



## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.**

250 N. Water STE 300  
Wichita KS 67202

ATTN: Steve Miller

**Alex #1-23**

**23-4s-31w Rawlins,KS**

Start Date: 2013.07.07 @ 18:03:00

End Date: 2013.07.08 @ 01:37:00

Job Ticket #: 53456                      DST #: 1

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

Printed: 2013.07.16 @ 08:05:40



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co.  
 250 N. Water STE 300  
 Wichita KS 67202  
 ATTN: Steve Miller

**23-4s-31w Rawlins, KS**

**Alex #1-23**

Job Ticket: 53456

**DST#: 1**

Test Start: 2013.07.07 @ 18:03:00

## GENERAL INFORMATION:

Formation: **Toronto**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 20:00:40

Time Test Ended: 01:37:00

Test Type: Conventional Bottom Hole (Initial)

Tester: Ryan Nichols

Unit No: 66

**Interval: 3916.00 ft (KB) To 3960.00 ft (KB) (TVD)**

Reference Elevations: 2939.00 ft (KB)

Total Depth: 3960.00 ft (KB) (TVD)

2928.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 11.00 ft

**Serial #: 8520 Outside**

Press @ RunDepth: 167.02 psig @ 3917.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2013.07.07

End Date:

2013.07.08

Last Calib.:

2013.07.08

Start Time: 18:04:00

End Time:

01:37:00

Time On Btm:

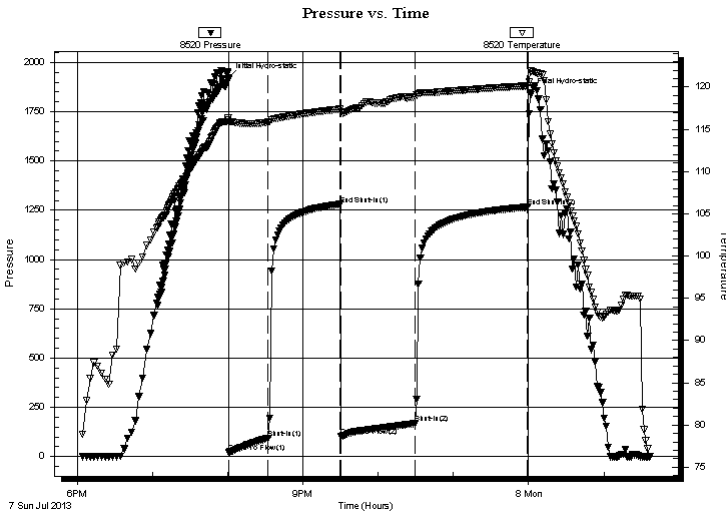
2013.07.07 @ 20:00:20

Time Off Btm:

2013.07.08 @ 00:01:00

**TEST COMMENT:** 30 IF - Surface blow built to 6 1/2"  
 60 ISI - No return  
 60 FF - Surface blow started @ 7 mins built to 8"  
 90 FSI - No return

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1921.80	116.35	Initial Hydro-static
1	19.98	115.89	Open To Flow (1)
32	94.46	115.83	Shut-In(1)
89	1279.87	117.38	End Shut-In(1)
91	101.88	117.05	Open To Flow (2)
149	167.02	118.90	Shut-In(2)
239	1266.05	120.14	End Shut-In(2)
241	1848.67	121.97	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
317.00	MCW - 20%M - 80%W	2.31

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53456

**DST#: 1**

ATTN: Steve Miller

Test Start: 2013.07.07 @ 18:03:00

## Tool Information

Drill Pipe:	Length: 3684.00 ft	Diameter: 3.80 inches	Volume: 51.68 bbl	Tool Weight:	2500.00 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: 235.00 ft	Diameter: 2.25 inches	Volume: 1.16 bbl	Weight to Pull Loose:	65000.00 lb
			<u>Total Volume: 52.84 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	31.00 ft			String Weight: Initial	54000.00 lb
Depth to Top Packer:	3916.00 ft			Final	58000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	44.00 ft				
Tool Length:	72.00 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			3889.00	
Shut In Tool	5.00			3894.00	
Hydraulic tool	5.00			3899.00	
Jars	5.00			3904.00	
Safety Joint	3.00			3907.00	
Packer	5.00			3912.00	28.00 Bottom Of Top Packer
Packer	4.00			3916.00	
Stubb	1.00			3917.00	
Recorder	0.00	8354	Inside	3917.00	
Recorder	0.00	8520	Outside	3917.00	
Perforations	4.00			3921.00	
Change Over Sub	1.00			3922.00	
Drill Pipe	32.00			3954.00	
Change Over Sub	1.00			3955.00	
Bullnose	5.00			3960.00	44.00 Bottom Packers & Anchor

**Total Tool Length: 72.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53456

**DST#: 1**

ATTN: Steve Miller

Test Start: 2013.07.07 @ 18:03:00

## 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:

80000 ppm

Viscosity: 65.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.56 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1000.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
317.00	MCW - 20%M - 80%W	2.306

Total Length: 317.00 ft      Total Volume: 2.306 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

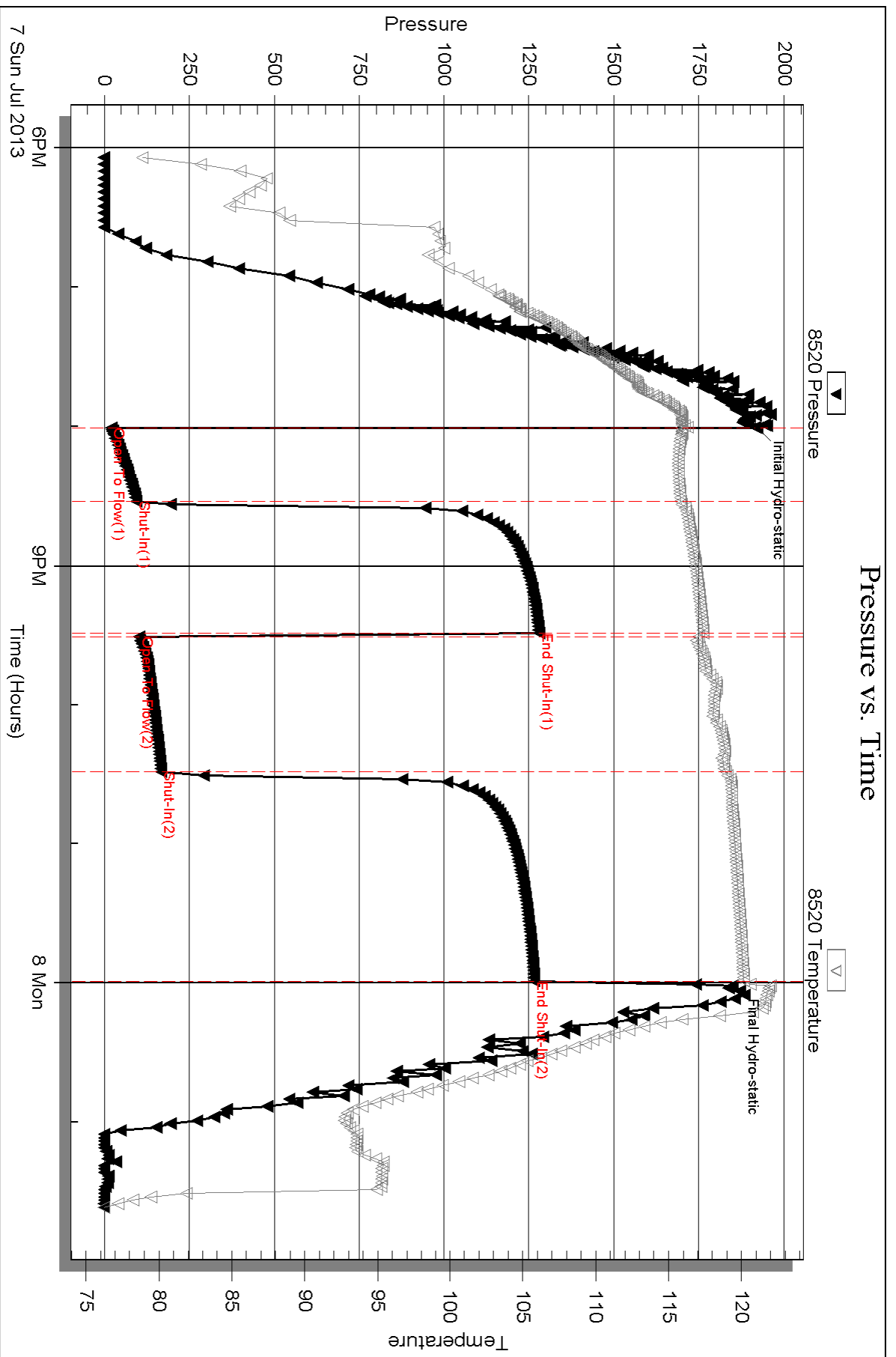
Recovery Comments: RW= .09 @ 77 DEG F

Serial #: 8520

Outside Murfin Drilling Co.

