Milford

Test Start: 2017.04.17 @ 06:00:00

### 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:

ppm

Viscosity: 69.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.58 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 600.00 ppm

Filter Cake: 2.00 inches

### Recovery Information

#### Recovery Table

Length ft	Description	Volume bbl
15.00	Mud w /Oil spots 96% <sub>m</sub> , 4% <sub>o</sub>	0.074

Total Length: 15.00 ft      Total Volume: 0.074 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

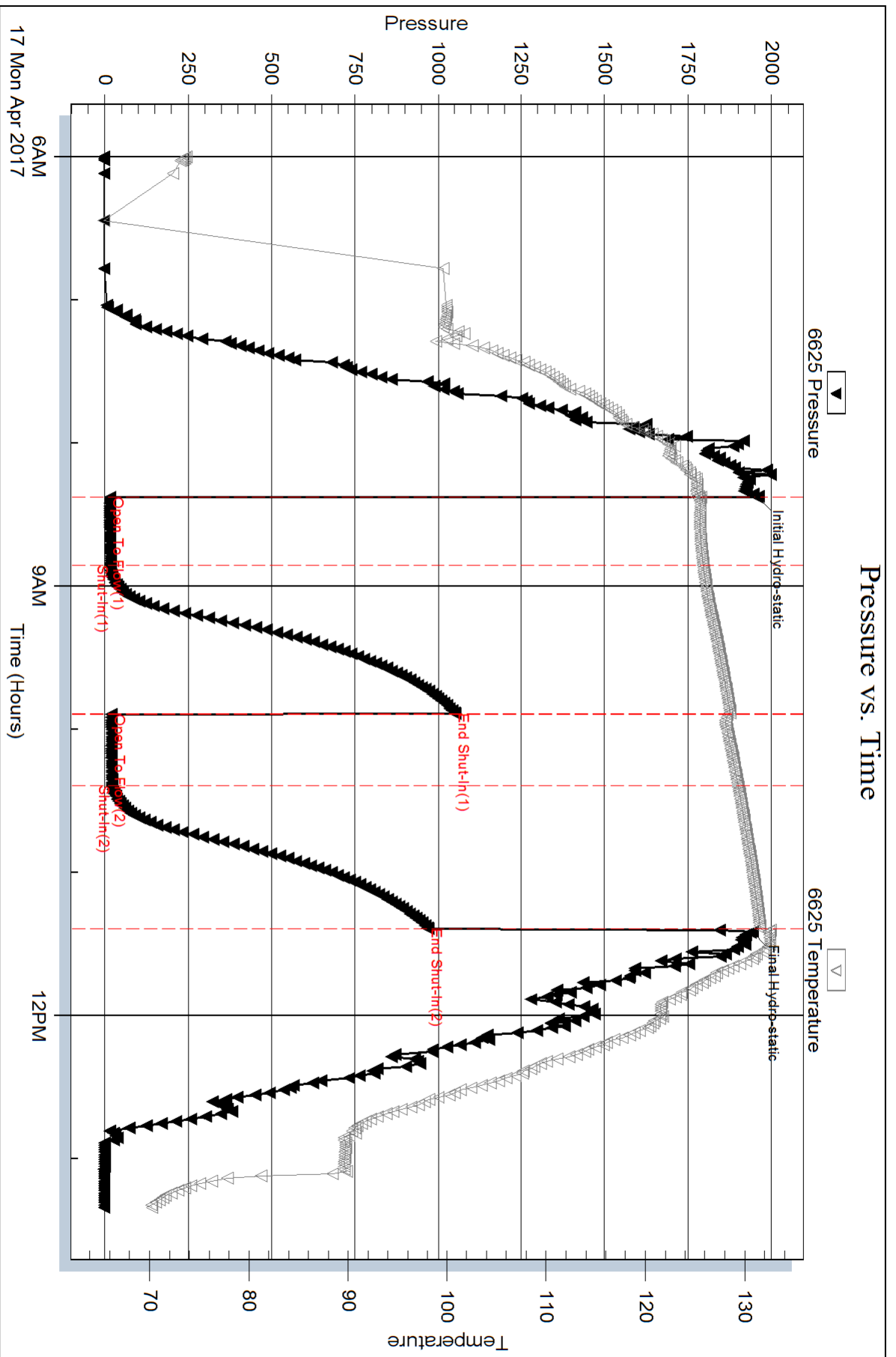
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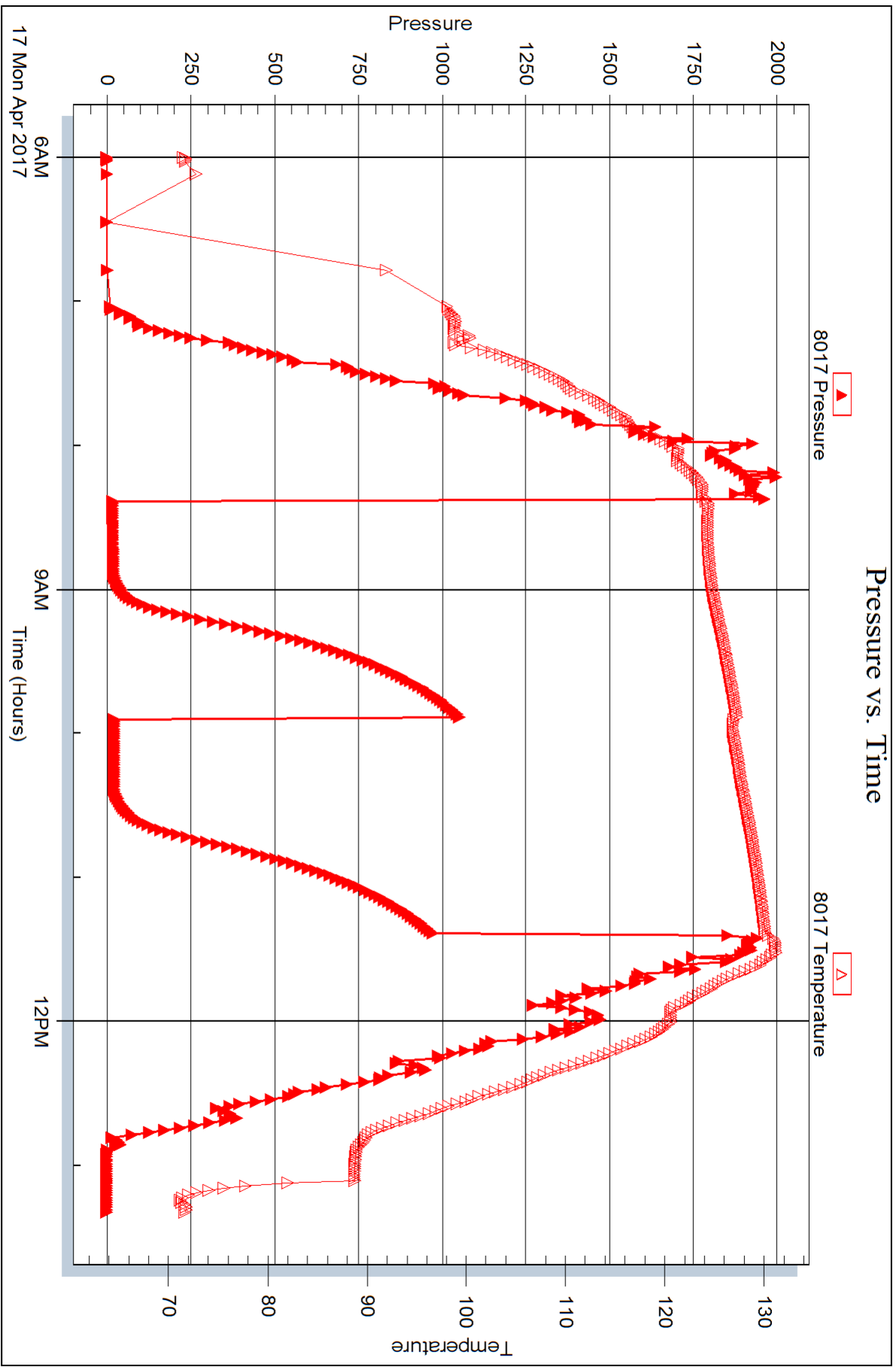
Inside

Murfin Drilling Co., Inc.

