



DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita, KS 67202

ATTN: Chuck Schmaltz

Sowers #1-19

19-1s-37w Cheyenne KS

Start Date: 2014.12.12 @ 00:30:00

End Date: 2014.12.12 @ 09:25:00

Job Ticket #: 60833 DST #: 1

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

Printed: 2014.12.17 @ 14:29:02



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60833

DST#: 1

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 00:30:00

GENERAL INFORMATION:

Formation: **LKC "A - D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 02:59:30

Time Test Ended: 09:25:00

Test Type: Conventional Bottom Hole (Initial)

Tester: James Winder

Unit No: 83

Interval: 4112.00 ft (KB) To 4236.00 ft (KB) (TVD)

Reference Elevations: 3210.00 ft (KB)

Total Depth: 4236.00 ft (KB) (TVD)

3199.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 11.00 ft

Serial #: 8791

Inside

Press@RunDepth: 184.17 psig @ 4113.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2014.12.12

End Date:

2014.12.12

Last Calib.:

2014.12.12

Start Time: 00:30:05

End Time:

09:25:00

Time On Btm:

2014.12.12 @ 02:57:45

Time Off Btm:

2014.12.12 @ 07:06:00

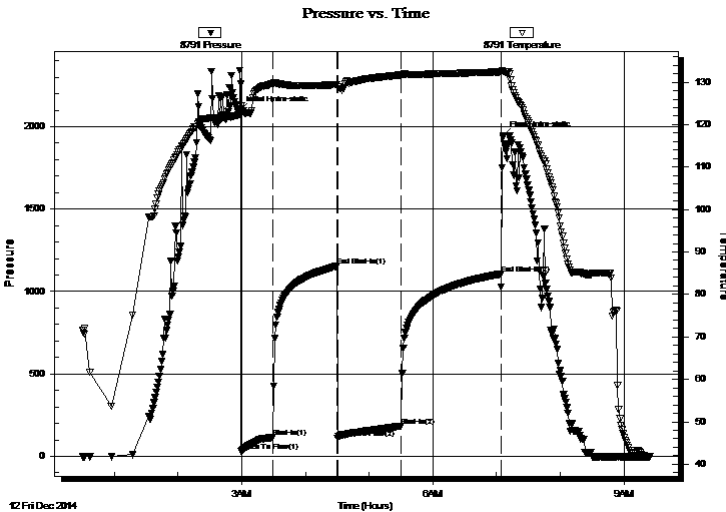
TEST COMMENT: 30 - IF: Blow built to 9 1/4"

60 - IS: No blow back

60 - FF: Blow started at 1 1/2 min., built to BOB (11") at 53 min.

90 - FS: No blow back

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2100.12	122.35	Initial Hydro-static
2	28.31	123.05	Open To Flow (1)
32	115.24	129.70	Shut-In(1)
92	1154.30	129.42	End Shut-In(1)
93	109.12	128.84	Open To Flow (2)
153	184.17	131.69	Shut-In(2)
247	1105.98	132.43	End Shut-In(2)
249	1947.12	132.57	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
123.00	OWCM 81% _m , 11% _w , 4% _o , 4% _g	0.60
242.00	OCM 92% _m , 6% _o , 2% _g	2.83

Gas Rates

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



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Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60833

DST#: 1

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 00:30:00

GENERAL INFORMATION:

Formation: **LKC "A - D"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 02:59:30

Time Test Ended: 09:25:00

Test Type: Conventional Bottom Hole (Initial)

Tester: James Winder

Unit No: 83

Interval: **4112.00 ft (KB) To 4236.00 ft (KB) (TVD)**

Reference Elevations: 3210.00 ft (KB)

Total Depth: 4236.00 ft (KB) (TVD)

3199.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 11.00 ft

Serial #: 8366

Outside

Press@RunDepth: psig @ 4113.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2014.12.12

End Date:

2014.12.12

Last Calib.:

2014.12.12

Start Time: 00:30:05

End Time:

09:24:30

Time On Btm:

Time Off Btm:

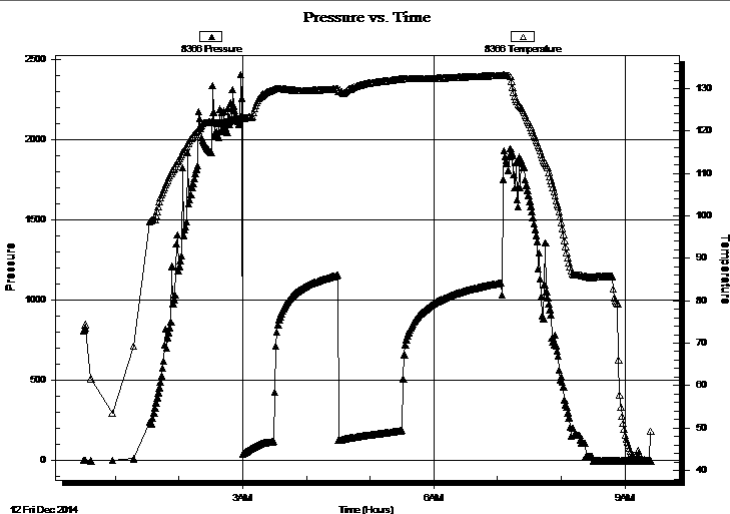
TEST COMMENT: 30 - IF: Blow built to 9 1/4"

60 - IS: No blow back

60 - FF: Blow started at 1 1/2 min., built to BOB (11") at 53 min.

90 - FS: No blow back

PRESSURE SUMMARY



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

Recovery

Length (ft)	Description	Volume (bbl)
123.00	OWCM 81% <i>m</i> , 11% <i>w</i> , 4% <i>o</i> , 4% <i>g</i>	0.60
242.00	OCM 92% <i>m</i> , 6% <i>o</i> , 2% <i>g</i>	2.83

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60833

DST#: 1

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 00:30:00

Tool Information

Drill Pipe:	Length: 3922.00 ft	Diameter: 3.80 inches	Volume: 55.02 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: 185.00 ft	Diameter: 2.25 inches	Volume: 0.91 bbl	Weight to Pull Loose: 76000.00 lb
			<u>Total Volume: 55.93 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	23.00 ft			String Weight: Initial 64000.00 lb
Depth to Top Packer:	4112.00 ft			Final 66000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	124.00 ft			
Tool Length:	152.00 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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Shut In Tool	5.00			4089.00	
Hydraulic tool	5.00			4094.00	
Jars	5.00			4099.00	
Safety Joint	3.00			4102.00	
Packer	5.00			4107.00	28.00 Bottom Of Top Packer
Packer	5.00			4112.00	
Stubb	1.00			4113.00	
Recorder	0.00	8791	Inside	4113.00	
Recorder	0.00	8366	Outside	4113.00	
Perforations	23.00			4136.00	
Blank Spacing	97.00			4233.00	
Bullnose	3.00			4236.00	124.00 Bottom Packers & Anchor

Total Tool Length: 152.00



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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60833

DST#: 1

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 00:30:00

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: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.75 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 500.00 ppm

Filter Cake: 2.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
123.00	OWCM 81%m, 11%w, 4%o, 4%g	0.605
242.00	OCM 92%m, 6%o, 2%g	2.830