Alex #1-23

DST Test Number: 1



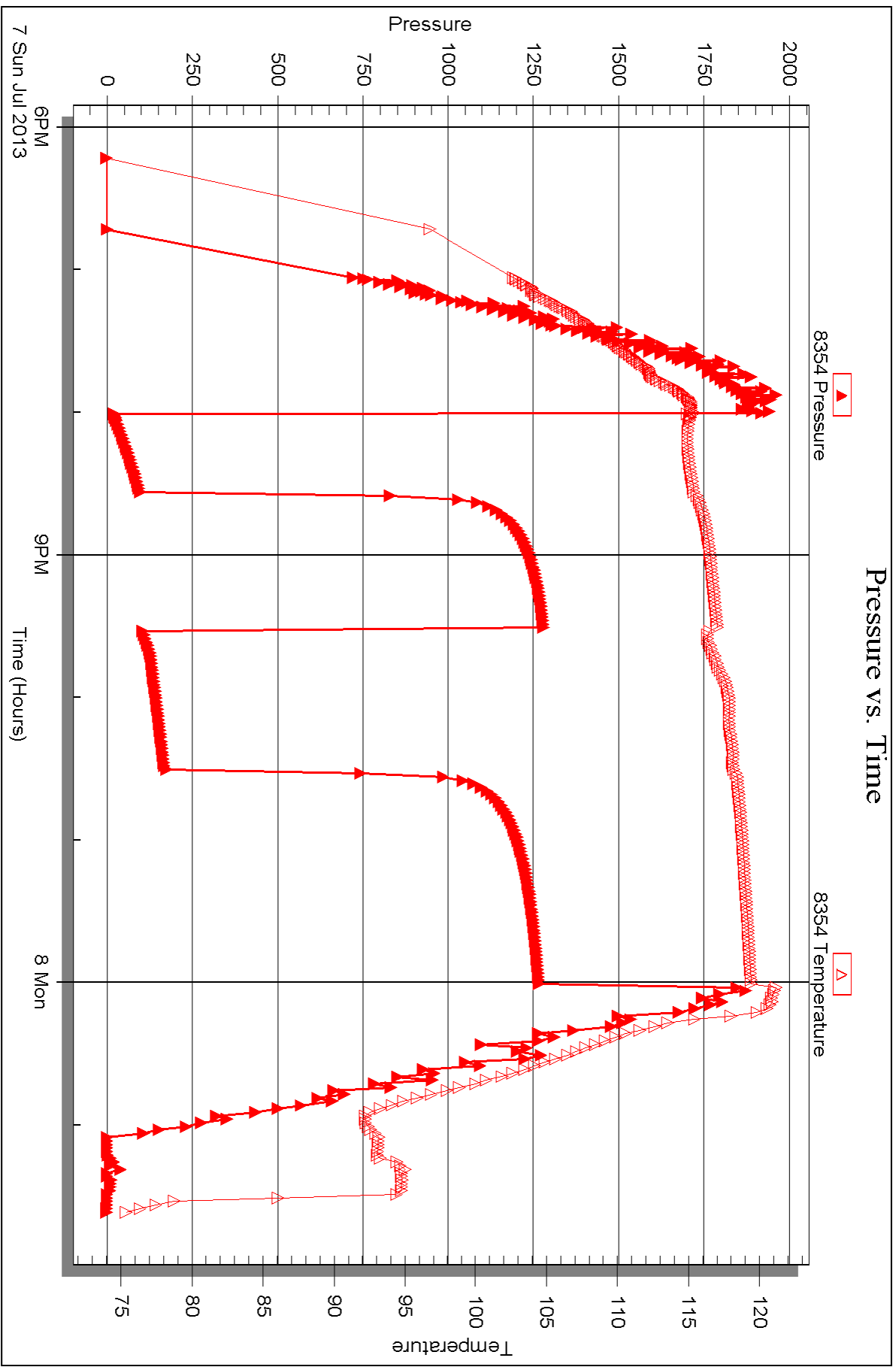
Serial #: 8354

Inside

Murfin Drilling Co.

Alex #1-23

DST Test Number: 1





## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.**

250 N. Water STE 300  
Wichita KS 67202

ATTN: Steve Miller

**Alex #1-23**

**23-4s-31w Rawlins,KS**

Start Date: 2013.07.08 @ 10:43:00

End Date: 2013.07.08 @ 18:28:30

Job Ticket #: 53457                      DST #: 2

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

Printed: 2013.07.16 @ 08:04:59

Murfin Drilling Co. 23-4s-31w Rawlins,KS Alex #1-23 DST # 2 LKC " A - B " 2013.07.08





**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co.  
250 N. Water STE 300  
Wichita KS 67202  
ATTN: Steve Miller

**23-4s-31w Rawlins, KS**  
**Alex #1-23**  
Job Ticket: 53457      **DST#: 2**  
Test Start: 2013.07.08 @ 10:43:00

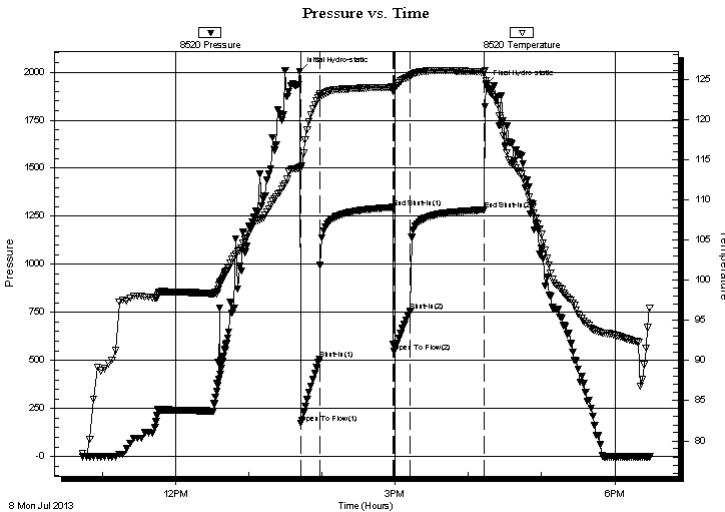
## GENERAL INFORMATION:

Formation: **LKC " A - B "**  
Deviated: No Whipstock: ft (KB)      Test Type: Conventional Bottom Hole (Reset)  
Time Tool Opened: 13:43:00      Tester: Ryan Nichols  
Time Test Ended: 18:28:30      Unit No: 66  
**Interval: 3960.00 ft (KB) To 4004.00 ft (KB) (TVD)**      Reference Elevations: 2939.00 ft (KB)  
Total Depth: 4004.00 ft (KB) (TVD)      2928.00 ft (CF)  
Hole Diameter: 7.88 inches Hole Condition: Good      KB to GR/CF: 11.00 ft

**Serial #: 8520      Outside**  
Press @ Run Depth: 757.24 psig @ 3961.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2013.07.08      End Date: 2013.07.08      Last Calib.: 2013.07.08  
Start Time: 10:44:00      End Time: 18:28:30      Time On Btm: 2013.07.08 @ 13:42:00  
Time Off Btm: 2013.07.08 @ 16:14:30

**TEST COMMENT:** 15 IF - Bob in 1 min  
60 ISI - Surface blow @ 2 mins  
15 FF - Bob in 2 mins  
60 FSI - Surface blow @ 8 mins

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2001.60	114.05	Initial Hydro-static
1	175.09	113.84	Open To Flow (1)
16	508.39	122.90	Shut-In(1)
76	1296.18	123.99	End Shut-In(1)
77	545.73	123.78	Open To Flow (2)
91	757.24	125.38	Shut-In(2)
151	1283.39	125.86	End Shut-In(2)
153	1936.66	124.85	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
1419.00	OMCW - 2%o - 95%M - 3%W	17.76
248.00	OMCW - 2%o - 30%M - 68%W	3.48
20.00	OMCW - 5%o - 30%M - 65%W	0.28

\* 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.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53457

**DST#: 2**

ATTN: Steve Miller

Test Start: 2013.07.08 @ 10:43:00

## Tool Information

Drill Pipe:	Length: 3717.00 ft	Diameter: 3.80 inches	Volume: 52.14 bbl	Tool Weight: 2500.00 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: 235.00 ft	Diameter: 2.25 inches	Volume: 1.16 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 53.30 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	20.00 ft			String Weight: Initial 56000.00 lb
Depth to Top Packer:	3960.00 ft			Final 61000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	44.00 ft			
Tool Length:	72.00 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			3933.00	
Shut In Tool	5.00			3938.00	
Hydraulic tool	5.00			3943.00	
Jars	5.00			3948.00	
Safety Joint	3.00			3951.00	
Packer	5.00			3956.00	28.00 Bottom Of Top Packer
Packer	4.00			3960.00	
Stubb	1.00			3961.00	
Recorder	0.00	8354	Inside	3961.00	
Recorder	0.00	8520	Outside	3961.00	
Perforations	4.00			3965.00	
Change Over Sub	1.00			3966.00	
Drill Pipe	32.00			3998.00	
Change Over Sub	1.00			3999.00	
Bullnose	5.00			4004.00	44.00 Bottom Packers & Anchor

**Total Tool Length: 72.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53457

**DST#: 2**

ATTN: Steve Miller

Test Start: 2013.07.08 @ 10:43:00

## 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:

80000 ppm

Viscosity: 67.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.57 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1100.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
1419.00	OMCW - 2%o - 95%M - 3%W	17.764
248.00	OMCW - 2%o - 30%M - 68%W	3.479
20.00	OMCW - 5%o - 30%M - 65%W	0.281

Total Length: 1687.00 ft      Total Volume: 21.524 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