Munn #2-12

DST Test Number: 1







## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co., Inc.**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Rocky Milford

### **Munn #2-12**

#### **12-2s-38w Cheyenne KS**

Start Date: 2017.04.18 @ 19:30:00

End Date: 2017.04.19 @ 04:01:30

Job Ticket #: 65440                      DST #: 2

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.04.24 @ 09:20:30





**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.  
 250 N. Water STE 300  
 Wichita, KS 67202  
 ATTN: Rocky Milford

**12-2s-38w Cheyenne KS**

**Munn #2-12**

Job Ticket: 65440

**DST#: 2**

Test Start: 2017.04.18 @ 19:30:00

## GENERAL INFORMATION:

Formation: **Douglas Sd - LKC "D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 21:34:00

Time Test Ended: 04:01:30

Test Type: Conventional Bottom Hole (Reset)

Tester: James Winder

Unit No: 83

Interval: **4165.00 ft (KB) To 4305.00 ft (KB) (TVD)**

Reference Elevations: 3278.00 ft (KB)

Total Depth: 4305.00 ft (KB) (TVD)

3273.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

**Serial #: 6625**

**Inside**

Press@RunDepth: 148.38 psig @ 4166.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.18

End Date:

2017.04.19

Last Calib.: 2017.04.19

Start Time: 19:30:05

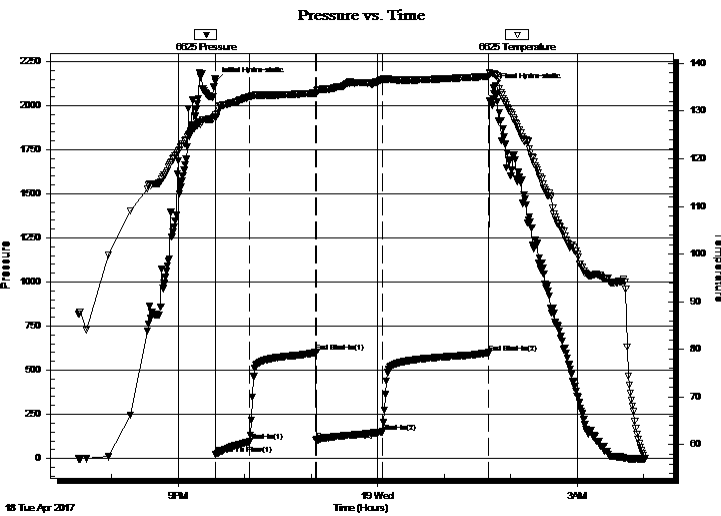
End Time:

04:01:29

Time On Btm: 2017.04.18 @ 21:33:45

Time Off Btm: 2017.04.19 @ 01:44:30

TEST COMMENT: 30 - IF: Blow built to 7"  
 60 - IS: No blow back  
 60 - FF: Blow built to 7"  
 90 - FS: No blow back



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2134.47	129.09	Initial Hydro-static
1	23.27	128.59	Open To Flow (1)
31	94.59	133.04	Shut-In(1)
91	600.51	133.76	End Shut-In(1)
91	103.82	133.77	Open To Flow (2)
151	148.38	136.64	Shut-In(2)
247	599.46	137.25	End Shut-In(2)
251	2099.50	137.80	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
116.00	GOWCM 71% <sub>m</sub> , 15% <sub>g</sub> , 9% <sub>w</sub> , 5% <sub>o</sub>	0.57
160.00	GOCM 83% <sub>m</sub> , 10% <sub>g</sub> , 7% <sub>o</sub>	1.43
0.00	GIP = 20'	0.00

\* Recovery from multiple tests

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65440

**DST#: 2**

ATTN: Rocky Milford

Test Start: 2017.04.18 @ 19:30:00

## Tool Information

Drill Pipe:	Length: 3964.00 ft	Diameter: 3.80 inches	Volume: 55.60 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 72000.00 lb
			<u>Total Volume: 56.61 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	33.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4165.00 ft			Final 66000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	140.00 ft			
Tool Length:	169.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

## Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4137.00	
Shut In Tool	5.00			4142.00	
Hydraulic tool	5.00			4147.00	
Jars	5.00			4152.00	
Safety Joint	3.00			4155.00	
Packer	5.00			4160.00	29.00 Bottom Of Top Packer
Packer	5.00			4165.00	
Packer - Shale	0.00			4165.00	
Stubb	1.00			4166.00	
Recorder	0.00	6625	Inside	4166.00	
Recorder	0.00	8017	Outside	4166.00	
Perforations	10.00			4176.00	
Blank Spacing	126.00			4302.00	
Bullnose	3.00			4305.00	140.00 Bottom Packers & Anchor

**Total Tool Length: 169.00**



**TRILOBITE  
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# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65440

**DST#: 2**

ATTN: Rocky Milford

Test Start: 2017.04.18 @ 19:30:00

## 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:

ppm

Viscosity: 69.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.38 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 600.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
116.00	GOWCM 71% <i>m</i> , 15% <i>g</i> , 9% <i>w</i> , 5% <i>o</i>	0.570
160.00	GOCM 83% <i>m</i> , 10% <i>g</i> , 7% <i>o</i>	1.434
0.00	GIP = 20'	0.000

Total Length: 276.00 ft

Total Volume: 2.004 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

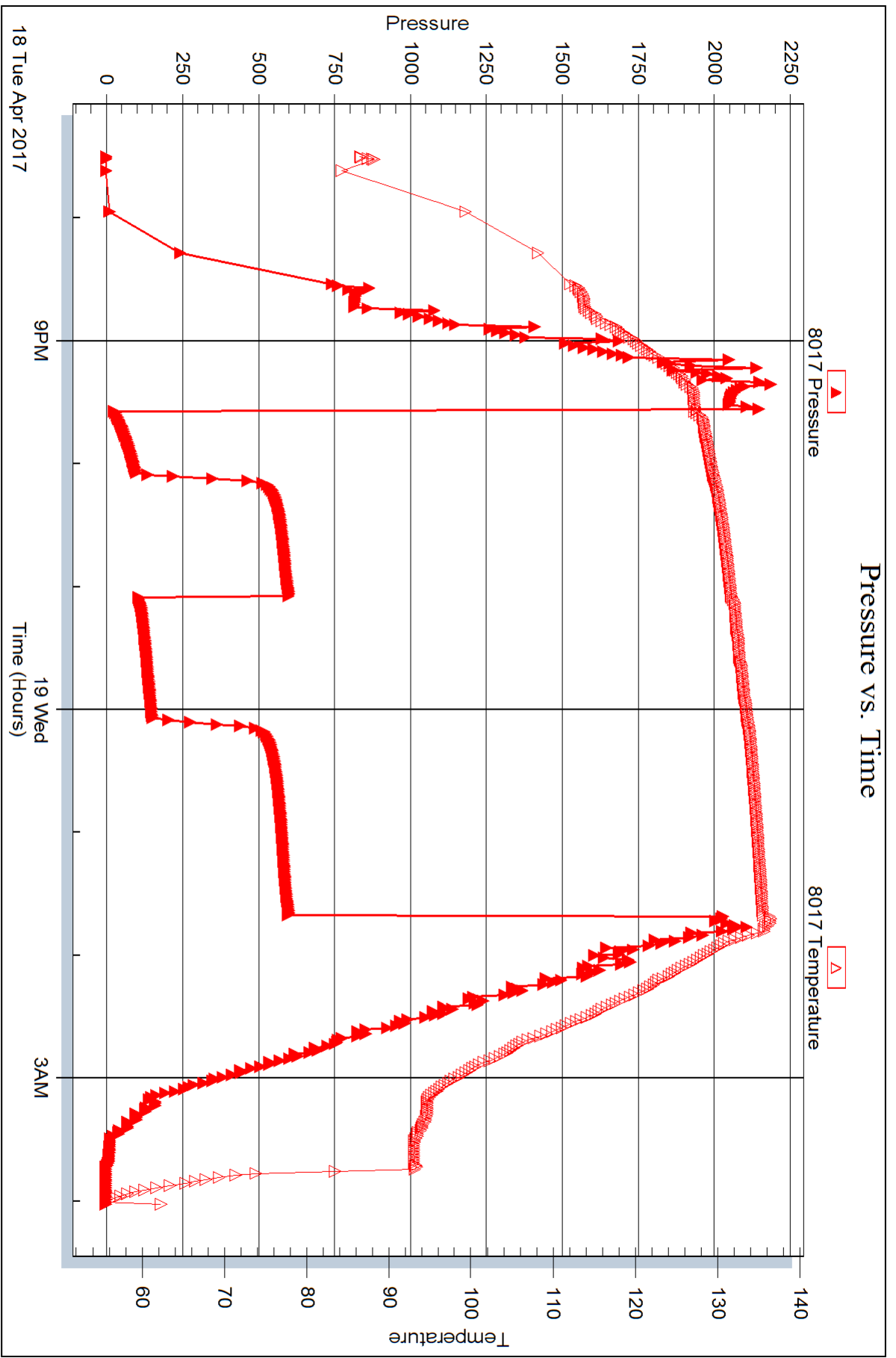
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co., Inc.**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Rocky Milford