Total Length: 365.00 ft Total Volume: 3.435 bbl

Num Fluid Samples: 0

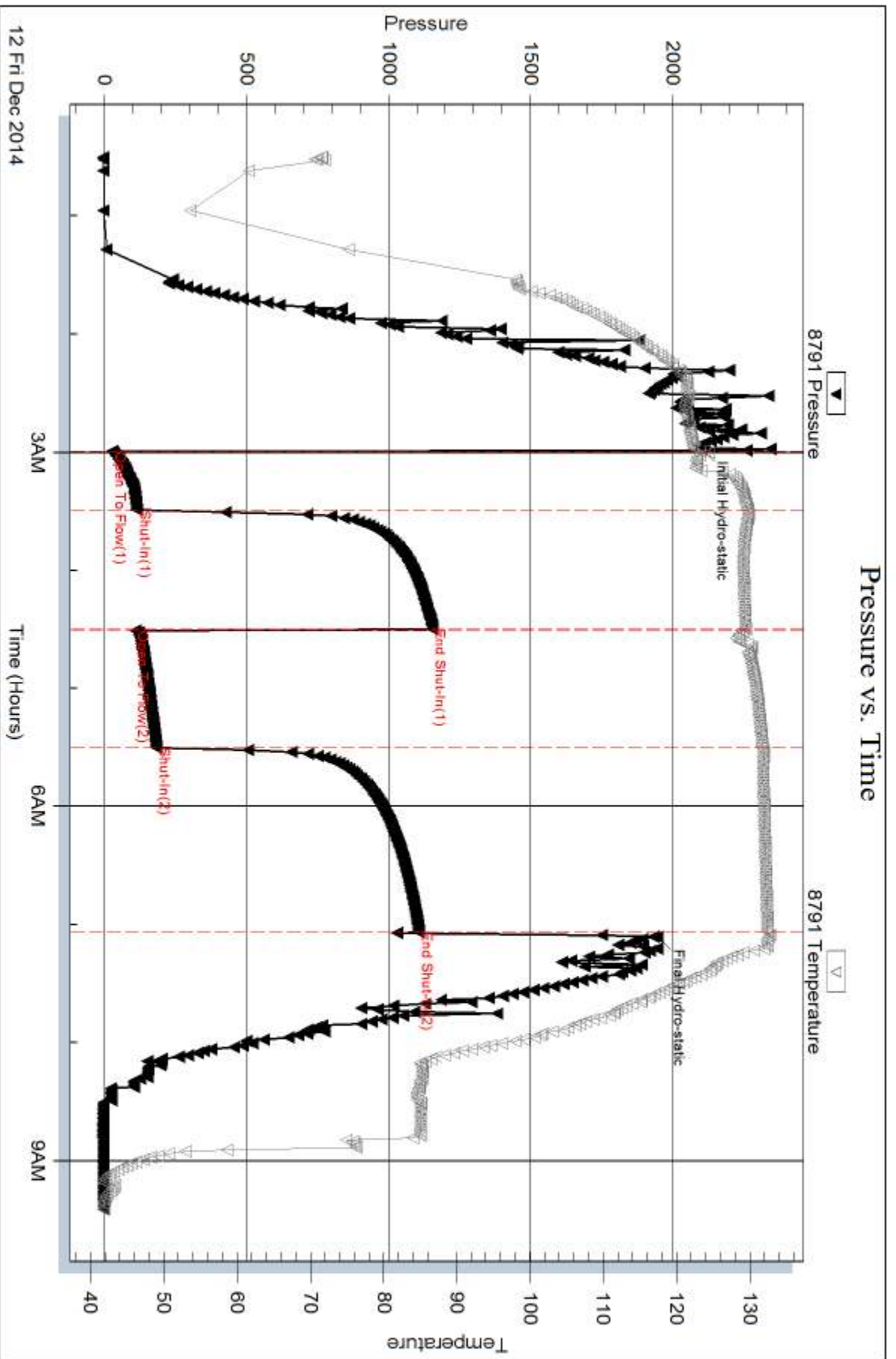
Num Gas Bombs: 0

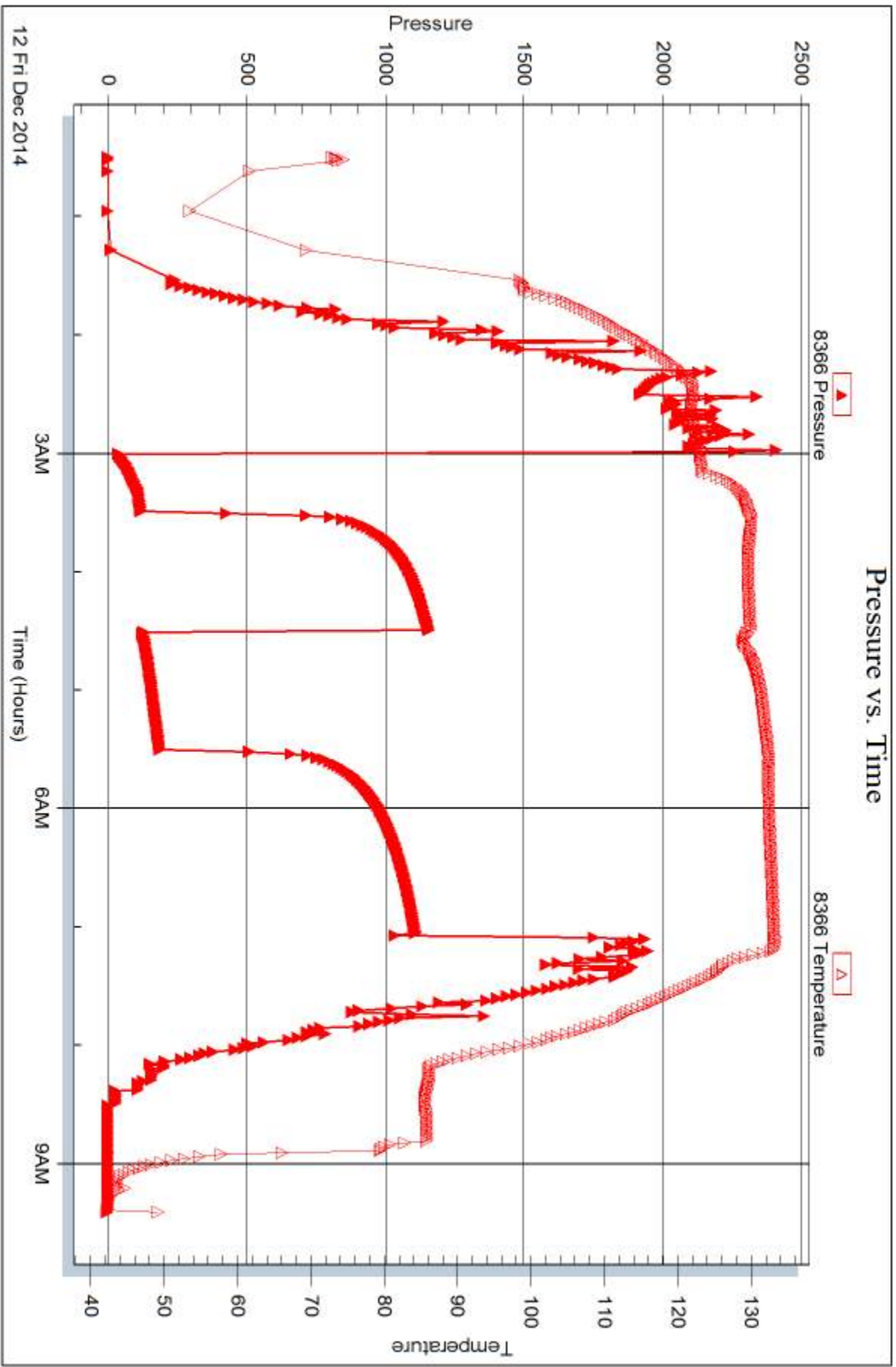
Serial #:

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: Chuck Schmaltz

Sowers #1-19

19-1s-37w Cheyenne KS

Start Date: 2014.12.12 @ 18:46:00

End Date: 2014.12.13 @ 02:19:30

Job Ticket #: 60834 DST #: 2

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

Printed: 2014.12.17 @ 14:28:38

Murfin Drilling Co., Inc.
19-1s-37w Cheyenne KS
Sowers #1-19
DST # 2
LKC "G"
2014.12.12



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60834

DST#: 2

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 18:46:00

GENERAL INFORMATION:

Formation: **LKC "G"**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 21:21:45
 Tester: James Winder
 Time Test Ended: 02:19:30
 Unit No: 83
 Interval: **4244.00 ft (KB) To 4296.00 ft (KB) (TVD)**
 Reference Elevations: 3210.00 ft (KB)
 Total Depth: 4296.00 ft (KB) (TVD)
 3199.00 ft (CF)
 Hole Diameter: 7.88 inches
 Hole Condition: Fair
 KB to GR/CF: 11.00 ft