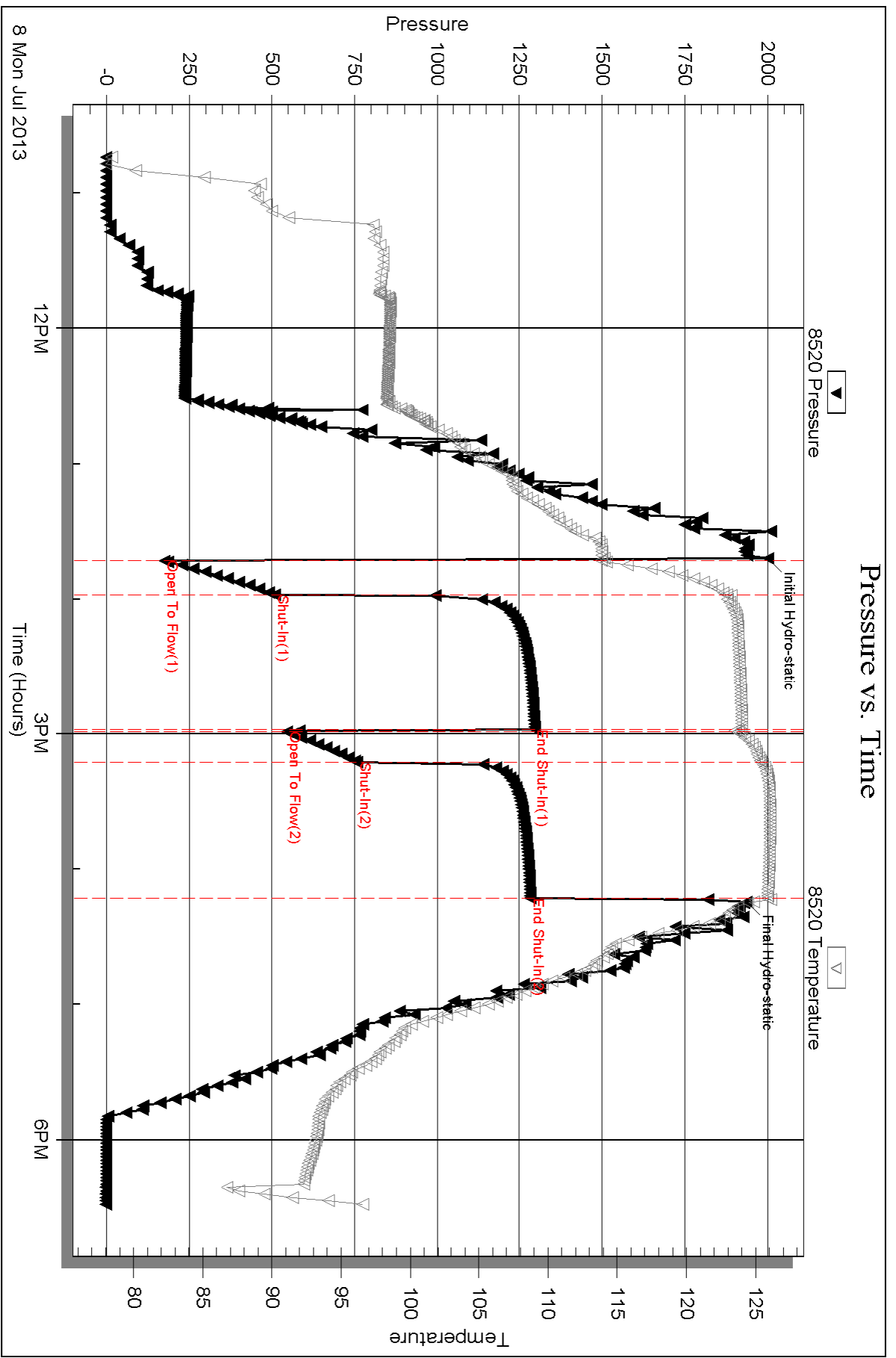
Recovery Comments: RW = .065 @ 109 DEG F

Serial #: 8520

Outside Murfin Drilling Co.

Alex #1-23

DST Test Number: 2



Triobite Testing, Inc

Ref. No: 53457

Printed: 2013.07.16 @ 08:05:02

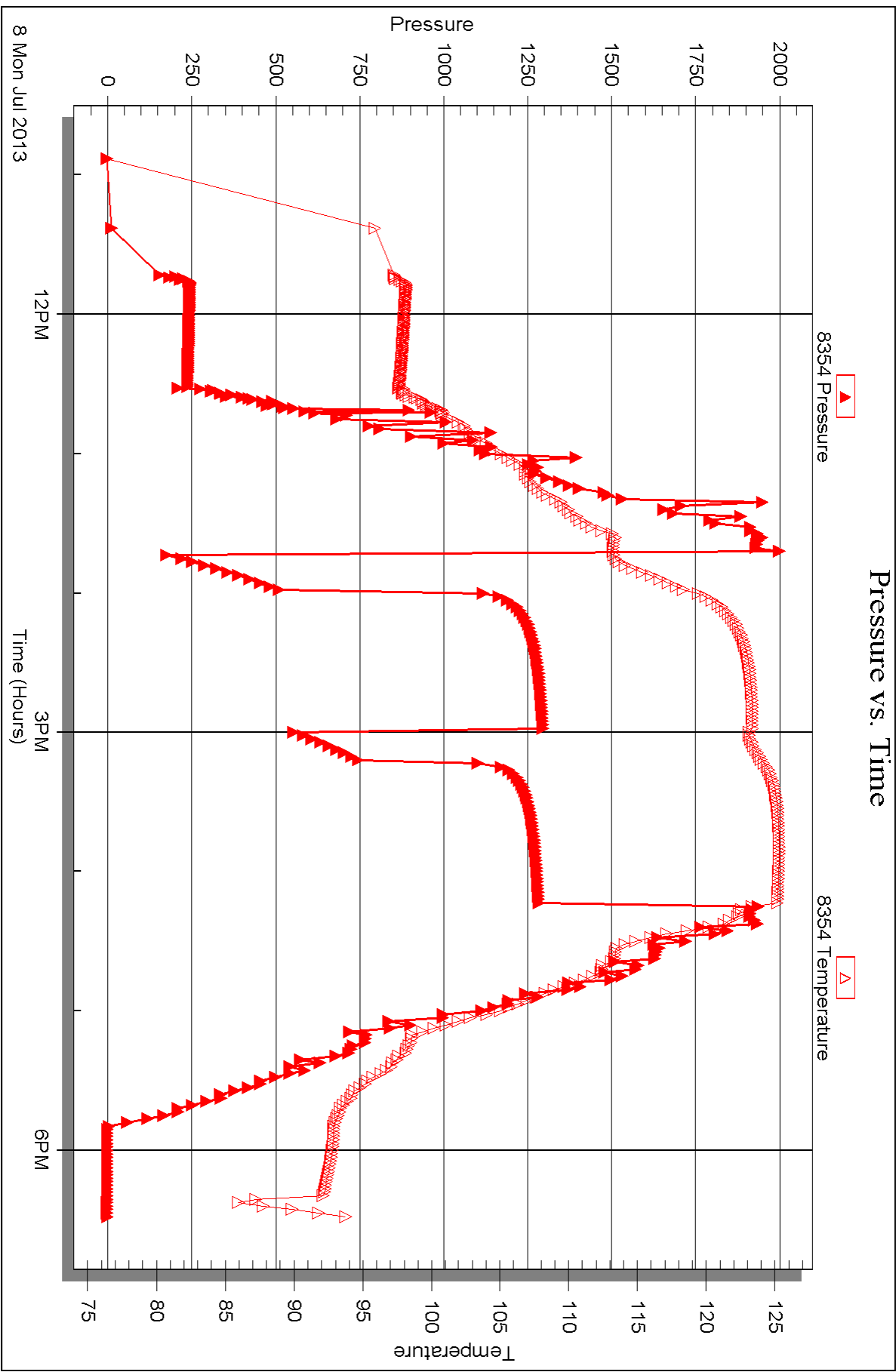
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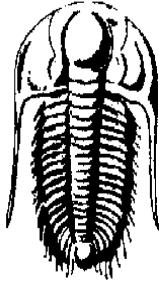
Inside

Murfin Drilling Co.

Alex #1-23

DST Test Number: 2





**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.**

250 N. Water STE 300  
Wichita KS 67202

ATTN: Steve Miller

**Alex #1-23**

**23-4s-31w Rawlins,KS**

Start Date: 2013.07.09 @ 02:11:00

End Date: 2013.07.09 @ 08:59:30

Job Ticket #: 53458                      DST #: 3

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2013.07.16 @ 08:04:18

Murfin Drilling Co. 23-4s-31w Rawlins,KS Alex #1-23 DST # 3 LKC " D & F " 2013.07.09



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co.  
250 N. Water STE 300  
Wichita KS 67202  
ATTN: Steve Miller

**23-4s-31w Rawlins, KS**

**Alex #1-23**

Job Ticket: 53458

**DST#: 3**

Test Start: 2013.07.09 @ 02:11:00

## GENERAL INFORMATION:

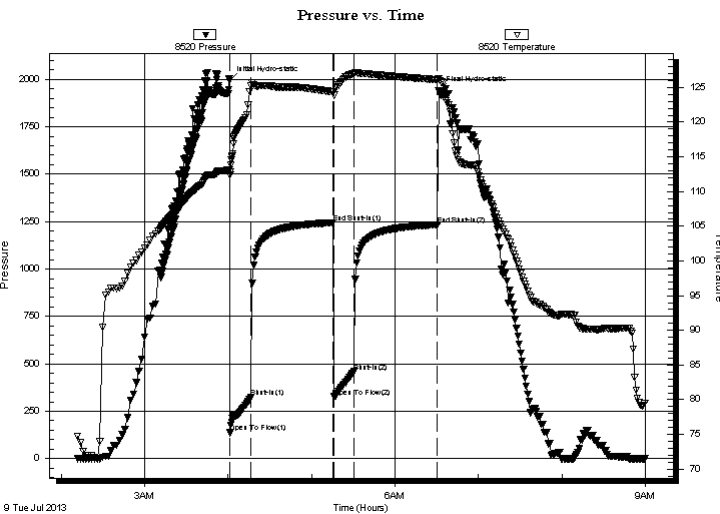
Formation: **LKC " D & F "**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 04:01:30  
 Time Test Ended: 08:59:30  
 Interval: **4004.00 ft (KB) To 4044.00 ft (KB) (TVD)**  
 Total Depth: 4044.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Good  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Ryan Nichols  
 Unit No: 66  
 Reference Elevations: 2939.00 ft (KB)  
 2928.00 ft (CF)  
 KB to GR/CF: 11.00 ft

## Serial #: 8520

## Outside

Press @ Run Depth: 458.50 psig @ 4005.00 ft (KB)  
 Start Date: 2013.07.09 End Date: 2013.07.09  
 Start Time: 02:12:00 End Time: 08:59:30  
 Capacity: 8000.00 psig  
 Last Calib.: 2013.07.09  
 Time On Btm: 2013.07.09 @ 04:01:10  
 Time Off Btm: 2013.07.09 @ 06:31:30