**Munn #2-12**

**12-2s-38w Cheyenne KS**

Start Date: 2017.04.19 @ 13:15:00

End Date: 2017.04.19 @ 20:09:30

Job Ticket #: 65441                      DST #: 3

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.04.24 @ 09:20:08

Murfin Drilling Co., Inc. 12-2s-38w Cheyenne KS Munn #2-12 DST # 3 LKC "G" 2017.04.19



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.  
 250 N. Water STE 300  
 Wichita, KS 67202  
 ATTN: Rocky Milford

**12-2s-38w Cheyenne KS**

**Munn #2-12**

Job Ticket: 65441

**DST#: 3**

Test Start: 2017.04.19 @ 13:15:00

## GENERAL INFORMATION:

Formation: **LKC "G"**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 15:07:00  
 Time Test Ended: 20:09:30  
 Interval: **4299.00 ft (KB) To 4350.00 ft (KB) (TVD)**  
 Total Depth: 4350.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: James Winder  
 Unit No: 83  
 Reference Elevations: 3278.00 ft (KB)  
 3273.00 ft (CF)  
 KB to GR/CF: 5.00 ft

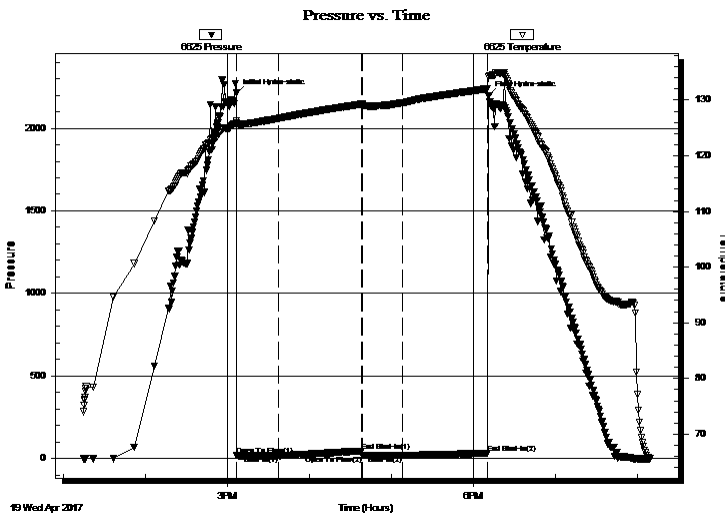
## Serial #: 6625

Inside

Press@RunDepth: 18.90 psig @ 4300.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.04.19 End Date: 2017.04.19 Last Calib.: 2017.04.19  
 Start Time: 13:15:05 End Time: 20:09:29 Time On Btm: 2017.04.19 @ 15:06:45  
 Time Off Btm: 2017.04.19 @ 18:11:15

TEST COMMENT: 30 - IF: Blow built to 1/16", intermittent from 15 - 20 min. then dead  
 60 - IS: No blow  
 30 - FF: No blow  
 60 - FS: No blow

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2212.28	126.29	Initial Hydro-static
1	16.63	125.88	Open To Flow (1)
31	16.55	126.71	Shut-In(1)
92	45.03	129.27	End Shut-In(1)
92	18.40	129.26	Open To Flow (2)
122	18.90	129.46	Shut-In(2)
184	30.75	132.02	End Shut-In(2)
185	2196.71	134.23	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
2.00	Mud w /Oil spots 97%m, 3%o	0.01

\* Recovery from multiple tests

## Gas Rates

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







**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65441

**DST#: 3**

ATTN: Rocky Milford

Test Start: 2017.04.19 @ 13:15:00

## Tool Information

Drill Pipe:	Length: 4090.00 ft	Diameter: 3.80 inches	Volume: 57.37 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 58.38 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4299.00 ft			Final 65000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	51.00 ft			
Tool Length:	80.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

## Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4271.00	
Shut In Tool	5.00			4276.00	
Hydraulic tool	5.00			4281.00	
Jars	5.00			4286.00	
Safety Joint	3.00			4289.00	
Packer	5.00			4294.00	29.00 Bottom Of Top Packer
Packer	5.00			4299.00	
Stubb	1.00			4300.00	
Recorder	0.00	6625	Inside	4300.00	
Recorder	0.00	8017	Outside	4300.00	
Perforations	15.00			4315.00	
Blank Spacing	32.00			4347.00	
Bullnose	3.00			4350.00	51.00 Bottom Packers & Anchor

**Total Tool Length: 80.00**



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65441

**DST#: 3**

ATTN: Rocky Milford

Test Start: 2017.04.19 @ 13:15:00

### 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:

ppm

Viscosity: 76.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.78 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 700.00 ppm