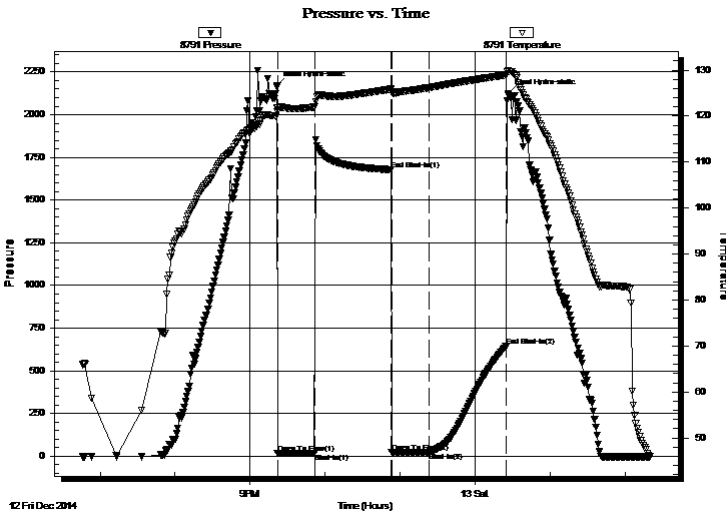
Serial #: 8791

Inside

Press@RunDepth: 23.74 psig @ 4245.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.12.12 End Date: 2014.12.13 Last Calib.: 2014.12.13
 Start Time: 18:46:05 End Time: 02:19:29 Time On Btm: 2014.12.12 @ 21:21:30
 Time Off Btm: 2014.12.13 @ 00:26:00

TEST COMMENT: 30 - IF: Blow built to 1/2", died back, dead at 27 min.
 60 - IS: No blow back
 30 - FF: No blow
 60 - FS: No blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2167.36	121.75	Initial Hydro-static
1	17.06	121.02	Open To Flow (1)
30	19.58	121.98	Shut-In(1)
91	1677.75	125.88	End Shut-In(1)
92	22.05	125.23	Open To Flow (2)
122	23.74	126.18	Shut-In(2)
184	647.23	128.94	End Shut-In(2)
185	2122.63	129.94	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
30.00	Mud w /trace of oil 100%m	0.15

* Recovery from multiple tests

Gas Rates

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



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DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60834

DST#: 2

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 18:46:00

Tool Information

Drill Pipe:	Length: 4046.00 ft	Diameter: 3.80 inches	Volume: 56.75 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: 185.00 ft	Diameter: 2.25 inches	Volume: 0.91 bbl	Weight to Pull Loose:	74000.00 lb
			<u>Total Volume: 57.66 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	15.00 ft			String Weight: Initial	65000.00 lb
Depth to Top Packer:	4244.00 ft			Final	65000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	52.00 ft				
Tool Length:	80.00 ft				
Number of Packers:	2	Diameter: 6.75 inches			

Tool Comments: lost packer seat on ISI? (we pulled the slips and sat back down to weight after turning the tool) - driller pulled up too high when pulling the slips and I felt tool reopen as soon as he sat back down

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Shut In Tool	5.00			4221.00	
Hydraulic tool	5.00			4226.00	
Jars	5.00			4231.00	
Safety Joint	3.00			4234.00	
Packer	5.00			4239.00	28.00 Bottom Of Top Packer
Packer	5.00			4244.00	
Packer - Shale	0.00			4244.00	
Stubb	1.00			4245.00	
Recorder	0.00	8791	Inside	4245.00	
Recorder	0.00	8366	Outside	4245.00	
Perforations	15.00			4260.00	
Blank Spacing	33.00			4293.00	
Bullnose	3.00			4296.00	52.00 Bottom Packers & Anchor

Total Tool Length: 80.00



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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60834

DST#: 2

ATTN: Chuck Schmaltz

Test Start: 2014.12.12 @ 18:46:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 10.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.95 in³

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
30.00	Mud w /trace of oil 100%m	0.148