**TEST COMMENT:** 15 IF - Bob in 2 mins  
 60 ISI - Surface blow built to 6 1/2"  
 15 FF - Bob in 1 1/2" mins  
 60 FSI - Surface blow built to Bob in 8 mins



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1993.68	113.12	Initial Hydro-static
1	137.06	112.45	Open To Flow (1)
16	321.80	125.19	Shut-In(1)
75	1244.59	124.33	End Shut-In(1)
76	325.47	123.88	Open To Flow (2)
90	458.50	127.02	Shut-In(2)
150	1234.08	126.12	End Shut-In(2)
151	1939.02	126.30	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
235.00	GMWCO - 30%G - 15%M - 20%W - 35%o	1.16
630.00	GMWCO - 10%G - 5%M - 20%W - 65%o	8.84
189.00	GMWCO - 10%G - 10%M - 25%W - 55%o	2.65
30.00	MCO - 45%M - 55%o	0.42
0.00	974' GIP	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.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53458

**DST#: 3**

ATTN: Steve Miller

Test Start: 2013.07.09 @ 02:11:00

## Tool Information

Drill Pipe:	Length: 3748.00 ft	Diameter: 3.80 inches	Volume: 52.57 bbl	Tool Weight: 2500.00 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: 235.00 ft	Diameter: 2.25 inches	Volume: 1.16 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 53.73 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	7.00 ft			String Weight: Initial 56000.00 lb
Depth to Top Packer:	4004.00 ft			Final 60000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	40.00 ft			
Tool Length:	68.00 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			3977.00	
Shut In Tool	5.00			3982.00	
Hydraulic tool	5.00			3987.00	
Jars	5.00			3992.00	
Safety Joint	3.00			3995.00	
Packer	5.00			4000.00	28.00 Bottom Of Top Packer
Packer	4.00			4004.00	
Stubb	1.00			4005.00	
Recorder	0.00	8354	Inside	4005.00	
Recorder	0.00	8520	Outside	4005.00	
Perforations	34.00			4039.00	
Bullnose	5.00			4044.00	40.00 Bottom Packers & Anchor

**Total Tool Length: 68.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53458

**DST#: 3**

ATTN: Steve Miller

Test Start: 2013.07.09 @ 02:11:00

## 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: 5.98 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1100.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
235.00	GMWCO - 30%G - 15%M - 20%W - 35%o	1.156
630.00	GMWCO - 10%G - 5%M - 20%W - 65%o	8.837
189.00	GMWCO - 10%G - 10%M - 25%W - 55%o	2.651
30.00	MCO - 45%M - 55%o	0.421
0.00	974' GIP	0.000

Total Length: 1084.00 ft      Total Volume: 13.065 bbl

Num Fluid Samples: 0

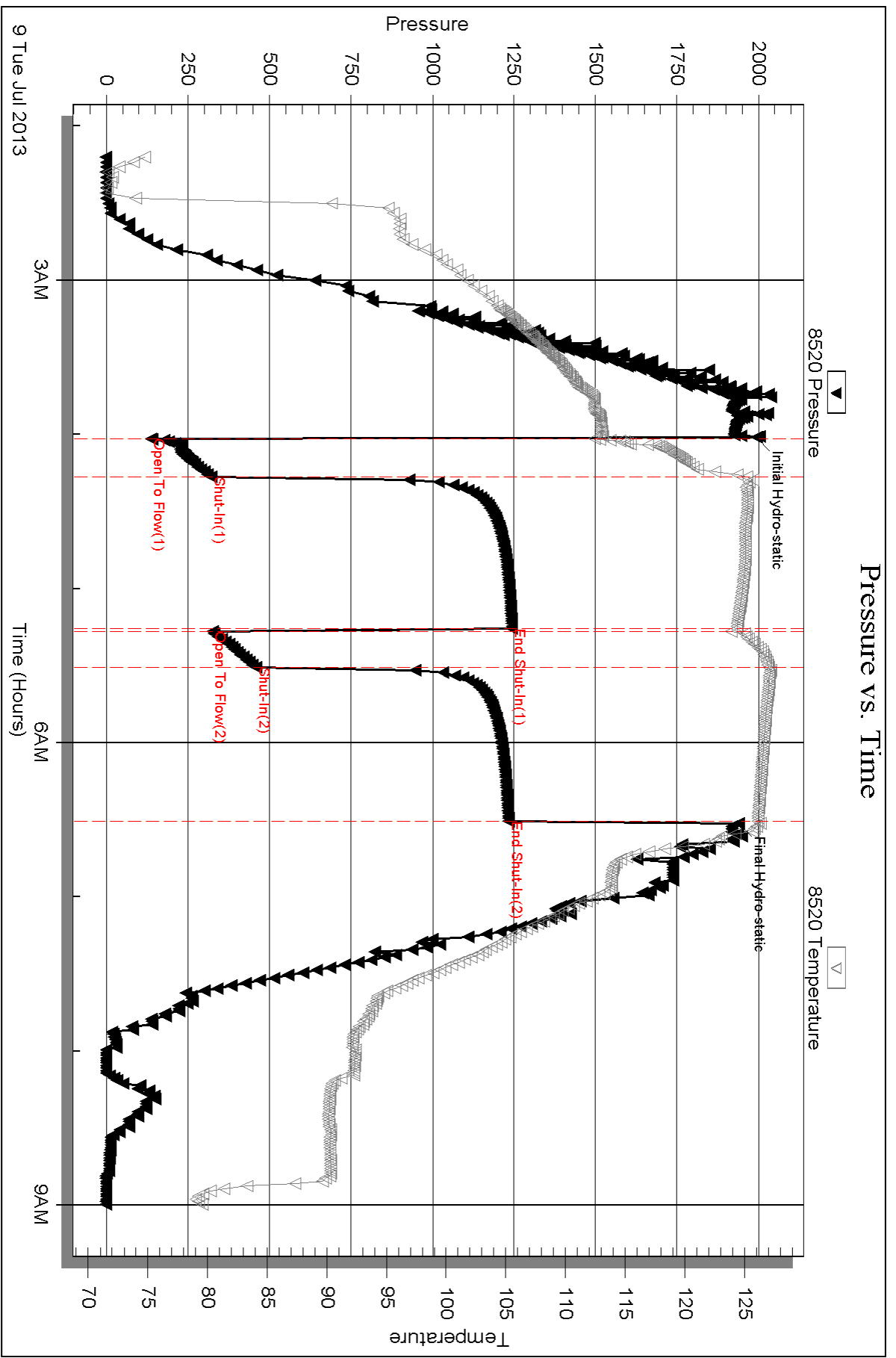
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



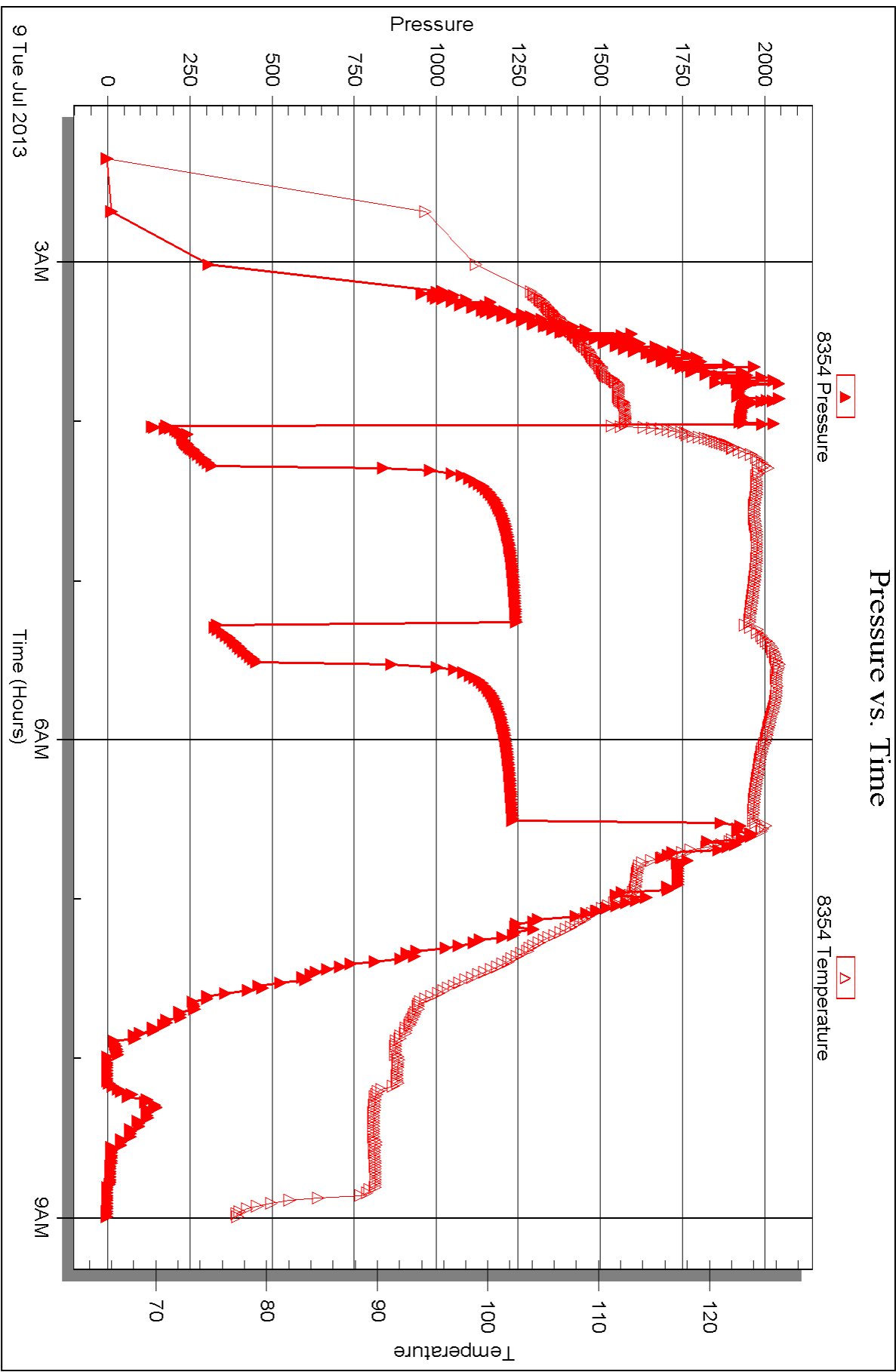
Serial #: 8354

Inside

Murfin Drilling Co.