Filter Cake: 2.00 inches

### Recovery Information

Recovery Table

Length ft	Description	Volume bbl
2.00	Mud w /Oil spots 97%m, 3%o	0.010

Total Length: 2.00 ft      Total Volume: 0.010 bbl

Num Fluid Samples: 0

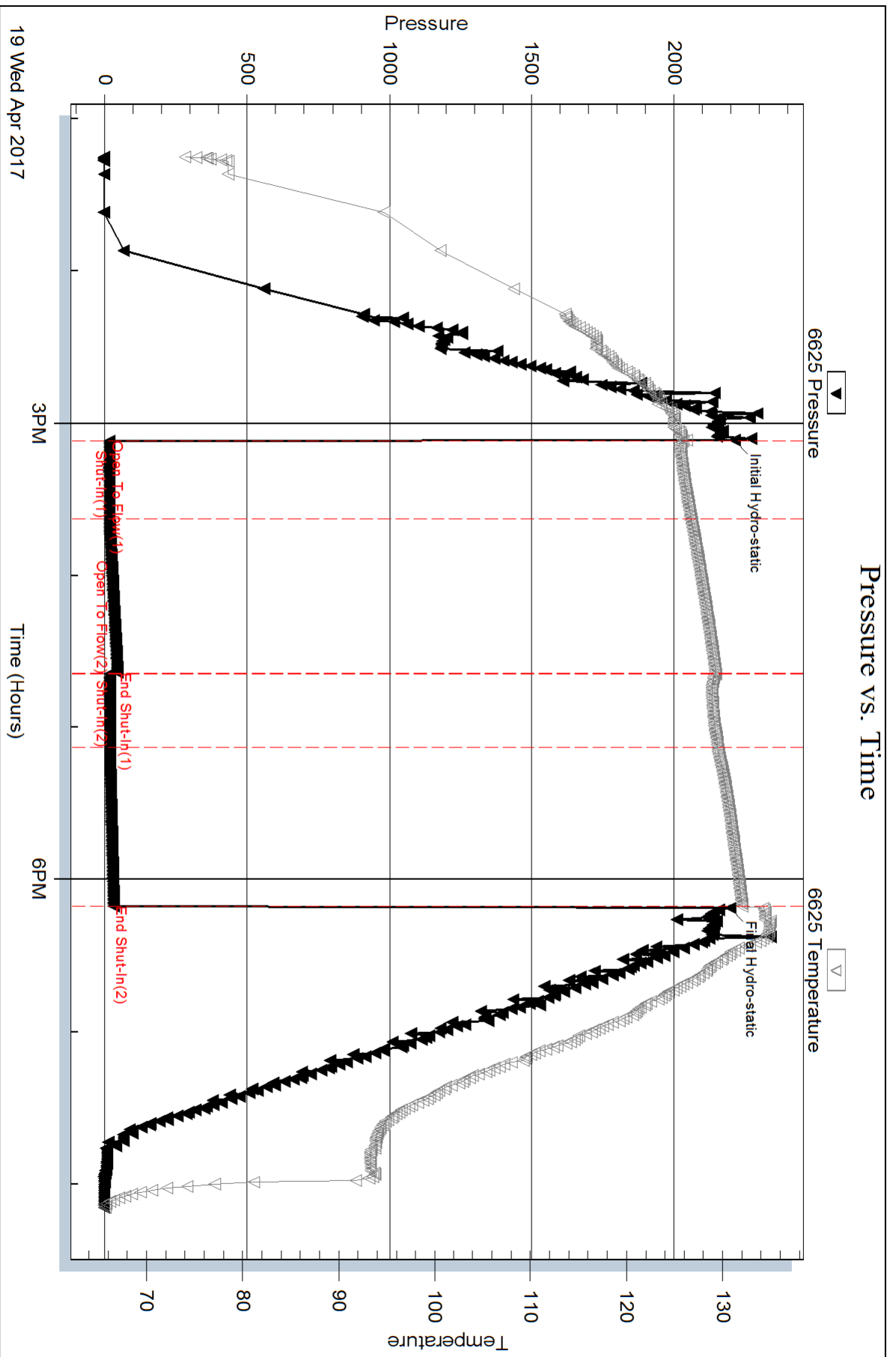
Num Gas Bombs: 0

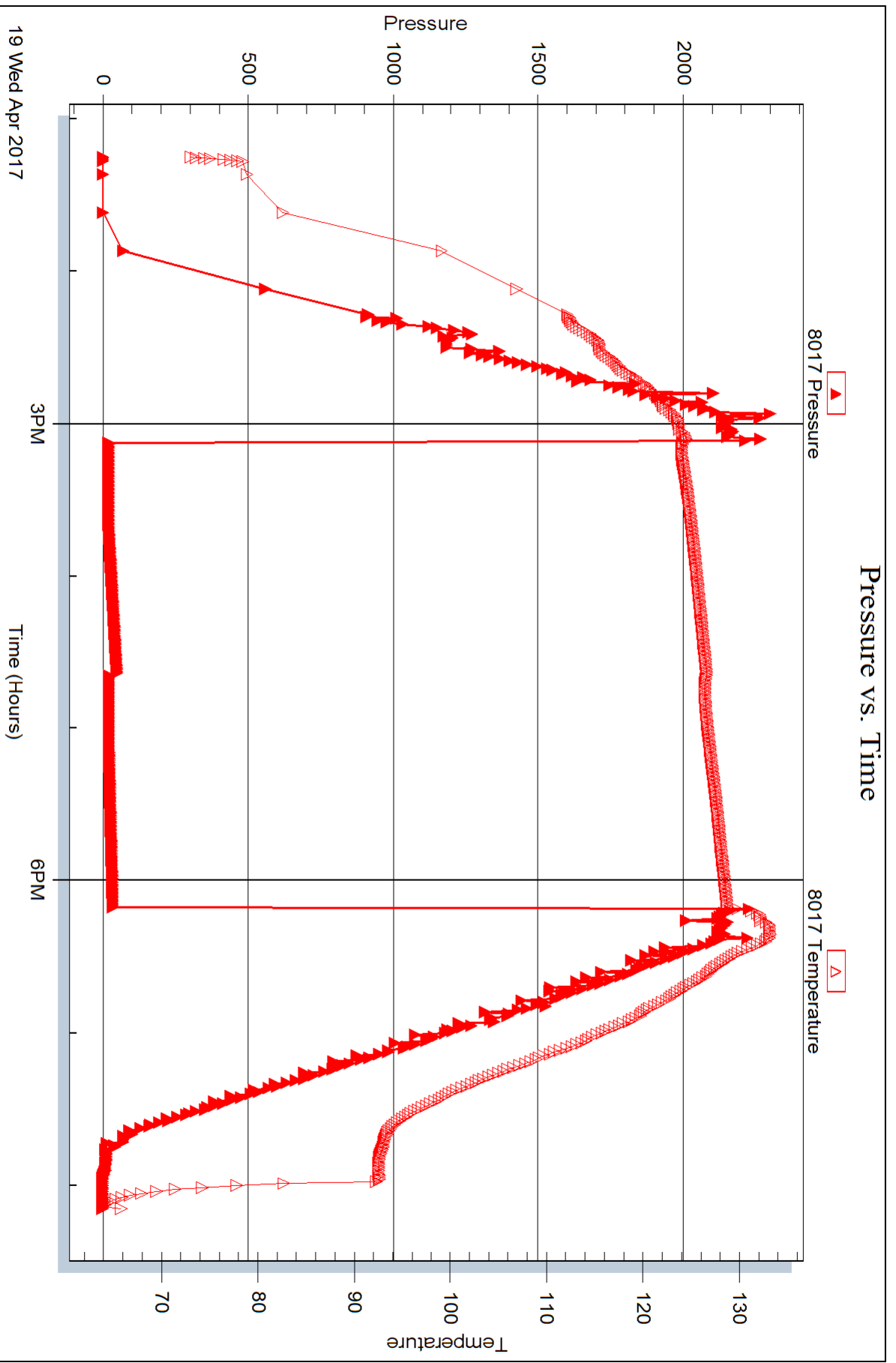
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co., Inc.**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Rocky Milford

### **Munn #2-12**

#### **12-2s-38w Cheyenne KS**

Start Date: 2017.04.20 @ 10:22:00

End Date: 2017.04.20 @ 18:19:15

Job Ticket #: 65442                      DST #: 4

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.04.24 @ 09:19:47



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.  
 250 N. Water STE 300  
 Wichita, KS 67202  
 ATTN: Rocky Milford

**12-2s-38w Cheyenne KS**

**Munn #2-12**

Job Ticket: 65442

**DST#: 4**

Test Start: 2017.04.20 @ 10:22:00

## GENERAL INFORMATION:

Formation: **LKC "H - J"**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:10:30  
 Time Test Ended: 18:19:15  
 Interval: **4346.00 ft (KB) To 4435.00 ft (KB) (TVD)**  
 Total Depth: 4435.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Fair  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: James Winder  
 Unit No: 83  
 Reference Elevations: 3278.00 ft (KB)  
 3273.00 ft (CF)  
 KB to GR/CF: 5.00 ft

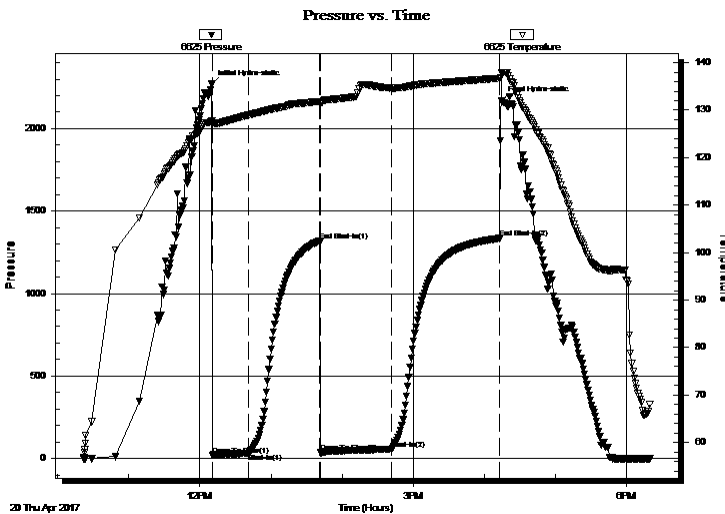
## Serial #: 6625

Inside

Press@RunDepth: 57.65 psig @ 4347.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.04.20 End Date: 2017.04.20 Last Calib.: 2017.04.20  
 Start Time: 10:22:05 End Time: 18:19:14 Time On Btm: 2017.04.20 @ 12:10:15  
 Time Off Btm: 2017.04.20 @ 16:14:30

TEST COMMENT: 30 - IF: Blow built to 6 1/4"  
 60 - IS: No blow back  
 60 - FF: Blow built to BOB (11") at 43 min.  
 90 - FS: No blow back

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2268.89	127.80	Initial Hydro-static
1	18.67	126.95	Open To Flow (1)
31	32.20	128.98	Shut-In(1)
91	1320.02	131.85	End Shut-In(1)
92	34.43	131.62	Open To Flow (2)
152	57.65	134.65	Shut-In(2)
243	1334.89	136.71	End Shut-In(2)
245	2169.23	137.79	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
70.00	GOM 45% m, 41% o, 14% g	0.34
40.00	CO 98% o, 2% g	0.20
0.00	GIP = 320'	0.00

\* Recovery from multiple tests

## Gas Rates

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







**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65442

**DST#: 4**

ATTN: Rocky Milford

Test Start: 2017.04.20 @ 10:22:00

## Tool Information

Drill Pipe:	Length: 4120.00 ft	Diameter: 3.80 inches	Volume: 57.79 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 74000.00 lb
			<u>Total Volume: 58.80 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	8.00 ft			String Weight: Initial 68000.00 lb
Depth to Top Packer:	4346.00 ft			Final 70000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	89.00 ft			
Tool Length:	118.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