Total Length: 30.00 ft Total Volume: 0.148 bbl

Num Fluid Samples: 0

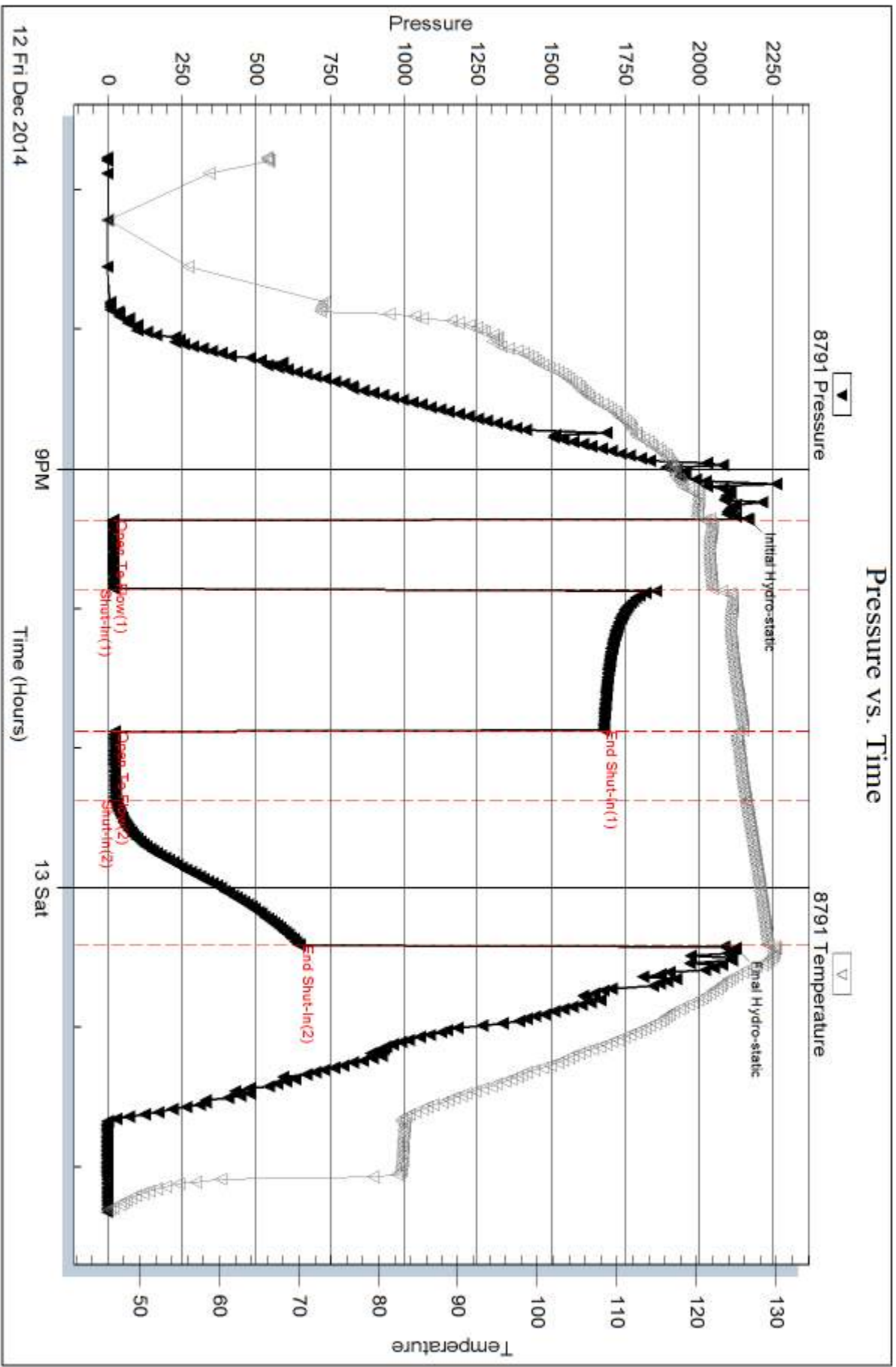
Num Gas Bombs: 0

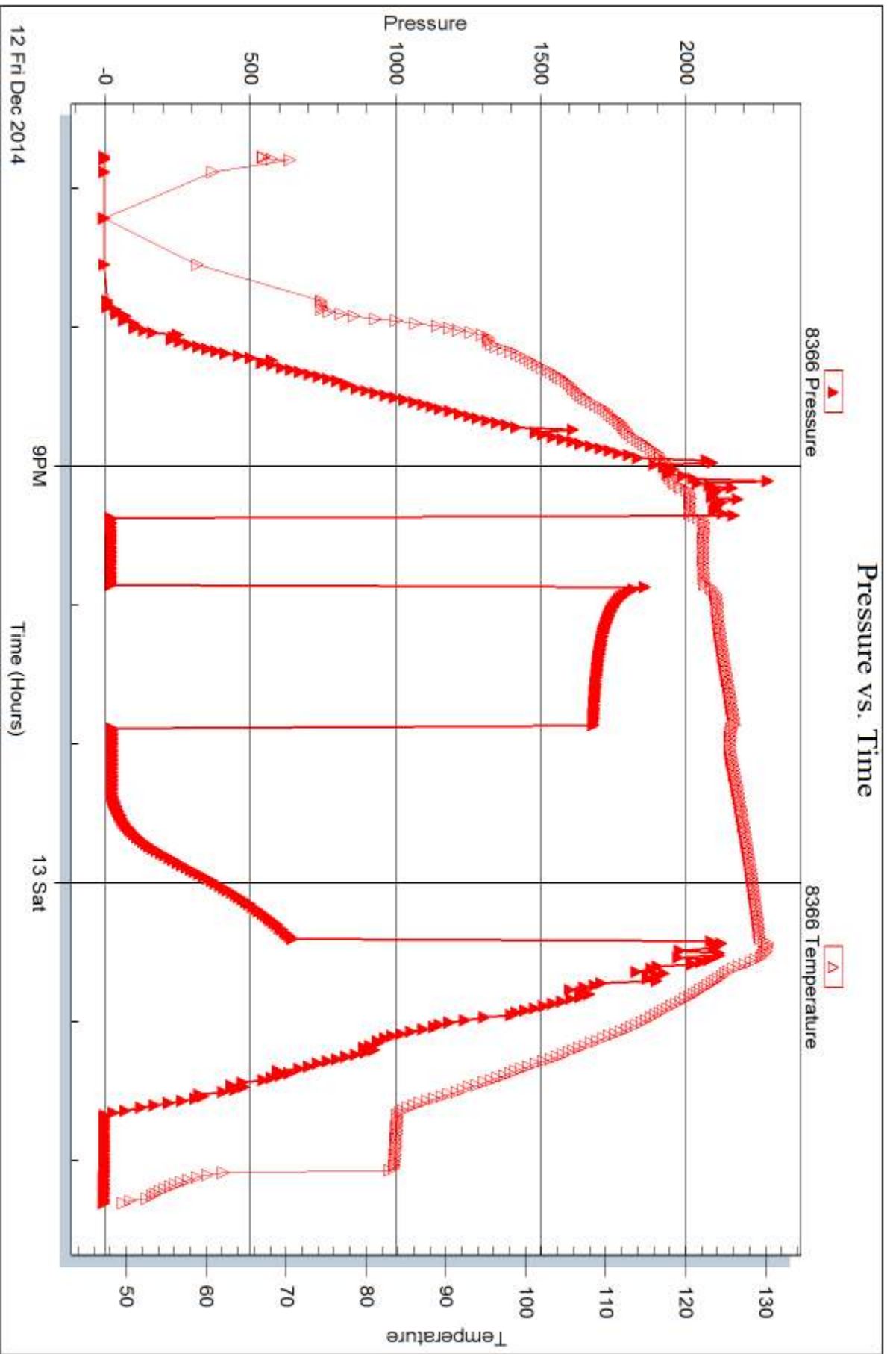
Serial #:

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: Chuck Schmaltz

Sowers #1-19

19-1s-37w Cheyenne KS

Start Date: 2014.12.13 @ 16:40:00

End Date: 2014.12.14 @ 00:24:00

Job Ticket #: 60835 DST #: 3

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

Printed: 2014.12.17 @ 14:19:27



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60835

DST#: 3

ATTN: Chuck Schmaltz

Test Start: 2014.12.13 @ 16:40:00

GENERAL INFORMATION:

Formation: **LKC "H - J"**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 19:13:45
 Tester: James Winder
 Time Test Ended: 00:24:00
 Unit No: 83
Interval: 4290.00 ft (KB) To 4390.00 ft (KB) (TVD)
 Reference Elevations: 3210.00 ft (KB)
 Total Depth: 4390.00 ft (KB) (TVD)
 3199.00 ft (CF)
 Hole Diameter: 7.88 inches
 Hole Condition: Fair
 KB to GR/CF: 11.00 ft

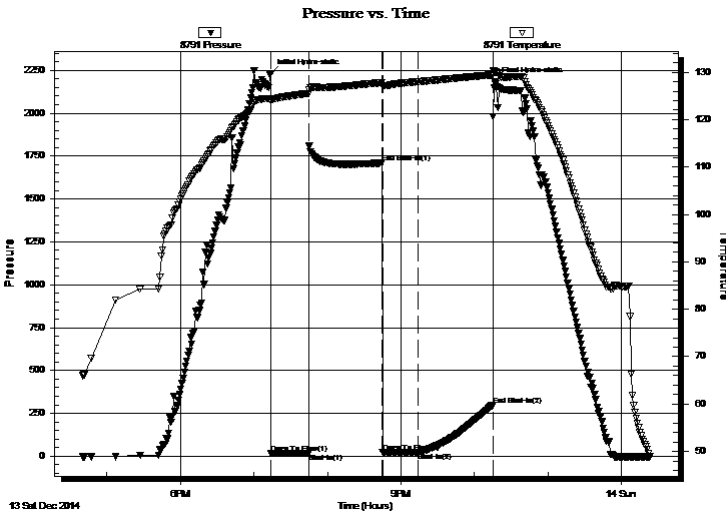
Serial #: 8791

Inside

Press@RunDepth: 24.56 psig @ 4291.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.12.13 End Date: 2014.12.14 Last Calib.: 2014.12.14
 Start Time: 16:40:05 End Time: 00:23:59 Time On Btm: 2014.12.13 @ 19:13:30
 Time Off Btm: 2014.12.13 @ 22:16:45

TEST COMMENT: 30 - IF: Blow built to 1/4", died back, dead at 18 min.
 60 - IS!: No blow
 30 - FF: No blow
 60 - FS!: No blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2231.33	124.49	Initial Hydro-static
1	15.74	123.98	Open To Flow (1)
32	18.32	125.53	Shut-In(1)
91	1709.49	127.80	End Shut-In(1)
92	21.56	126.94	Open To Flow (2)
121	24.56	128.00	Shut-In(2)
182	298.95	129.46	End Shut-In(2)
184	2181.27	130.06	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.07

* Recovery from multiple tests

Gas Rates

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



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DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60835

DST#: 3

ATTN: Chuck Schmaltz

Test Start: 2014.12.13 @ 16:40:00

GENERAL INFORMATION:

Formation: **LKC "H - J"**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:13:45

Time Test Ended: 00:24:00

Test Type: Conventional Bottom Hole (Reset)

Tester: James Winder

Unit No: 83

Interval: 4290.00 ft (KB) To 4390.00 ft (KB) (TVD)

Reference Elevations: 3210.00 ft (KB)

Total Depth: 4390.00 ft (KB) (TVD)

3199.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 11.00 ft

Serial #: 8366 Outside

Press@RunDepth: psig @ 4291.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2014.12.13

End Date:

2014.12.14

Last Calib.:

2014.12.14

Start Time: 16:40:05

End Time:

00:24:44

Time On Btm:

Time Off Btm:

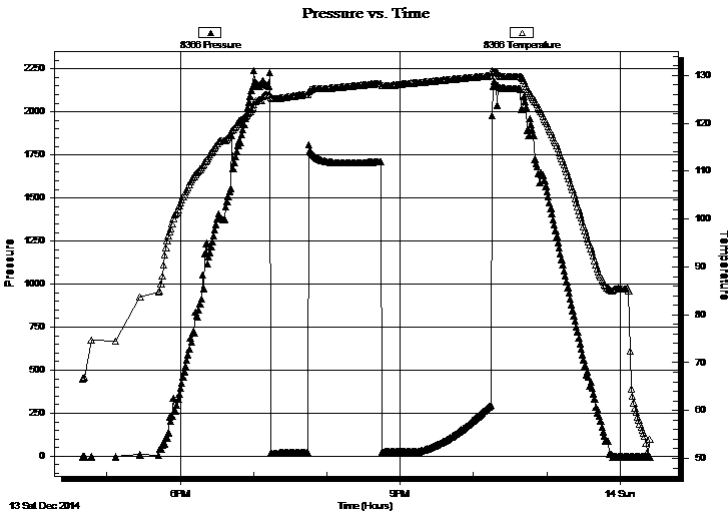
TEST COMMENT: 30 - IF: Blow built to 1/4", died back, dead at 18 min.