Alex #1-23

DST Test Number: 3





## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.**

250 N. Water STE 300  
Wichita KS 67202

ATTN: Steve Miller

**Alex #1-23**

**23-4s-31w Rawlins,KS**

Start Date: 2013.07.09 @ 14:51:00

End Date: 2013.07.09 @ 21:05:30

Job Ticket #: 53459                      DST #: 4

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

Printed: 2013.07.16 @ 08:03:33

Murfin Drilling Co. 23-4s-31w Rawlins,KS Alex #1-23 DST # 4 LKC " G " 2013.07.09



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co.  
 250 N. Water STE 300  
 Wichita KS 67202  
 ATTN: Steve Miller

**23-4s-31w Rawlins, KS**  
**Alex #1-23**  
 Job Ticket: 53459 **DST#: 4**  
 Test Start: 2013.07.09 @ 14:51:00

## GENERAL INFORMATION:

Formation: **LKC " G "**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 16:34:40  
 Time Test Ended: 21:05:30  
 Interval: **4049.00 ft (KB) To 4060.00 ft (KB) (TVD)**  
 Total Depth: 4060.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Good  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Ryan Nichols  
 Unit No: 66  
 Reference Elevations: 2939.00 ft (KB)  
 2928.00 ft (CF)  
 KB to GR/CF: 11.00 ft

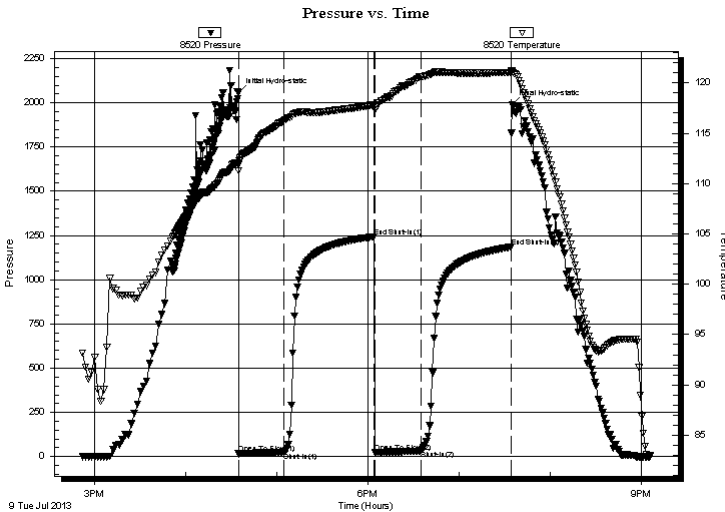
## Serial #: 8520

Outside

Press @ Run Depth: 35.64 psig @ 4050.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2013.07.09 End Date: 2013.07.09 Last Calib.: 2013.07.09  
 Start Time: 14:52:00 End Time: 21:05:30 Time On Btm: 2013.07.09 @ 16:34:30  
 Time Off Btm: 2013.07.09 @ 19:35:00

TEST COMMENT: 30 IF - Surface blow built to 1"  
 60 ISI - No return  
 30 FF - No blow  
 60 FSI - No return

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2059.08	111.99	Initial Hydro-static
1	16.44	111.27	Open To Flow (1)
30	23.23	116.24	Shut-In(1)
90	1243.94	117.83	End Shut-In(1)
90	24.56	117.27	Open To Flow (2)
121	35.64	120.59	Shut-In(2)
180	1184.93	121.04	End Shut-In(2)
181	1989.11	121.11	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud w/oil spots - 100%M	0.02

\* 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.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53459

**DST#: 4**

ATTN: Steve Miller

Test Start: 2013.07.09 @ 14:51:00

## Tool Information

Drill Pipe:	Length: 3806.00 ft	Diameter: 3.80 inches	Volume: 53.39 bbl	Tool Weight:	2500.00 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: 235.00 ft	Diameter: 2.25 inches	Volume: 1.16 bbl	Weight to Pull Loose:	70000.00 lb
			<u>Total Volume: 54.55 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	20.00 ft			String Weight: Initial	56000.00 lb
Depth to Top Packer:	4049.00 ft			Final	56000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	11.00 ft				
Tool Length:	39.00 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			4022.00	
Shut In Tool	5.00			4027.00	
Hydraulic tool	5.00			4032.00	
Jars	5.00			4037.00	
Safety Joint	3.00			4040.00	
Packer	5.00			4045.00	28.00 Bottom Of Top Packer
Packer	4.00			4049.00	
Stubb	1.00			4050.00	
Recorder	0.00	8354	Inside	4050.00	
Recorder	0.00	8520	Outside	4050.00	
Perforations	5.00			4055.00	
Bullnose	5.00			4060.00	11.00 Bottom Packers & Anchor

**Total Tool Length: 39.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53459

**DST#: 4**

ATTN: Steve Miller

Test Start: 2013.07.09 @ 14:51:00

## 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: 5.98 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1700.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	Mud w /oil spots - 100%M	0.025

Total Length: 5.00 ft      Total Volume: 0.025 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

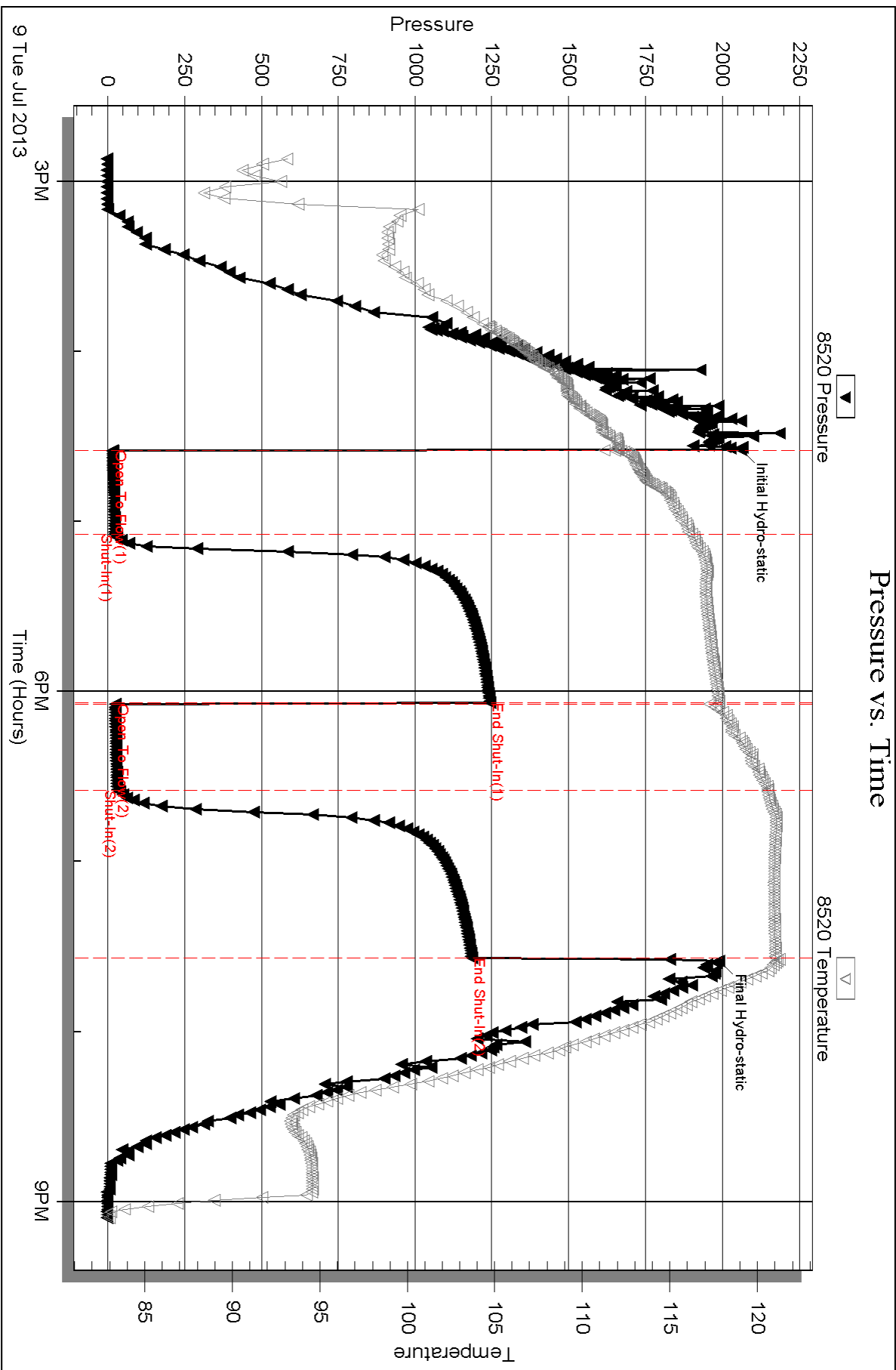
Recovery Comments:

Serial #: 8520

Outside Murfin Drilling Co.