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

Change Over Sub	1.00			4318.00	
Shut In Tool	5.00			4323.00	
Hydraulic tool	5.00			4328.00	
Jars	5.00			4333.00	
Safety Joint	3.00			4336.00	
Packer	5.00			4341.00	29.00 Bottom Of Top Packer
Packer	5.00			4346.00	
Stubb	1.00			4347.00	
Recorder	0.00	6625	Inside	4347.00	
Recorder	0.00	8017	Outside	4347.00	
Perforations	21.00			4368.00	
Blank Spacing	64.00			4432.00	
Bullnose	3.00			4435.00	89.00 Bottom Packers & Anchor

**Total Tool Length: 118.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

## FLUID SUMMARY

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65442

**DST#: 4**

ATTN: Rocky Milford

Test Start: 2017.04.20 @ 10:22:00

### Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

37.4 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 81.00 sec/qt

Cushion Volume:

bbbl

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

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 700.00 ppm

Filter Cake: 2.00 inches

### Recovery Information

Recovery Table

Length ft	Description	Volume bbl
70.00	GOM 45% <sub>m</sub> , 41% <sub>o</sub> , 14% <sub>g</sub>	0.344
40.00	CO 98% <sub>o</sub> , 2% <sub>g</sub>	0.197
0.00	GIP = 320'	0.000

Total Length: 110.00 ft      Total Volume: 0.541 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

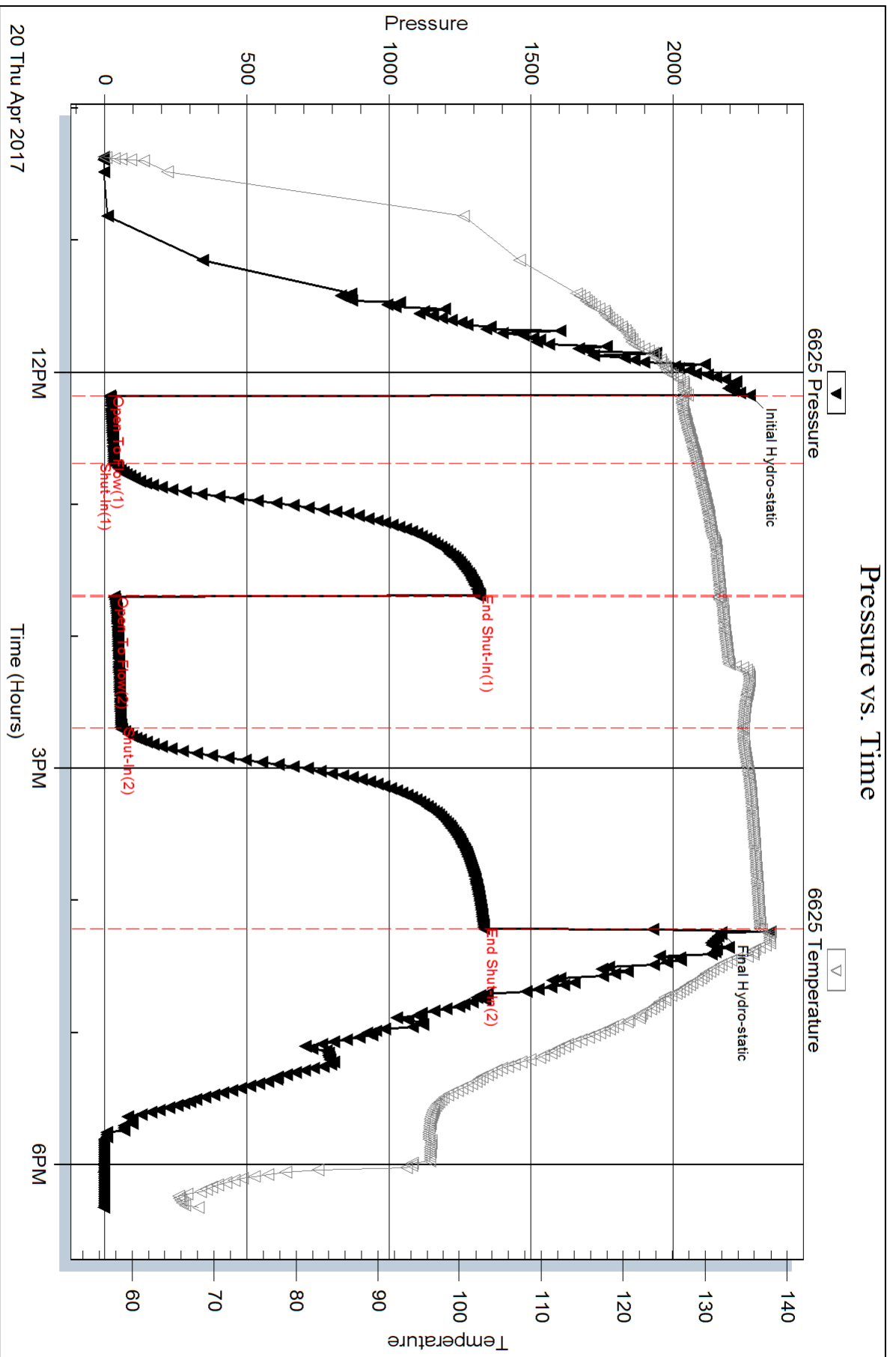
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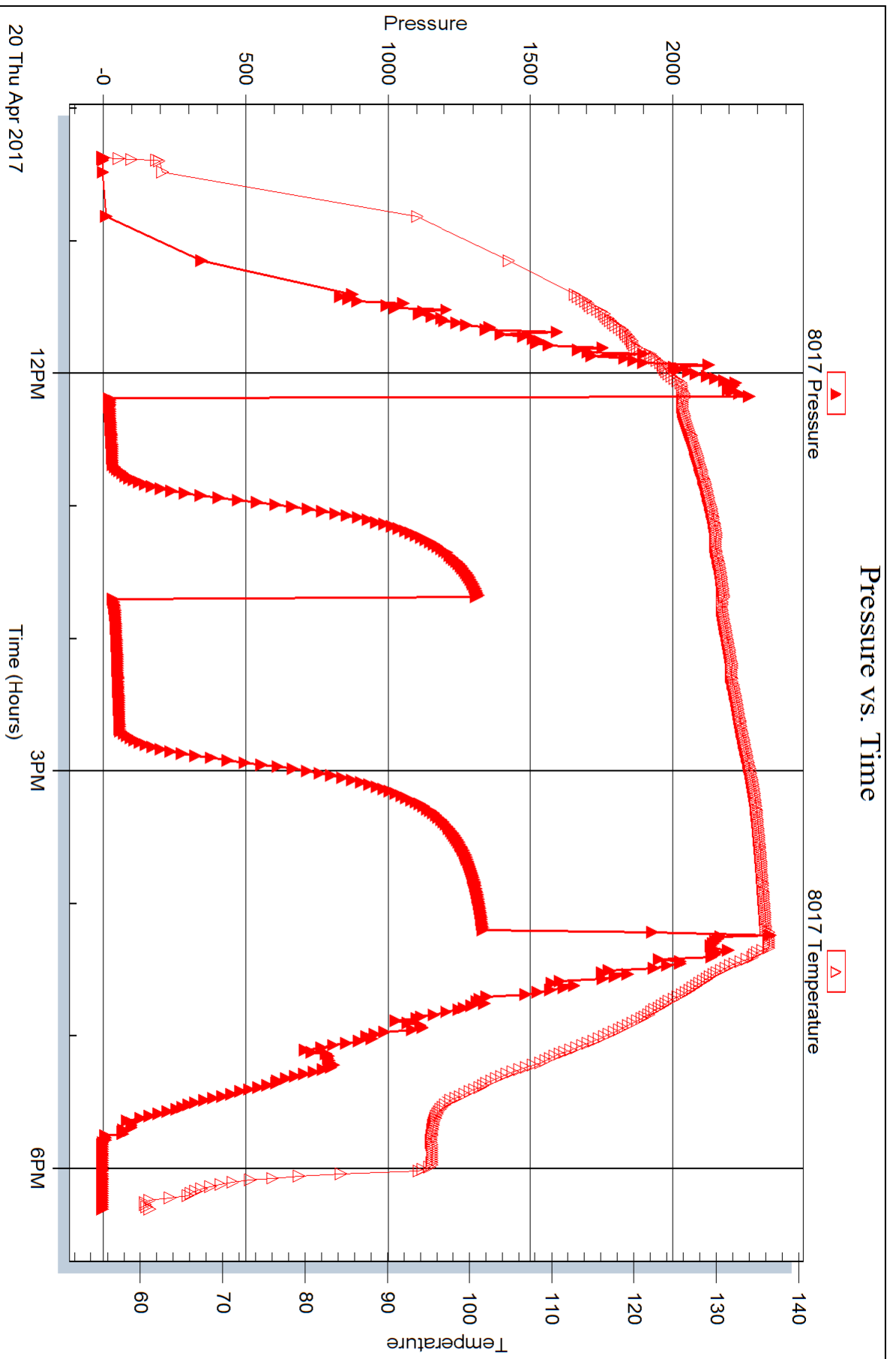
Laboratory Name:

Laboratory Location:

Recovery Comments: Gravity = 38.8 api @ 74 deg F

Corrected Gravity = 37.4 api







## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co., Inc.**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Rocky Milford

**Munn #2-12**

**12-2s-38w Cheyenne KS**

Start Date: 2017.04.21 @ 15:56:00

End Date: 2017.04.21 @ 22:53:00

Job Ticket #: 65443                      DST #: 5

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

Printed: 2017.04.24 @ 09:19:21



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.  
 250 N. Water STE 300  
 Wichita, KS 67202  
 ATTN: Rocky Milford

**12-2s-38w Cheyenne KS**

**Munn #2-12**

Job Ticket: 65443

**DST#: 5**

Test Start: 2017.04.21 @ 15:56:00

## GENERAL INFORMATION:

Formation: **Ft. Scott**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 17:44:45

Time Test Ended: 22:53:00

Test Type: Conventional Bottom Hole (Reset)

Tester: James Winder

Unit No: 83

**Interval: 4589.00 ft (KB) To 4640.00 ft (KB) (TVD)**

Reference Elevations: 3278.00 ft (KB)

Total Depth: 4640.00 ft (KB) (TVD)

3273.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

**Serial #: 6625 Inside**

Press@RunDepth: 37.05 psig @ 4590.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.04.21

End Date:

2017.04.21

Last Calib.: 2017.04.21

Start Time: 15:56:05

End Time:

22:52:59

Time On Btm: 2017.04.21 @ 17:44:30

Time Off Btm: 2017.04.21 @ 20:47:15

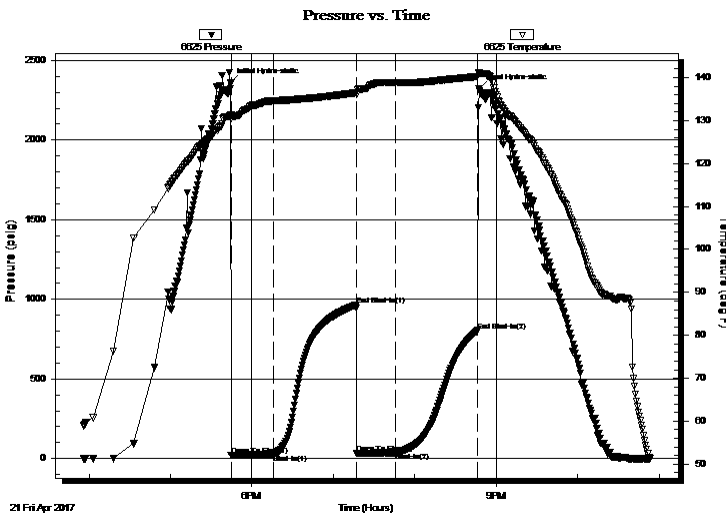
TEST COMMENT: 30 - IF: Blow built to 1 1/4"

60 - IS: No blow back

30 - FF: No blow

60 - FS: No blow

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2357.82	131.43	Initial Hydro-static
1	20.43	130.49	Open To Flow (1)
32	27.10	134.61	Shut-In(1)
93	965.32	136.47	End Shut-In(1)
93	31.82	136.19	Open To Flow (2)
122	37.05	138.80	Shut-In(2)
182	803.24	140.25	End Shut-In(2)
183	2323.29	141.09	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
45.00	Mud w /Oil spots 98%m, 2%o	0.22

\* Recovery from multiple tests

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65443

**DST#: 5**

ATTN: Rocky Milford

Test Start: 2017.04.21 @ 15:56:00

## Tool Information

Drill Pipe:	Length: 4367.00 ft	Diameter: 3.80 inches	Volume: 61.26 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 74000.00 lb
			<u>Total Volume: 62.27 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	12.00 ft			String Weight: Initial 68000.00 lb
Depth to Top Packer:	4589.00 ft			Final 68000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	51.00 ft			
Tool Length:	80.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

## Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4561.00	
Shut In Tool	5.00			4566.00	
Hydraulic tool	5.00			4571.00	
Jars	5.00			4576.00	
Safety Joint	3.00			4579.00	
Packer	5.00			4584.00	29.00 Bottom Of Top Packer
Packer	5.00			4589.00	
Packer - Shale	0.00			4589.00	
Stubb	1.00			4590.00	
Recorder	0.00	6625	Inside	4590.00	
Recorder	0.00	8017	Outside	4590.00	
Perforations	14.00			4604.00	
Blank Spacing	33.00			4637.00	
Bullnose	3.00			4640.00	51.00 Bottom Packers & Anchor

**Total Tool Length: 80.00**





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co., Inc.

**12-2s-38w Cheyenne KS**

250 N. Water STE 300  
Wichita, KS 67202

**Munn #2-12**

Job Ticket: 65443

**DST#: 5**

ATTN: Rocky Milford

Test Start: 2017.04.21 @ 15:56:00

## 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:

ppm

Viscosity: 67.00 sec/qt

Cushion Volume:

bbbl

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

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 800.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
45.00	Mud w /Oil spots 98%m, 2%o	0.221

Total Length: 45.00 ft      Total Volume: 0.221 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

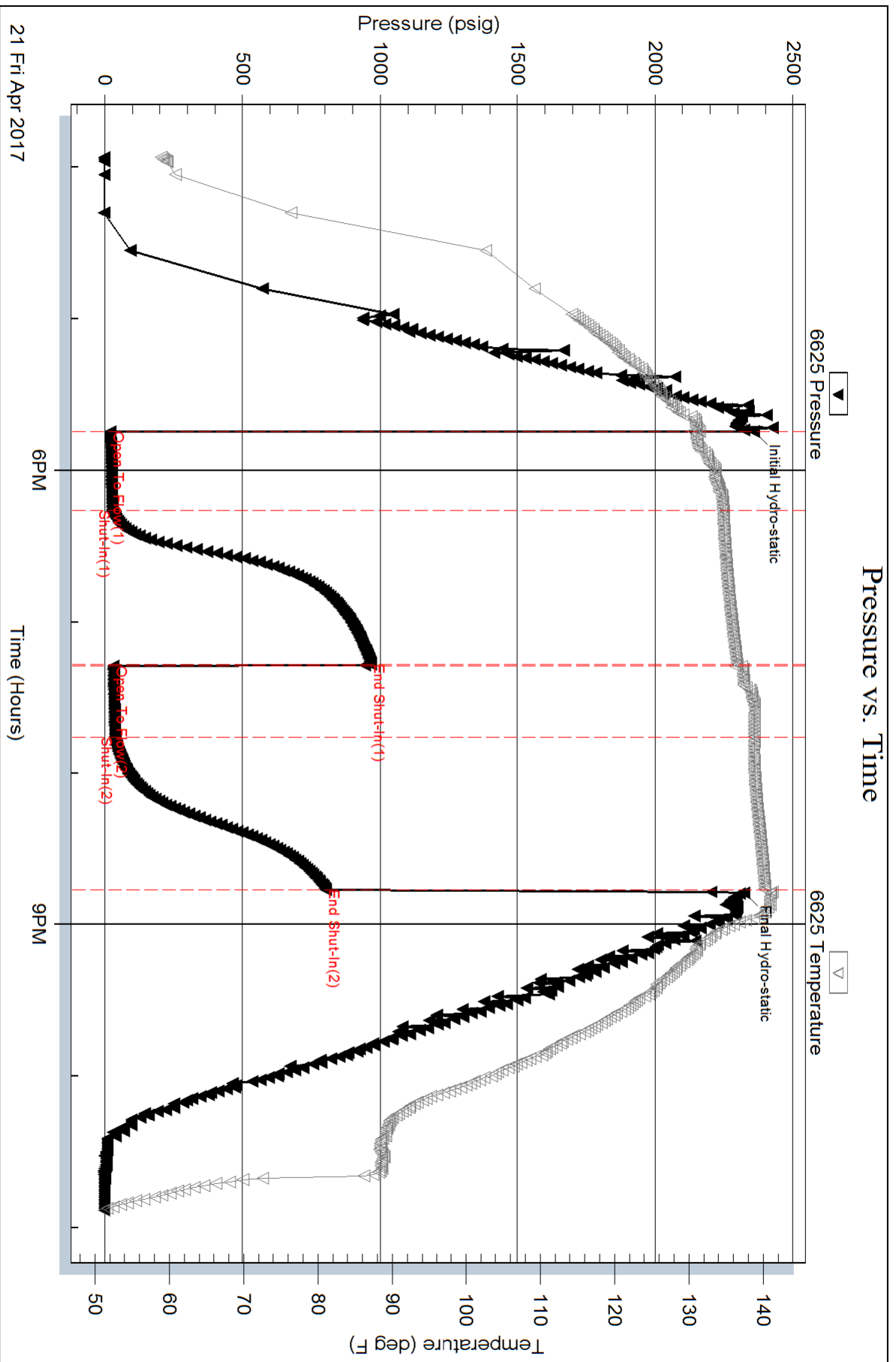
Serial #:

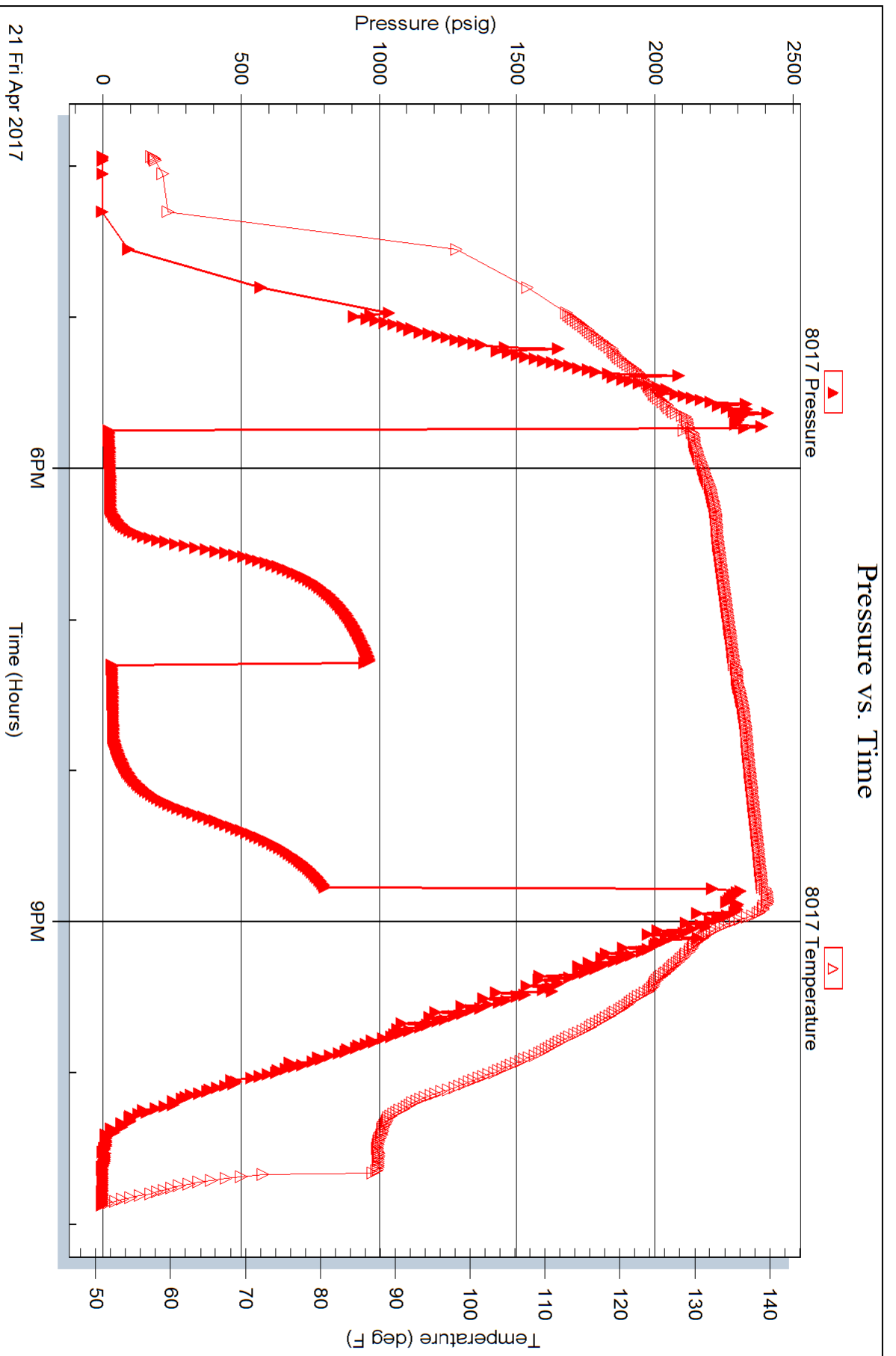
Laboratory Name:

Laboratory Location:

Recovery Comments:

# Pressure vs. Time







# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 65439

Well Name & No. Munn # 2-12 Test No. 1 Date 4-17-17  
 Company Murfin Drilling Co. Inc Elevation 3278 KB 3273 GL  
 Address 250 N. Water STE 300 Wichita KS 67202  
 Co. Rep / Geo. Rocky Milford Rig Murfin #24  
 Location: Sec. 12 Twp. 2s Rge. 38w Co. Cheyenne State KS

Interval Tested 3967 - 4014 Zone Tested Topeka  
 Anchor Length 47 Drill Pipe Run 3746 Mud Wt. 8.9  
 Top Packer Depth 3962 Drill Collars Run 205 Vis 69  
 Bottom Packer Depth 3967 (shale) Wt. Pipe Run - WL 5.6  
 Total Depth 4014 Chlorides 600 ppm System LCM 5  
 Blow Description IF: Blow built to 1/2", died back to weak surface blow at close  
ISI: No blow  
FF: No blow  
FSI: No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>15</u>	<u>Mud w/oil spots</u>	<u>4</u>	<u>96</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 132 Gravity \_\_\_\_\_ API RW \_\_\_\_\_ @ \_\_\_\_\_ °F Chlorides \_\_\_\_\_ ppm

(A) Initial Hydrostatic 1957  Test 1050 T-On Location 5:00  
 (B) First Initial Flow 16  Jars 250 T-Started 6:00  
 (C) First Final Flow 17  Safety Joint 75 T-Open 8:22  
 (D) Initial Shut-In 1052  Circ Sub \_\_\_\_\_ T-Pulled 11:23  
 (E) Second Initial Flow 20  Hourly Standby \_\_\_\_\_ T-Out 13:15  
 (F) Second Final Flow 21  Mileage 134RT 100.50 Comments \_\_\_\_\_  
 (G) Final Shut-In 970  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 1943  Straddle \_\_\_\_\_  
 Shale Packer 250  Ruined Shale Packer \_\_\_\_\_  
 Extra Packer \_\_\_\_\_  Ruined Packer \_\_\_\_\_  
 Extra Recorder \_\_\_\_\_ Sub Total 0  
 Day Standby \_\_\_\_\_ Total 1725.50  
 Accessibility \_\_\_\_\_ MP/DST Disc't \_\_\_\_\_  
 Sub Total 1725.50

Approved By Rocky Milford

Our Representative James Winters

Trilobite Testing Inc. shall not be liable for damaged or 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. **65440**

Well Name & No. Munn # 2-12 Test No. 2 Date 4-18-17  
 Company Murfin Drilling Co. Inc. Elevation 3278 KB 3273 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Rocky Milford Rig Murfin #24  
 Location: Sec. 12 Twp. 2S Rge. 38W Co. Cheyenne State KS

Interval Tested 4165 - 4305 Zone Tested Douglas Sand - LKC "D" prime  
 Anchor Length 140 Drill Pipe Run 3964 Mud Wt. 9.2  
 Top Packer Depth 4160 Drill Collars Run 205 Vis 69  
 Bottom Packer Depth 4165 (Shale) Wt. Pipe Run - WL 6.4  
 Total Depth 4305 Chlorides 600 ppm System LCM 4  
 Blow Description IF: Blow built to 7"  
ISI: No blowback  
FP: Blow built to 7"  
FST: No blowback