60 - IS: No blow

30 - FF: No blow

60 - FS: No blow

PRESSURE SUMMARY



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

Recovery

Length (ft)	Description	Volume (bbl)
15.00	Mud 100%	0.07

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60835

DST#: 3

ATTN: Chuck Schmaltz

Test Start: 2014.12.13 @ 16:40:00

Tool Information

Drill Pipe:	Length: 4110.00 ft	Diameter: 3.80 inches	Volume: 57.65 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: 185.00 ft	Diameter: 2.25 inches	Volume: 0.91 bbl	Weight to Pull Loose: 72000.00 lb
			<u>Total Volume: 58.56 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	33.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4290.00 ft			Final 65000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	100.00 ft			
Tool Length:	128.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments: Same as last test - w hile pulling slips after turning tool at end of IF the driller pulled up too far and closed tool (I tried to w ave him off but it w as too late) - tool reopened as soon as he sat back dow n

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Shut In Tool	5.00			4267.00	
Hydraulic tool	5.00			4272.00	
Jars	5.00			4277.00	
Safety Joint	3.00			4280.00	
Packer	5.00			4285.00	28.00 Bottom Of Top Packer
Packer	5.00			4290.00	
Stubb	1.00			4291.00	
Recorder	0.00	8791	Inside	4291.00	
Recorder	0.00	8366	Outside	4291.00	
Perforations	31.00			4322.00	
Blank Spacing	65.00			4387.00	
Bullnose	3.00			4390.00	100.00 Bottom Packers & Anchor

Total Tool Length: 128.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60835

DST#: 3

ATTN: Chuck Schmaltz

Test Start: 2014.12.13 @ 16:40:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 60.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.57 in³

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 100%	0.074

Total Length: 15.00 ft Total Volume: 0.074 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

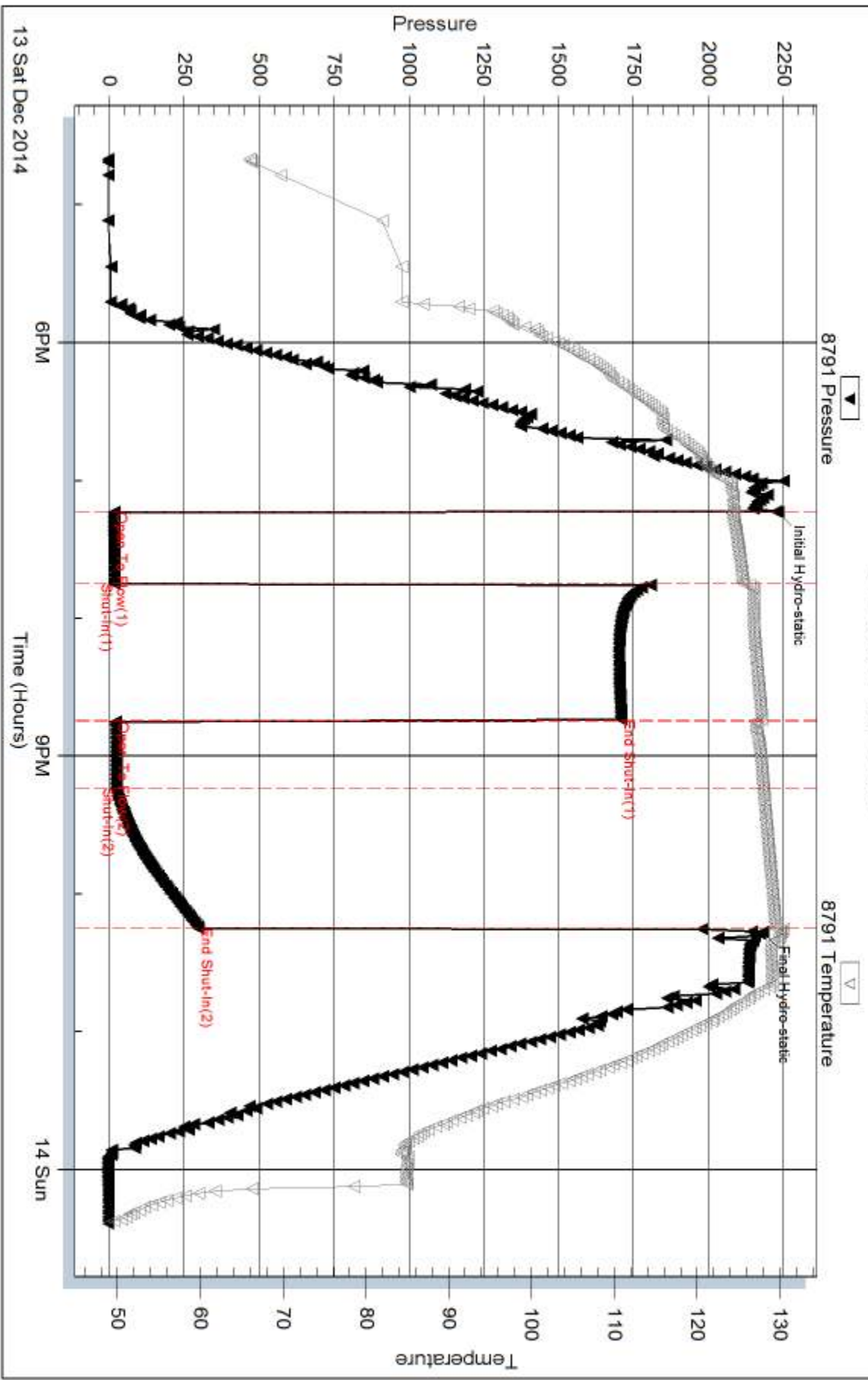
Serial #:

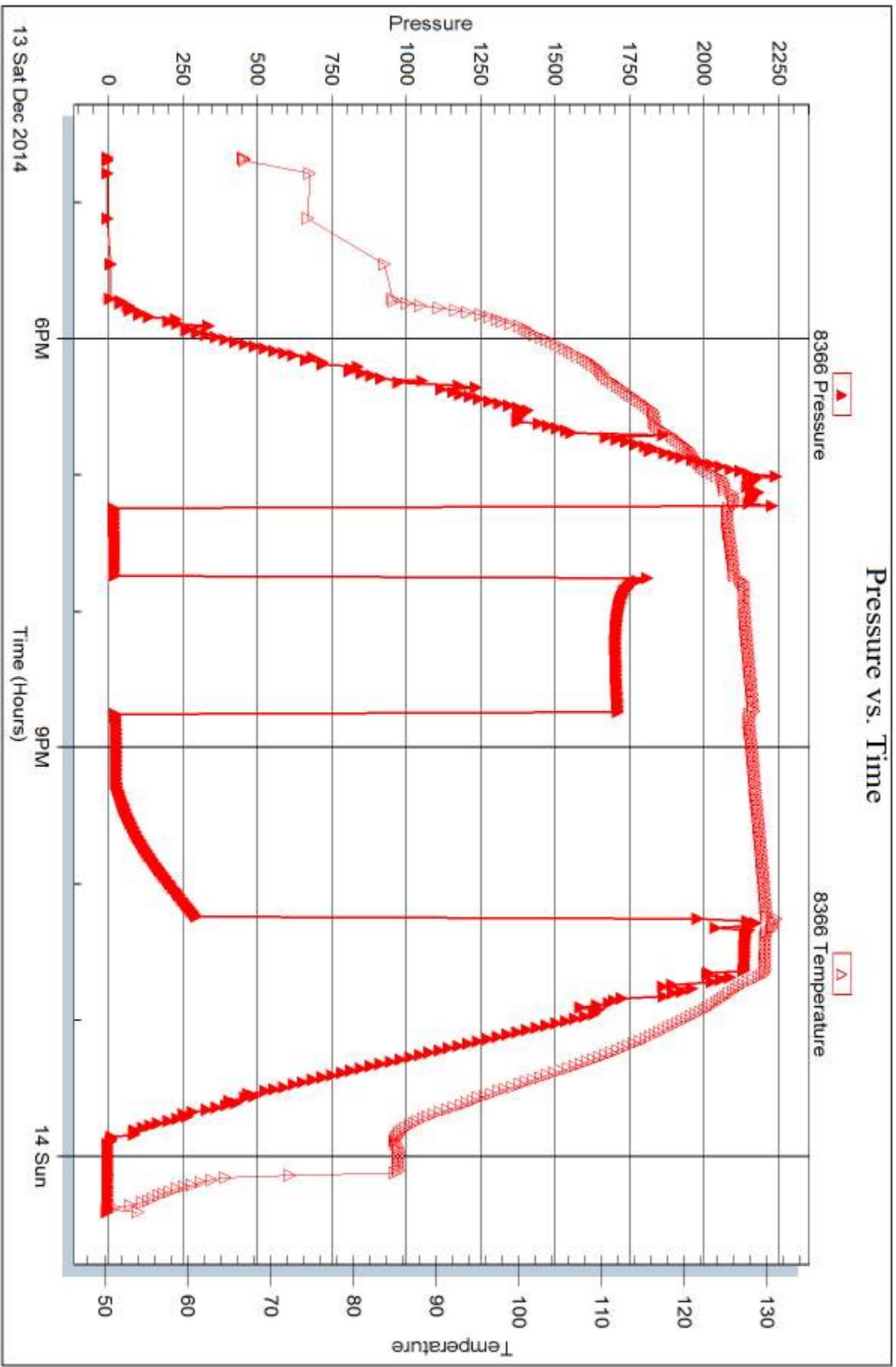
Laboratory Name:

Laboratory Location:

Recovery Comments:

Pressure vs. Time







DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita, KS 67202

ATTN: Chuck Schmaltz

Sowers #1-19

19-1s-37w Cheyenne KS

Start Date: 2014.12.14 @ 19:11:00

End Date: 2014.12.15 @ 04:11:30

Job Ticket #: 60836 DST #: 4

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

Printed: 2014.12.17 @ 14:18:51



**TRILOBITE
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DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60836

DST#: 4

ATTN: Chuck Schmaltz

Test Start: 2014.12.14 @ 19:11:00

GENERAL INFORMATION:

Formation: **Upper Pawnee**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 21:25:30

Time Test Ended: 04:11:30

Test Type: Conventional Bottom Hole (Reset)

Tester: James Winder

Unit No: 83

Interval: 4544.00 ft (KB) To 4575.00 ft (KB) (TVD)

Reference Elevations: 3210.00 ft (KB)

Total Depth: 4575.00 ft (KB) (TVD)

3199.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 11.00 ft

Serial #: 8791

Inside

Press@RunDepth: 87.49 psig @ 4545.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2014.12.14

End Date:

2014.12.15

Last Calib.:

2014.12.15

Start Time: 19:11:05

End Time:

04:11:30

Time On Btm:

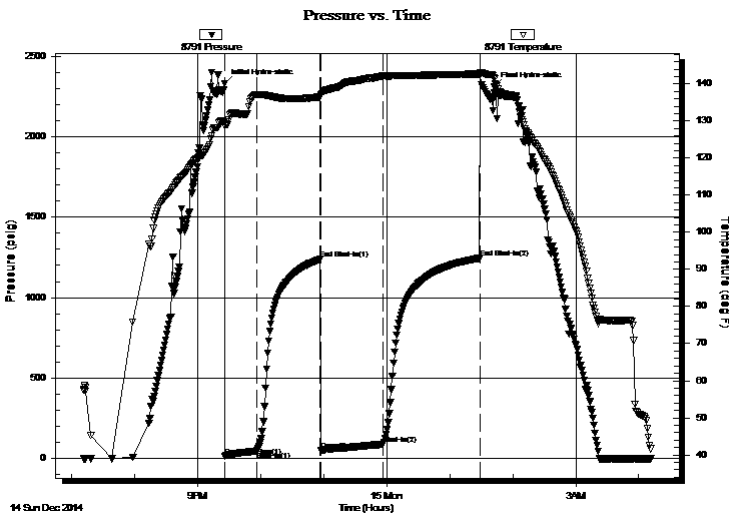
2014.12.14 @ 21:25:15

Time Off Btm:

2014.12.15 @ 01:42:30

TEST COMMENT: 30 - IF: Blow built to 4"
60 - IS: No blow back
60 - FF: Blow started at 7 min., built to 4"
90 - FS: No blow back

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2329.43	129.80	Initial Hydro-static
1	14.89	128.59	Open To Flow (1)
31	45.33	137.17	Shut-In(1)
91	1238.04	136.45	End Shut-In(1)
93	50.26	137.02	Open To Flow (2)
151	87.49	142.16	Shut-In(2)
244	1245.04	142.70	End Shut-In(2)
258	2310.78	141.38	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
62.00	SO/WCM 63% _m , 27% _w , 6% _g , 4% _o	0.30
60.00	OCM 67% _m , 26% _o , 7% _g	0.30
40.00	SMCO 94% _o , 4% _m , 2% _g	0.20
0.00	GIP = 20'+	0.00

Gas Rates

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

* Recovery from multiple tests



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60836

DST#: 4

ATTN: Chuck Schmaltz

Test Start: 2014.12.14 @ 19:11:00

GENERAL INFORMATION:

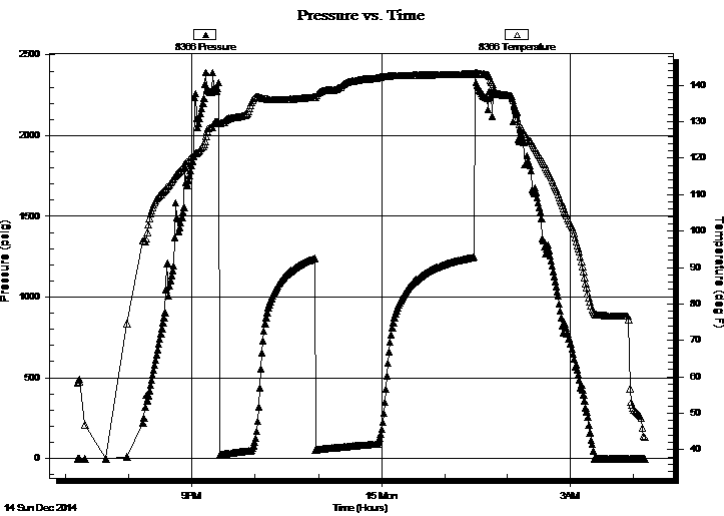
Formation: **Upper Pawnee**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 21:25:30
 Time Test Ended: 04:11:30
 Interval: **4544.00 ft (KB) To 4575.00 ft (KB) (TVD)**
 Total Depth: 4575.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: James Winder
 Unit No: 83
 Reference Elevations: 3210.00 ft (KB)
 3199.00 ft (CF)
 KB to GR/CF: 11.00 ft

Serial #: 8366

Outside

Press@RunDepth: psig @ 4545.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.12.14 End Date: 2014.12.15 Last Calib.: 2014.12.15
 Start Time: 19:11:05 End Time: 04:10:45 Time On Btm:
 Time Off Btm:

TEST COMMENT: 30 - IF: Blow built to 4"
 60 - ISI: No blow back
 60 - FF: Blow started at 7 min., built to 4"
 90 - FSI: No blow back



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
62.00	SO/WCM 63% _m , 27% _w , 6% _g , 4% _o	0.30
60.00	OCM 67% _m , 26% _o , 7% _g	0.30
40.00	SMCO 94% _o , 4% _m , 2% _g	0.20
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.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60836

DST#: 4

ATTN: Chuck Schmaltz

Test Start: 2014.12.14 @ 19:11:00

Tool Information

Drill Pipe:	Length: 4361.00 ft	Diameter: 3.80 inches	Volume: 61.17 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: 185.00 ft	Diameter: 2.25 inches	Volume: 0.91 bbl	Weight to Pull Loose: 68000.00 lb
			<u>Total Volume: 62.08 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	30.00 ft			String Weight: Initial 66000.00 lb
Depth to Top Packer:	4544.00 ft			Final 66000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	31.00 ft			
Tool Length:	59.00 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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Shut In Tool	5.00			4521.00	
Hydraulic tool	5.00			4526.00	
Jars	5.00			4531.00	
Safety Joint	3.00			4534.00	
Packer	5.00			4539.00	28.00 Bottom Of Top Packer
Packer	5.00			4544.00	
Stubb	1.00			4545.00	
Recorder	0.00	8791	Inside	4545.00	
Recorder	0.00	8366	Outside	4545.00	
Perforations	27.00			4572.00	
Bullnose	3.00			4575.00	31.00 Bottom Packers & Anchor

Total Tool Length: 59.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co., Inc.