Alex #1-23

DST Test Number: 4



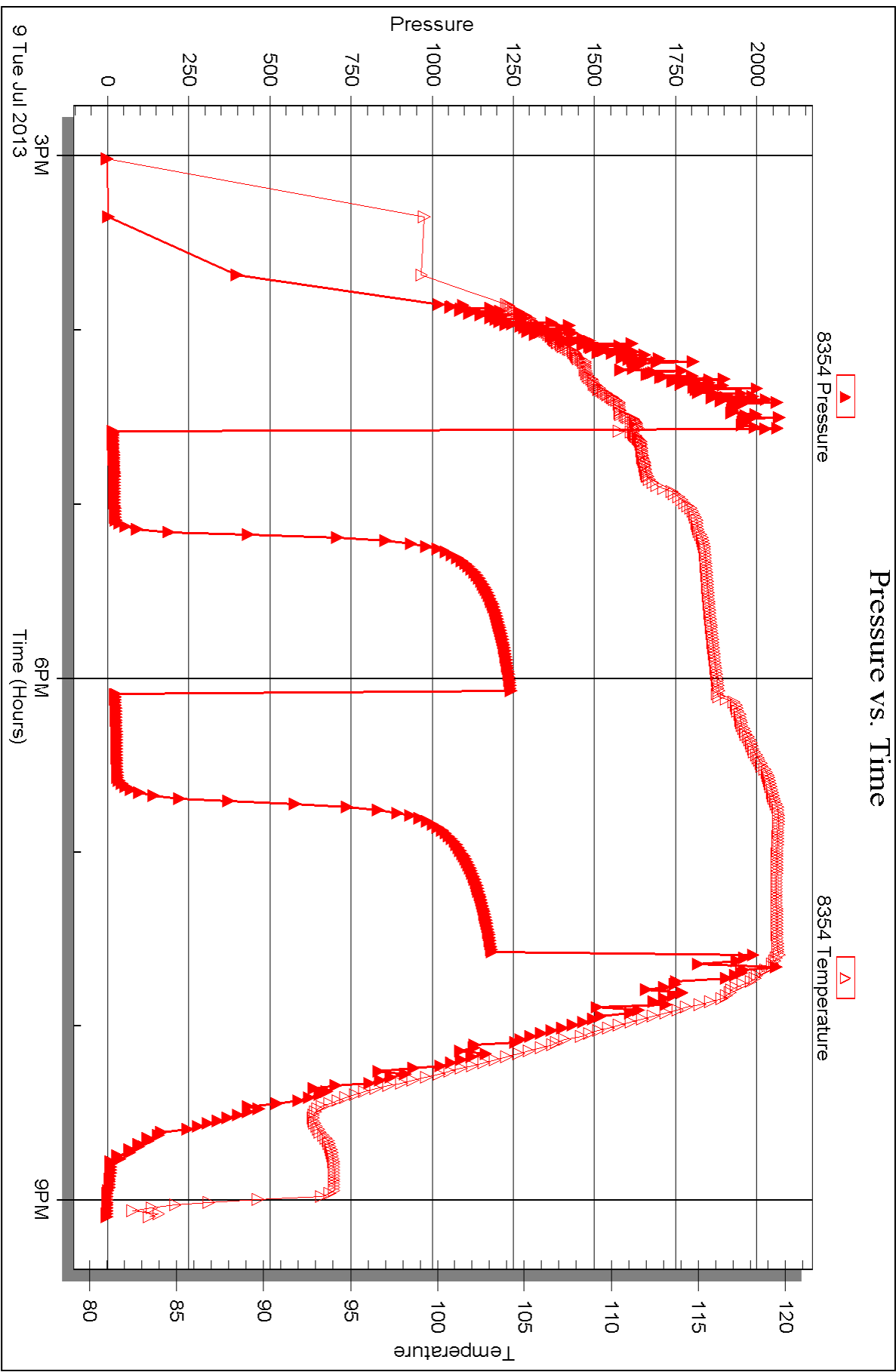
Serial #: 8354

Inside

Murfin Drilling Co.

Alex #1-23

DST Test Number: 4





## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.**

250 N. Water STE 300  
Wichita KS 67202

ATTN: Steve Miller

**Alex #1-23**

**23-4s-31w Rawlins,KS**

Start Date: 2013.07.10 @ 10:24:00

End Date: 2013.07.10 @ 18:54:00

Job Ticket #: 53460                      DST #: 5

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2013.07.16 @ 08:02:49



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co.  
250 N. Water STE 300  
Wichita KS 67202  
ATTN: Steve Miller

**23-4s-31w Rawlins, KS**

**Alex #1-23**

Job Ticket: 53460

**DST#: 5**

Test Start: 2013.07.10 @ 10:24:00

## GENERAL INFORMATION:

Formation: **LKC "H-K"**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:39:30  
 Time Test Ended: 18:54:00  
 Interval: **4067.00 ft (KB) To 4176.00 ft (KB) (TVD)**  
 Total Depth: 4176.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Good  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Ryan Nichols  
 Unit No: 66  
 Reference Elevations: 2939.00 ft (KB)  
 2928.00 ft (CF)  
 KB to GR/CF: 11.00 ft

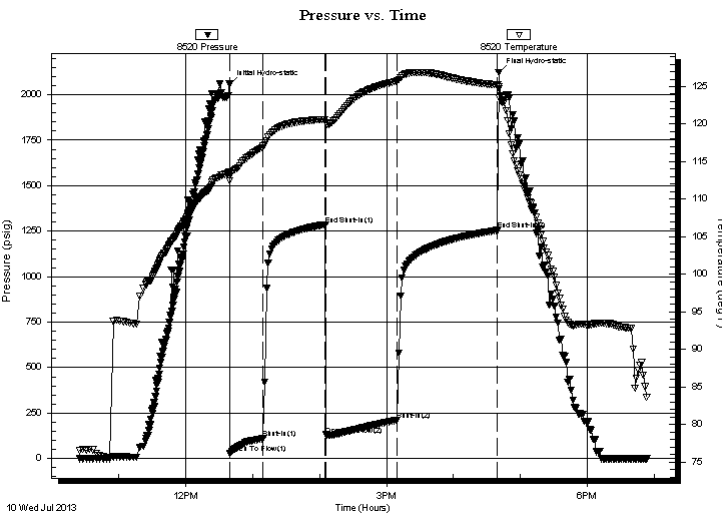
**Serial #: 8520**

**Outside**

Press @ Run Depth: 212.60 psig @ 4068.00 ft (KB)  
 Start Date: 2013.07.10 End Date: 2013.07.10  
 Start Time: 10:25:00 End Time: 18:54:00  
 Capacity: 8000.00 psig  
 Last Calib.: 2013.07.10  
 Time On Btm: 2013.07.10 @ 12:39:00  
 Time Off Btm: 2013.07.10 @ 16:40:30

**TEST COMMENT:** 30 IF - BOB @ 6 1/2 mins  
 60 ISI - Surface blow built to Bob @ 20 mins  
 60 FF - BOB @ 6 mins  
 90 FSI - Surface blow built to Bob @ 13 mins

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2058.24	113.57	Initial Hydro-static
1	26.29	112.42	Open To Flow (1)
31	110.95	117.04	Shut-In(1)
86	1286.76	120.63	End Shut-In(1)
87	131.29	120.15	Open To Flow (2)
151	212.60	125.72	Shut-In(2)
241	1255.13	125.19	End Shut-In(2)
242	2122.86	125.00	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
118.00	GOCM - 50%G - 10%o - 40%M	0.58
306.00	GO - 50%G - 50%o	3.23
126.00	GO - 70%G - 30%o	1.77
0.00	1260' GIP	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.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53460

**DST#: 5**

ATTN: Steve Miller

Test Start: 2013.07.10 @ 10:24:00

## Tool Information

Drill Pipe:	Length: 3837.00 ft	Diameter: 3.80 inches	Volume: 53.82 bbl	Tool Weight:	2500.00 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: 235.00 ft	Diameter: 2.25 inches	Volume: 1.16 bbl	Weight to Pull Loose:	60000.00 lb
			<u>Total Volume: 54.98 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	33.00 ft			String Weight: Initial	58000.00 lb
Depth to Top Packer:	4067.00 ft			Final	59000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	109.00 ft				
Tool Length:	137.00 ft				
Number of Packers:	2	Diameter:	6.75 inches		
Tool Comments:					

## Tool Description

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

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4040.00	
Shut In Tool	5.00			4045.00	
Hydraulic tool	5.00			4050.00	
Jars	5.00			4055.00	
Safety Joint	3.00			4058.00	
Packer	5.00			4063.00	28.00 Bottom Of Top Packer
Packer	4.00			4067.00	
Stubb	1.00			4068.00	
Recorder	0.00	8354	Inside	4068.00	
Recorder	0.00	8520	Outside	4068.00	
Perforations	6.00			4074.00	
Change Over Sub	1.00			4075.00	
Drill Pipe	95.00			4170.00	
Change Over Sub	1.00			4171.00	
Bullnose	5.00			4176.00	109.00 Bottom Packers & Anchor

**Total Tool Length: 137.00**





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co.