Rec	Feet of	%gas	%oil	%water	%mud
<u>160</u>	<u>60cm</u>	<u>10</u>	<u>7</u>	<u>-</u>	<u>83</u>
<u>116</u>	<u>60wcm</u>	<u>15</u>	<u>5</u>	<u>9</u>	<u>71</u>
<u>    </u>	<u>5IP=20'</u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>
<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>
<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>	<u>    </u>

Rec Total 276 BHT 137 Gravity      API RW      @      °F Chlorides      ppm

(A) Initial Hydrostatic 2134  Test 1150 T-On Location 18:30 4/18  
 (B) First Initial Flow 23  Jars 250 T-Started 19:30  
 (C) First Final Flow 95  Safety Joint 75 T-Open 21:34  
 (D) Initial Shut-In 601  Circ Sub      T-Pulled 1:40  
 (E) Second Initial Flow 104  Hourly Standby      T-Out 4:00 4/19  
 (F) Second Final Flow 148  Mileage 134 RT 100.50 Comments       
 (G) Final Shut-In 599  Sampler       
 (H) Final Hydrostatic 2100  Straddle       Ruined Shale Packer       
 Shale Packer 250  Ruined Packer       
 Extra Packer       Extra Copies       
 Extra Recorder      Sub Total 0  
 Day Standby      Total 1825.50  
 Accessibility      MP/DST Disc't       
 Sub Total 1825.50

Approved By Rocky Milford

Our Representative James Winder

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. **65441**

Well Name & No. Munn #2-12 Test No. 3 Date 4-19-17  
 Company Murfin Drilling Co Inc Elevation 3278 KB 3273 GL  
 Address 250 N. Water STE 300 Wichita KS 67202  
 Co. Rep / Geo. Rocky Milford Rig Murfin #24  
 Location: Sec. 12 Twp. 2s Rge. 38w Co. Cheyenne State KS

Interval Tested 4299 - 4350 Zone Tested LKC "G"  
 Anchor Length 51 Drill Pipe Run 4090 Mud Wt. 9.2  
 Top Packer Depth 4294 Drill Collars Run 205 Vis 76  
 Bottom Packer Depth 4299 Wt. Pipe Run - WL 6.8  
 Total Depth 4350 Chlorides 700 ppm System LCM 4

Blow Description IF: Blow built to 1/16", intermittent from 15-20 min. then dead  
ISI: No blow  
FF: No blow  
FSI: No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>2</u>	<u>Mud w/oil spots</u>	<u>3</u>		<u>97</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 2 BHT 132 Gravity \_\_\_\_\_ API RW \_\_\_\_\_ @ \_\_\_\_\_ °F Chlorides \_\_\_\_\_ ppm

(A) Initial Hydrostatic 2212  Test 1150 T-On Location 12:35  
 (B) First Initial Flow 17  Jars 250 T-Started 13:15  
 (C) First Final Flow 17  Safety Joint 75 T-Open 15:07  
 (D) Initial Shut-In 45  Circ Sub \_\_\_\_\_ T-Pulled 18:10  
 (E) Second Initial Flow 18  Hourly Standby \_\_\_\_\_ T-Out 20:05  
 (F) Second Final Flow 19  Mileage 134RT 100.50 Comments \_\_\_\_\_  
 (G) Final Shut-In 31  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 2197  Straddle \_\_\_\_\_  
 Ruined Shale Packer \_\_\_\_\_  
 Ruined Packer \_\_\_\_\_  
 Extra Copies \_\_\_\_\_  
 Sub Total 0  
 Total 1575.50  
 MP/DST Disc't \_\_\_\_\_

Initial Open 30  
 Initial Shut-In 60  
 Final Flow 30  
 Final Shut-In 60

Shale Packer \_\_\_\_\_  
 Extra Packer \_\_\_\_\_  
 Extra Recorder \_\_\_\_\_  
 Day Standby \_\_\_\_\_  
 Accessibility \_\_\_\_\_  
 Sub Total 1575.50

Approved By Rocky Milford Our Representative James Winkler

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. **65442**

Well Name & No. Munn #2-12 Test No. 4 Date 4-20-17  
 Company Murfin Drilling Co. Inc Elevation 3278 KB 3273 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Rocky Milford Rig Murfin #24  
 Location: Sec. 12 Twp. 2S Rge. 38W Co. Cheyenne State KS

Interval Tested 4346-4435 Zone Tested LKC "H-J"  
 Anchor Length 89 Drill Pipe Run 4120 Mud Wt. 9.4  
 Top Packer Depth 4341 Drill Collars Run 205 Vis 81  
 Bottom Packer Depth 4346 Wt. Pipe Run - WL 6.8  
 Total Depth 4435 Chlorides 700 ppm System LCM 5

Blow Description IF: Blow built to 6 1/4"  
ISI: No blowback  
FF: Blow built to BOB(11") at 43 min.  
FSI: No blowback

Rec	Feet of	%gas	%oil	%water	%mud
<u>40</u>	<u>CO</u>	<u>2</u>	<u>98</u>		
<u>70</u>	<u>GOM</u>	<u>14</u>	<u>41</u>	<u>-</u>	<u>45</u>
	<u>GIP = 110'</u>				

Rec Total 110 BHT 137 Gravity 37.4 API RW @      °F Chlorides      ppm

(A) Initial Hydrostatic <u>2269</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>9:25</u>
(B) First Initial Flow <u>19</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>10:22</u>
(C) First Final Flow <u>32</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>12:10</u>
(D) Initial Shut-In <u>1320</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>16:13</u>
(E) Second Initial Flow <u>34</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>18:15</u>
(F) Second Final Flow <u>58</u>	<input checked="" type="checkbox"/> Mileage <u>134RT</u> <u>100.50</u>	Comments
(G) Final Shut-In <u>1335</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>2169</u>	<input type="checkbox"/> Straddle	

Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Shale Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Ruined Packer
Final Flow <u>60</u>	<input type="checkbox"/> Extra Recorder	<input type="checkbox"/> Extra Copies
Final Shut-In <u>90</u>	<input type="checkbox"/> Day Standby	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility	Total <u>1575.50</u>
	Sub Total <u>1575.50</u>	MP/DST Disc't

Approved By Rocky Milford Our Representative James Hinder

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. **65443**

Well Name & No. Munn #2-12 Test No. 5 Date 4-21-17  
 Company Murfin Drilling Co Inc Elevation 3278 KB 3273 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Rocky Milford Rig Murfin #24  
 Location: Sec. 12 Twp. 2S Rge. 38W Co. Cheyenne State KS

Interval Tested 4589-4640 Zone Tested Ft. Scott  
 Anchor Length 51 Drill Pipe Run 4367 Mud Wt. 9.1  
 Top Packer Depth 4584 Drill Collars Run 205 Vis 67  
 Bottom Packer Depth 4589 (shale) Wt. Pipe Run - WL 6.8  
 Total Depth 4640 Chlorides 800 ppm System LCM 4  
 Blow Description IF: Blow built to 1 1/4"  
ISI: No blowback  
FF: No blow  
FSI: No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>45</u>	<u>Mud w/oil spots</u>		<u>2</u>		<u>98</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 45 BHT 140 Gravity \_\_\_\_\_ API RW \_\_\_\_\_ @ \_\_\_\_\_ °F Chlorides \_\_\_\_\_ ppm

(A) Initial Hydrostatic 2358  Test 1150 T-On Location 14:30  
 (B) First Initial Flow 20  Jars 250 T-Started 15:56  
 (C) First Final Flow 27  Safety Joint 75 T-Open 17:44  
 (D) Initial Shut-In 965  Circ Sub \_\_\_\_\_ T-Pulled 20:46  
 (E) Second Initial Flow 32  Hourly Standby \_\_\_\_\_ T-Out 22:45  
 (F) Second Final Flow 37  Mileage 134x2 201 Comments loaded 4/22 12:00  
 (G) Final Shut-In 803  Sampler \_\_\_\_\_  Ruined Shale Packer \_\_\_\_\_  
 (H) Final Hydrostatic 2323  Straddle \_\_\_\_\_  Ruined Packer \_\_\_\_\_  
 Shale Packer 250  Extra Copies \_\_\_\_\_  
 Initial Open 30  Extra Packer \_\_\_\_\_ Sub Total 0  
 Initial Shut-In 60  Extra Recorder \_\_\_\_\_ Total 1926  
 Final Flow 30  Day Standby \_\_\_\_\_ MP/DST Disc't \_\_\_\_\_  
 Final Shut-In 60  Accessibility \_\_\_\_\_  
 Sub Total 1926

Approved By Rocky Milford Our Representative James Winda  
 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.