19-1s-37w Cheyenne KS

250 N. Water STE 300
Wichita, KS 67202

Sowers #1-19

Job Ticket: 60836

DST#: 4

ATTN: Chuck Schmaltz

Test Start: 2014.12.14 @ 19:11:00

Mud and Cushion Information

Mud Type: Gel Chem
Mud Weight: 9.00 lb/gal
Viscosity: 50.00 sec/qt
Water Loss: 7.59 in³
Resistivity: ohm.m
Salinity: 700.00 ppm
Filter Cake: 2.00 inches

Cushion Type:
Cushion Length: ft
Cushion Volume: bbl
Gas Cushion Type:
Gas Cushion Pressure: psig

Oil API: 35.4 deg API
Water Salinity: 44000 ppm

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
62.00	SO/WCM 63%m, 27%w, 6%g, 4%o	0.305
60.00	OCM 67%m, 26%o, 7%g	0.295
40.00	SMCO 94%o, 4%m, 2%g	0.197
0.00	GIP = 20'+	0.000

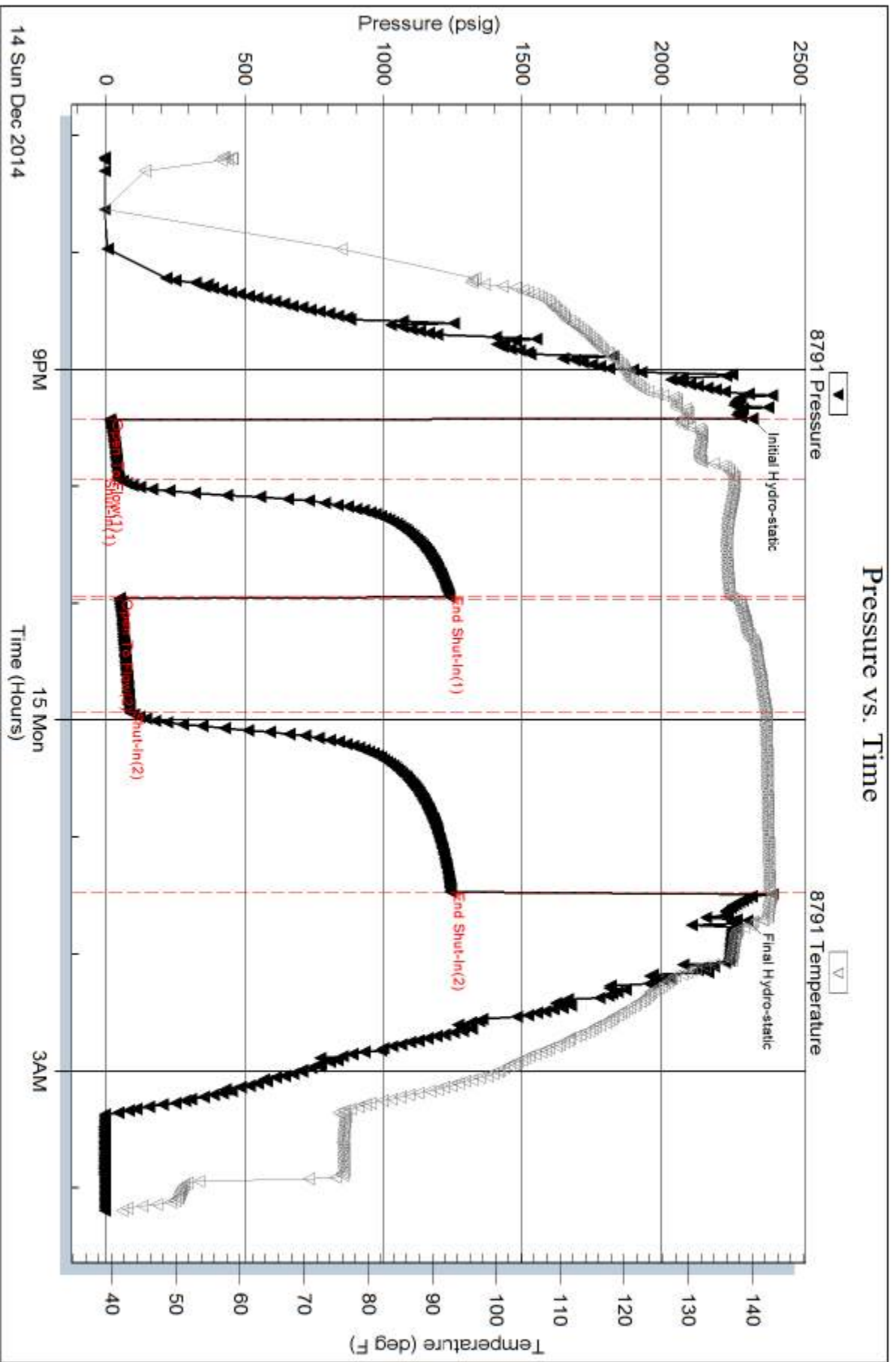
Total Length: 162.00 ft Total Volume: 0.797 bbl

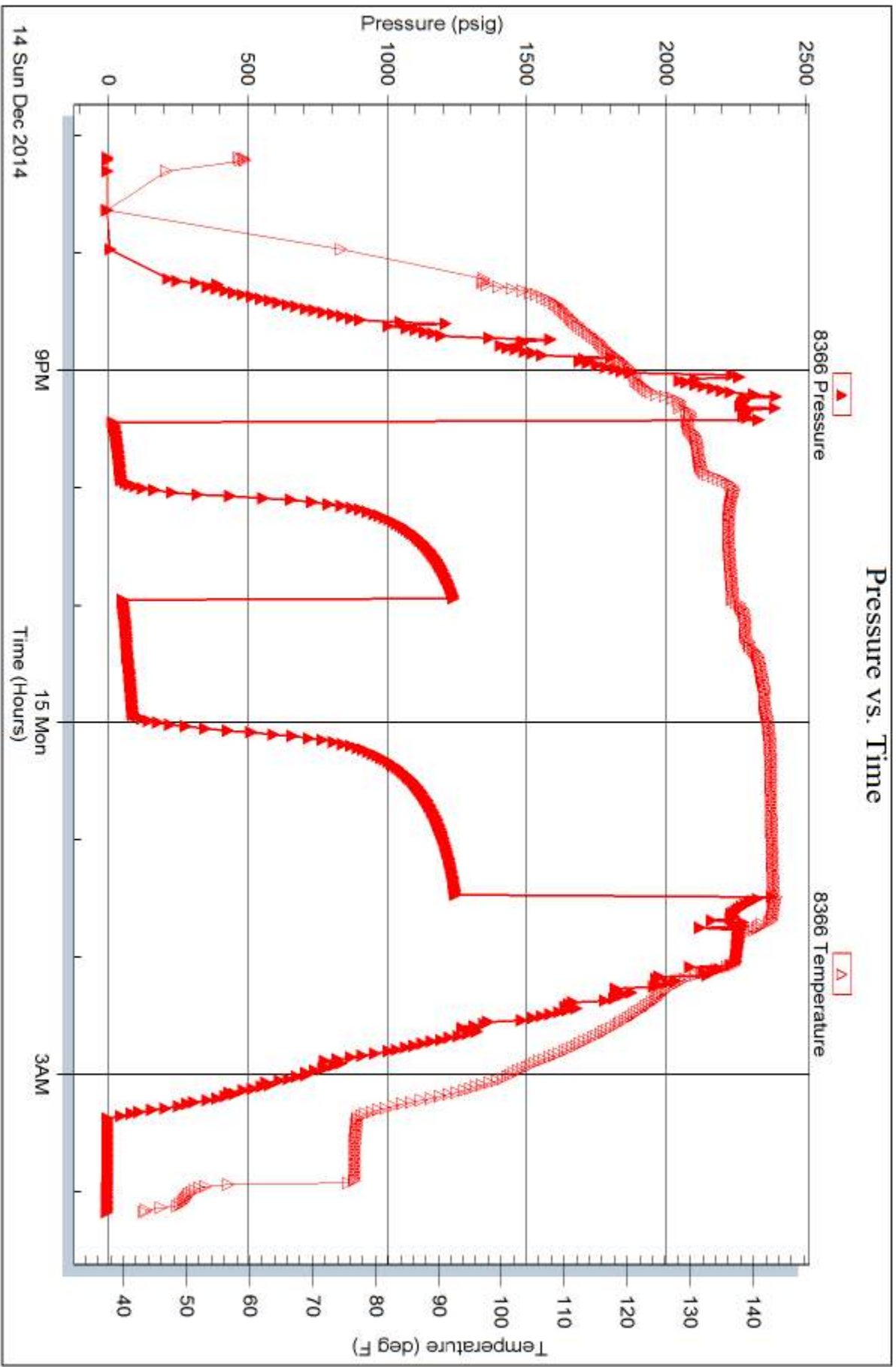
Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:

Laboratory Name: Laboratory Location:

Recovery Comments: Gravity = 33 api @ 36 deg F Corrected Gravity = 35.4 api
RW = .334 ohms @ 34.8 deg F Chlorides = 44,000 ppm