**23-4s-31w Rawlins,KS**

250 N. Water STE 300  
Wichita KS 67202

**Alex #1-23**

Job Ticket: 53460

**DST#: 5**

ATTN: Steve Miller

Test Start: 2013.07.10 @ 10:24:00

## Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

31.4 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 67.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.99 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1700.00 ppm

Filter Cake: 2.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
118.00	GOCM - 50%G - 10%o - 40%M	0.580
306.00	GO - 50%G - 50%o	3.227
126.00	GO - 70%G - 30%o	1.767
0.00	1260' GIP	0.000

Total Length: 550.00 ft      Total Volume: 5.574 bbl

Num Fluid Samples: 0

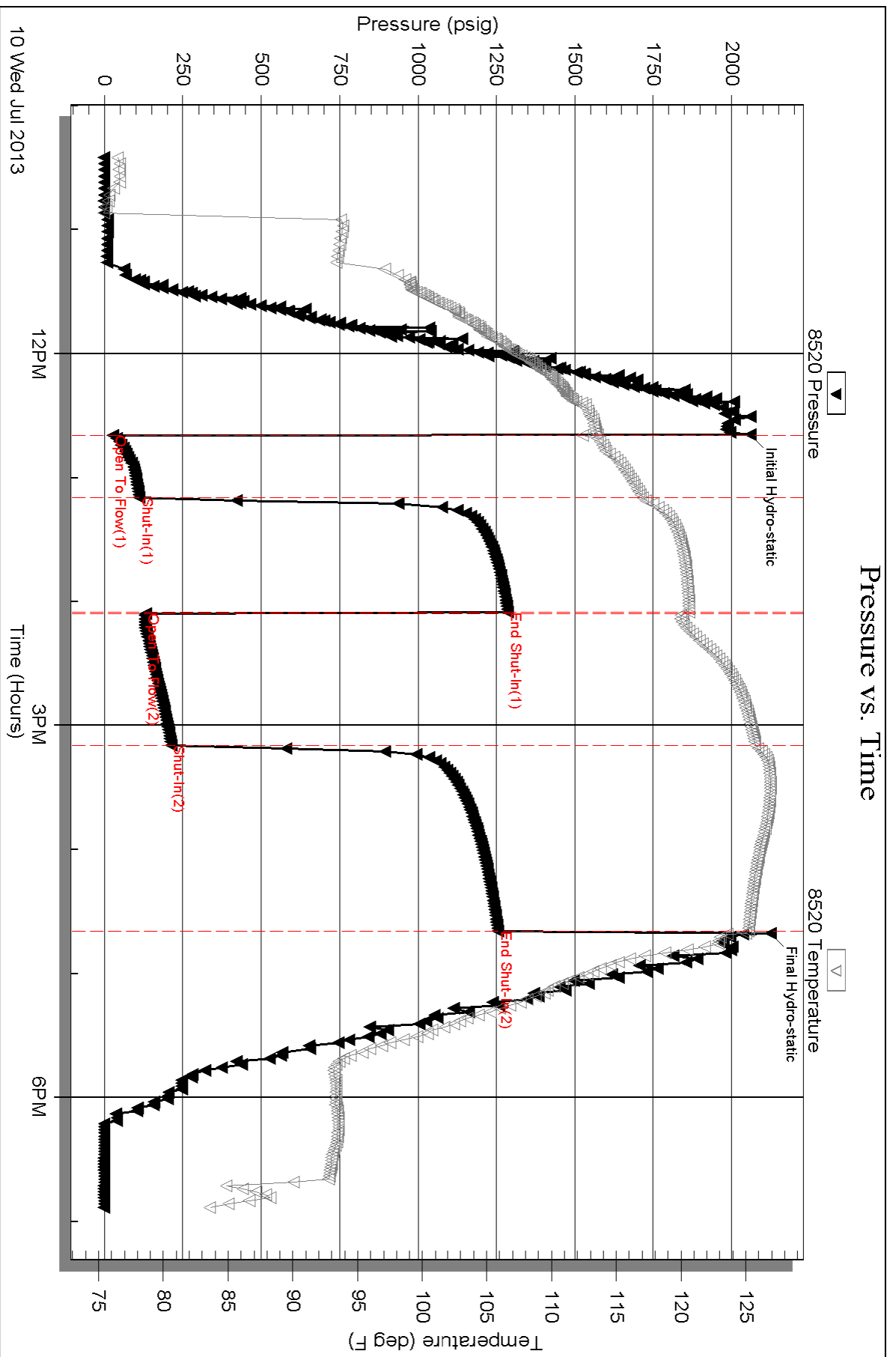
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: OIL API = 34 @ 86 DEG = 31.4 COR 60 DEG F



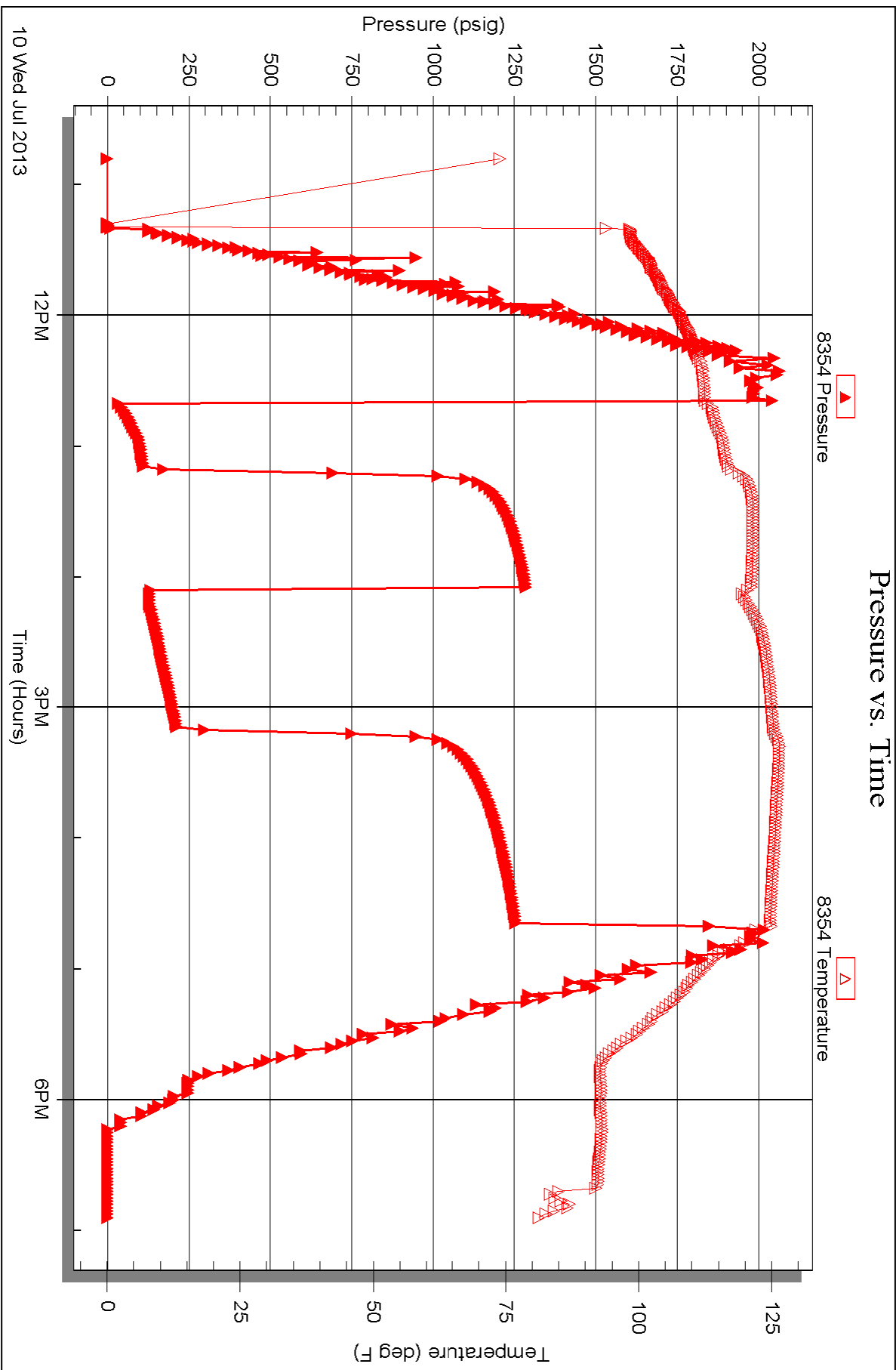
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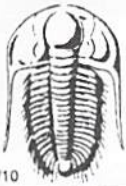
Inside

Murfin Drilling Co.

Alex #1-23

DST Test Number: 5





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. **53456** 19505

4/10

Well Name & No. Alex # 1-23 Test No. 1 Date 7/7/13  
 Company Murfin Drilling Co. Elevation 2939 KB 2928 GL  
 Address 250 N. Water STE 300 Wichita KS 67202  
 Co. Rep / Geo. Steve Miller Rig Murfin # 2  
 Location: Sec. 23 Twp. 45 Rge. 31 W Co. Rawlins State KS

Interval Tested 3916 - 3960 Zone Tested Toronto  
 Anchor Length 44' Drill Pipe Run 3684' Mud Wt. 8.9  
 Top Packer Depth 3911 Drill Collars Run 235' Vis 65  
 Bottom Packer Depth 3916 Wt. Pipe Run 0' WL 5.6  
 Total Depth 3960 Chlorides 1000 ppm System LCM 4

Blow Description IF - Surface blow built to 6 1/2"  
ISI - No return  
FF - Surface blow started @ 7 mins built to 8"  
FSI - No return

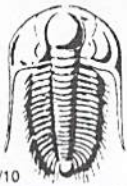
Rec	Feet of	%gas	%oil	%water	%mud
<u>317'</u>	<u>MCW</u>		<u>80</u>	<u>20</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 317' BHT 120° Gravity — API RW .09 @ 77° F Chlorides 80,000 ppm  
 (A) Initial Hydrostatic 1922  Test 1,150 T-On Location 16:45  
 (B) First Initial Flow 20  Jars 250 T-Started 18:03  
 (C) First Final Flow 94  Safety Joint 75 T-Open 20:01  
 (D) Initial Shut-In 1280  Circ Sub NC T-Pulled 00:01  
 (E) Second Initial Flow 102  Hourly Standby \_\_\_\_\_ T-Out 01:37  
 (F) Second Final Flow 167  Mileage 50 RT 77.50 Comments \_\_\_\_\_  
 (G) Final Shut-In 1266  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 1849  Straddle \_\_\_\_\_

Initial Open 30  Ruined Shale Packer \_\_\_\_\_  
 Initial Shut-In 60  Ruined Packer \_\_\_\_\_  
 Final Flow 60  Extra Packer \_\_\_\_\_  
 Final Shut-In 90  Extra Recorder \_\_\_\_\_  
 Day Standby \_\_\_\_\_ Sub Total \_\_\_\_\_  
 Accessibility NC Total 1,552.50  
 Sub Total 1,552.50 MP/DST Disc't \_\_\_\_\_

Approved By \_\_\_\_\_ Our Representative [Signature]

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 53457

Well Name & No. Alex # 1-23 Test No. 2 Date 7/8/13  
 Company Murfin Drilling Co. Elevation 2939 KB 2928 GL  
 Address 250 N Water STE 300 Wichita KS 67202  
 Co. Rep / Geo. Stere Miller Rig Murfin # 2  
 Location: Sec. 23 Twp. 45 Rge. 31W Co. Rawlins State KS

Interval Tested 3960 - 4004 Zone Tested LKC "A-B"  
 Anchor Length 44' Drill Pipe Run 3717' Mud Wt. 9.0  
 Top Packer Depth 3955 Drill Collars Run 235' Vis 67  
 Bottom Packer Depth 3960 Wt. Pipe Run 0' WL 5.6  
 Total Depth 4004 Chlorides 1100 ppm System LCM 4

Blow Description IF - BoB in 1 min  
ISI - Surface blow @ 2 mins  
FF - BoB @ 2 mins  
FSI - Surface blow started @ 8 mins

Rec	Feet of	%gas	%oil	%water	%mud
<u>20</u>	<u>OMCW</u>	<u>5</u>	<u>65</u>	<u>30</u>	
<u>248'</u>	<u>OMCW</u>	<u>2</u>	<u>68</u>	<u>30</u>	
<u>1419</u>	<u>OMCW</u>	<u>2</u>	<u>95</u>	<u>3</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 1687 BHT 126° Gravity — API RW 065 @ 109 °F Chlorides 80,000 ppm  
 (A) Initial Hydrostatic 2002  Test 1,250 T-On Location 10:30  
 (B) First Initial Flow 175  Jars 250 T-Started 10:43  
 (C) First Final Flow 508  Safety Joint 75 T-Open 13:43  
 (D) Initial Shut-In 1296  Circ Sub NC T-Pulled 16:13  
 (E) Second Initial Flow 546  Hourly Standby — T-Out 18:28  
 (F) Second Final Flow 757  Mileage 50RT 77.50  
 (G) Final Shut-In 1283  Sampler  
 (H) Final Hydrostatic 1937  Straddle

Initial Open 15  Shale Packer  Ruined Shale Packer  
 Initial Shut-In 60  Shale Packer  Ruined Packer  
 Final Flow 15  Extra Packer  Extra Copies  
 Final Shut-In 60  Extra Recorder  
 Sub Total 1,652.50  
 Total 1,652.50  
 Sub Total 1,652.50 MP/DST Disc't

Approved By \_\_\_\_\_ Our Representative Ryan J. Hubert

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. 53458

Well Name & No. Alex # 1-23 Test No. 3 Date 7-9-13  
 Company Martin Drilling Co. Elevation 2939 KB 2928 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Steve Miller Rig Martin #2  
 Location: Sec. 23 Twp. 45 Rge. 31W Co. Rawlins State KS

Interval Tested 4004-4044 Zone Tested LKC "D & F"  
 Anchor Length 40' Drill Pipe Run \_\_\_\_\_ Mud Wt. 9.0  
 Top Packer Depth 3999 Drill Collars Run 235' Vis 67  
 Bottom Packer Depth 4004 Wt. Pipe Run 0' WL 6.0  
 Total Depth 4044 Chlorides 1100 ppm System LCM 4

Blow Description IF- BoB in 2 mins  
ISI- Surface blow built to 5 1/2"  
FF- BoB in 1 1/2 mins  
FSI- Surface blow built to BoB in 8 mins

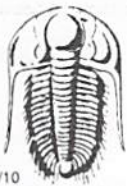
Rec	Feet of	%gas	%oil	%water	%mud
30	MDCO	55		45	
189'	GMWCO	10	55	25	10
630'	GMWCO	10	65	20	5
235'	GMWCO	30	35	20	15

Rec Total 1084' BHT 126° Gravity \_\_\_\_\_ API RW \_\_\_\_\_ @ \_\_\_\_\_ ° F Chlorides \_\_\_\_\_ ppm

(A) Initial Hydrostatic <u>1994</u>	<input checked="" type="checkbox"/> Test <u>1,250</u>	T-On Location <u>02:00</u>
(B) First Initial Flow <u>137</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>02:11</u>
(C) First Final Flow <u>322</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>04:01</u>
(D) Initial Shut-In <u>1245</u>	<input checked="" type="checkbox"/> Circ Sub <u>NC</u>	T-Pulled <u>06:31</u>
(E) Second Initial Flow <u>325</u>	<input type="checkbox"/> Hourly Standby _____	T-Out <u>09:00</u>
(F) Second Final Flow <u>459</u>	<input checked="" type="checkbox"/> Mileage <u>50 RT</u> 77.50	Comments <u>973' GIP</u>
(G) Final Shut-In <u>1234</u>	<input type="checkbox"/> Sampler _____	
(H) Final Hydrostatic <u>1939</u>	<input type="checkbox"/> Straddle _____	<input type="checkbox"/> Ruined Shale Packer _____
Initial Open <u>15</u>	<input type="checkbox"/> Shale Packer _____	<input type="checkbox"/> Ruined Packer _____
Initial Shut-In <u>30</u>	<input type="checkbox"/> Extra Packer _____	<input type="checkbox"/> Extra Copies _____
Final Flow <u>15</u>	<input type="checkbox"/> Extra Recorder _____	Sub Total _____
Final Shut-In <u>50</u>	<input type="checkbox"/> Day Standby _____	Total <u>1,652.50</u>
	<input type="checkbox"/> Accessibility _____	MP/DST Disc't _____
	Sub Total <u>1652.50</u>	

Approved By \_\_\_\_\_ Our Representative [Signature]

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 53459

Well Name & No. Alex # 1-23 Test No. 4 Date 7/9/13  
 Company Murfin Drilling Co. Elevation 2939 KB 2928 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Steve Miller Rig Murfin # 2  
 Location: Sec. 23 Twp. 4S Rge. 31W Co. Rawling State KS

Interval Tested 4049-4060 Zone Tested LKC "G"  
 Anchor Length 11' Drill Pipe Run 3806' Mud Wt. 9.1  
 Top Packer Depth 4044 Drill Collars Run 235' Vis 69  
 Bottom Packer Depth 4049 Wt. Pipe Run 0' WL 6.0  
 Total Depth 4060 Chlorides 1700 ppm System LCM 6

Blow Description IF - Surface blow built to 1"  
ISI - No return  
FF - No blow  
FSI - No return

Rec	Feet of	%gas	%oil	%water	%mud
<u>5'</u>	<u>Mud w/oil spots</u>			<u>100</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

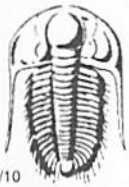
Rec Total 5' BHT 121° Gravity — API RW — @ — F Chlorides — ppm  
 (A) Initial Hydrostatic 2059  Test 1,250 T-On Location 14:30  
 (B) First Initial Flow 16  Jars 250 T-Started 14:51  
 (C) First Final Flow 23  Safety Joint 75 T-Open 16:35  
 (D) Initial Shut-In 1244  Circ Sub NC T-Pulled 19:35  
 (E) Second Initial Flow 25  Hourly Standby — T-Out 21:05  
 (F) Second Final Flow 36  Mileage 50 RT 77.50 Comments —  
 (G) Final Shut-In 1185  Sampler —  
 (H) Final Hydrostatic 1989  Straddle —  Ruined Shale Packer —  
 Shale Packer —  Ruined Packer —  
 Extra Packer —  Extra Copies —  
 Extra Recorder — Sub Total —  
 Day Standby — Total 1,652.50  
 Accessibility — MP/DST Disc't —

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

Approved By \_\_\_\_\_ Our Representative [Signature]

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 53460

Well Name & No. Alex #1-23 Test No. 5 Date 7/10/13  
 Company Murfin Drilling Co. Elevation 2939 KB 2928 GL  
 Address 250 N. Water STE 300 Wichita, KS 67202  
 Co. Rep / Geo. Steve Miller Rig Murfin #2  
 Location: Sec. 23 Twp. 4S Rge. 31W Co. Rawlins State KS

Interval Tested 4067-4176 Zone Tested LKC @ "H, J, & K"  
 Anchor Length 109' Drill Pipe Run 3837' Mud Wt. 9.2  
 Top Packer Depth 4062 Drill Collars Run 235' Vis 67  
 Bottom Packer Depth 4067 Wt. Pipe Run 0' WL 6.0  
 Total Depth 4176 Chlorides 1700 ppm System LCM 5

Blow Description IF - BoB @ 6 1/2 mins  
ISI - Surface blow built to BoB @ 20 mins  
FF - BoB @ 6 mins  
FSI - Surface blow built to BoB @ 13 mins

Rec	Feet of	%gas	%oil	%water	%mud
126'	60	70	30		
306'	60	50	50		
118'	60CM	50	10		40
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 550' BHT 125° Gravity 31.4 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2058  Test 1,250 T-On Location 10:00  
 (B) First Initial Flow 26  Jars 250 T-Started 10:24  
 (C) First Final Flow 111  Safety Joint 75 T-Open 12:40  
 (D) Initial Shut-In 1288  Circ Sub NC T-Pulled 16:40  
 (E) Second Initial Flow 131  Hourly Standby — T-Out 18:54  
 (F) Second Final Flow 213  Mileage 50 RT x2 155 Comments 1260' GIP  
 (G) Final Shut-In 1255  Sampler — Loaded tools @  
 (H) Final Hydrostatic 2123  Straddle — 04:45 on 7/12/13

Initial Open 30  Shale Packer —  Ruined Shale Packer —  
 Initial Shut-In 60  Shale Packer —  Ruined Packer —  
 Final Flow 60  Extra Packer —  Extra Copies —  
 Final Shut-In 90  Extra Recorder — Sub Total 800  
 Day Standby 1day 10 hrs Total 2,530  
 Accessibility — MP/DST Disc't —  
 Sub Total 1,730

Approved By \_\_\_\_\_ Our Representative [Signature]  
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