Pressure vs. Time







TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **60833**

Well Name & No. Sowers #1-19 Test No. 1 Date 12-12-14
 Company Murfin Drilling Co. Inc Elevation 3210 KB 3199 GL
 Address 250 N. Water STE 300 Wichita, KS 67202
 Co. Rep / Geo. Chuck ~~22010~~ Schmaltz Rig Murfin #20
 Location: Sec. 19 Twp. 1s Rge. 37w Co. Cheyenne State KS

Interval Tested 4112 - 4236 Zone Tested Lans "A-D"
 Anchor Length 124 Drill Pipe Run 3922 Mud Wt. 9.2
 Top Packer Depth 4107 Drill Collars Run 185 Vis 52
 Bottom Packer Depth 4112 Wt. Pipe Run - WL 6.8
 Total Depth 4236 Chlorides 500 ppm System LCM 4

Blow Description IF: Blow built to 9 1/4"
ISI: No blowback
FF: Blow started at 1 1/2 min., built to BOB (11") at ⁵³ min.
FSI: No blowback

Rec	Feet of	%gas	%oil	%water	%mud
<u>242</u>	<u>00cm</u>	<u>2</u>	<u>6</u>	<u>-</u>	<u>92</u>
<u>123</u>	<u>0wcm</u>	<u>4</u>	<u>4</u>	<u>11</u>	<u>81</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 365 BHT 132 Gravity _____ API RW _____ @ _____ °F Chlorides _____ ppm
 (A) Initial Hydrostatic 2100 Test 1250 T-On Location 23:35 12/11
 (B) First Initial Flow 28 Jars 250 T-Started 00:30
 (C) First Final Flow 115 Safety Joint 75 T-Open 2:59
 (D) Initial Shut-In 1154 Circ Sub _____ T-Pulled 7:04
 (E) Second Initial Flow 109 Hourly Standby _____ T-Out 9:10
 (F) Second Final Flow 184 Mileage 152 RT 235.60 Comments _____
 (G) Final Shut-In 1106 Sampler _____
 (H) Final Hydrostatic 1947 Straddle _____

Initial Open 30 Ruined Shale Packer _____
 Initial Shut-In 60 Ruined Packer 320
 Final Flow 60 Extra Copies _____
 Final Shut-In 90 Extra Recorder _____ Sub Total 320
 Day Standby _____ Total 2130.60
 Accessibility _____ MP/DST Disc't _____
 Sub Total 1810.60

Approved By *C. Schmaltz* Our Representative *James Winder*

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. **60834**

4/10

Well Name & No. Sowers #1-19 Test No. 2 Date 12-12-14
 Company Murfin Drilling Co. Inc. Elevation 3210 KB 3199 GL
 Address 250 N. Water STE 300 Wichita, KS 67202
 Co. Rep / Geo. Chuck Schmaltz Rig Murfin #20
 Location: Sec. 19 Twp. 1s Rge. 37w Co. Cheyenne State KS

Interval Tested 4244 - 4296 Zone Tested Lans. "6"
 Anchor Length 52 Drill Pipe Run 4046 Mud Wt. 9.5
 Top Packer Depth 4239 Drill Collars Run 185 Vis 52
 Bottom Packer Depth 4244 (shale) Wt. Pipe Run - WL 8.0
 Total Depth 4296 Chlorides 700 ppm System LCM 4
 Blow Description IF: Blow built to 1/2", died back, dead at 27 min.
ISI: No blowback
FF: No blow
FSI: No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>30</u>	<u>Mud w/trace of oil</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 30 BHT 129 Gravity _____ API RW _____ @ _____ °F Chlorides _____ ppm
 (A) Initial Hydrostatic 2167 Test 1250 T-On Location 18:10 ^{12/12}
 (B) First Initial Flow 17 Jars 250 T-Started 18:46
 (C) First Final Flow 20 Safety Joint 75 T-Open 21:21
 (D) Initial Shut-In 1678 (lost packer seat) Circ Sub _____ T-Pulled 00:24
 (E) Second Initial Flow 22 Hourly Standby _____ T-Out 2:15 ^{12/13}
 (F) Second Final Flow 24 Mileage 152 RT 235.60 Comments _____
 (G) Final Shut-In 647 Sampler _____
 (H) Final Hydrostatic 2123 Straddle _____ Ruined Shale Packer _____
 Shale Packer 250 Ruined Packer _____
 Extra Packer _____ Extra Copies _____
 Initial Open 30 Extra Recorder _____ Sub Total 0
 Initial Shut-In 60 Day Standby _____ Total 2060.60
 Final Flow 30 Accessibility _____ MP/DST Disc't _____
 Final Shut-In 60 _____
 Sub Total 2060.60

Approved By [Signature] Our Representative James Windley
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **60835**

4/10

Well Name & No. Sowers #1-19 Test No. 3 Date 12-13-14
 Company Murfin Drilling Co. Inc Elevation 3210 KB 3199 GL
 Address 250 N. Water STE 300 Wichita, KS 67202
 Co. Rep / Geo. Chuck ~~Q. A. A.~~ Schmaltz Rig Murfin #20
 Location: Sec. 19 Twp. 15 Rge. 37w Co. Cheyenne State KS

Interval Tested 4290 - 4390 Zone Tested Lans. "H-J"
 Anchor Length 100 Drill Pipe Run 4110 Mud Wt. 9.2
 Top Packer Depth 4285 Drill Collars Run 185 Vis 60
 Bottom Packer Depth 4290 Wt. Pipe Run - WL 7.6
 Total Depth 4390 Chlorides 600 ppm System LCM 4

Blow Description IF: Blow built to 1/4", died back, dead at 18 min.
ISI: No blow

FF: No blow

FSI: No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>15</u>	<u>mud</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 15 BHT 129 Gravity _____ API RW _____ @ _____ °F Chlorides _____ ppm

(A) Initial Hydrostatic 2231 Test 1250 T-On Location 15:45 12/13

(B) First Initial Flow 16 Jars 250 T-Started 16:40

(C) First Final Flow 18 Safety Joint 75 T-Open 19:13

(D) Initial Shut-In 1709 ^{Towl pulled too far} Circ Sub _____ T-Pulled 22:15

(E) Second Initial Flow 22 Hourly Standby _____ T-Out 00:20 12/14

(F) Second Final Flow 25 Mileage 152 RT 235.60 Comments _____

(G) Final Shut-In 299 Sampler _____

(H) Final Hydrostatic 2181 Straddle _____ Ruined Shale Packer _____

Shale Packer _____ Ruined Packer _____

Initial Open 30 Extra Packer _____ Extra Copies _____

Initial Shut-In 60 Extra Recorder _____ Sub Total 0

Final Flow 30 Day Standby _____ Total 1810.60

Final Shut-In 60 Accessibility _____ MP/DST Disc't _____

Sub Total 1810.60

Approved By [Signature] Our Representative James Winkler

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **60836**

4/10

Well Name & No. Sowers #1-19 Test No. 4 Date 12-14-14
 Company Murfin Drilling Co. Inc Elevation 3210 KB 3199 GL
 Address 250 N. Water STE 300 Wichita, KS 67202
 Co. Rep / Geo. Chuck Schmalz Rig Murfin #20
 Location: Sec. 19 Twp. 1S Rge. 37W Co. Cheyenne State KS

Interval Tested 4544-4575 Zone Tested Upper Pawnee
 Anchor Length 31 Drill Pipe Run 4361 Mud Wt. 9.0
 Top Packer Depth 4539 Drill Collars Run 185 Vis 50
 Bottom Packer Depth 4544 Wt. Pipe Run - WL 7.6
 Total Depth 4575 Chlorides 700 ppm System LCM 3

Blow Description IF: Blow built to 4"
ISI: No blowback
FF: Blow started at 7min., built to 4"
FSI: No blowback

Rec	Feet of	%gas	%oil	%water	%mud
<u>40</u>	<u>SMCO</u>	<u>2</u>	<u>94</u>	<u>-</u>	<u>4</u>
<u>60</u>	<u>OCM</u>	<u>7</u>	<u>26</u>	<u>-</u>	<u>67</u>
<u>62</u>	<u>SO/WCM</u>	<u>6</u>	<u>4</u>	<u>27</u>	<u>63</u>
<u> </u>	<u>GIP=20'</u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Rec Total 162 BHT 143 Gravity 35.4 API RW .334 @ 34.8 °F Chlorides 44,000 ppm

(A) Initial Hydrostatic 2329 Test 1250 T-On Location 18:55 12/14
 (B) First Initial Flow 15 Jars 250 T-Started 19:11
 (C) First Final Flow 45 Safety Joint 75 T-Open 21:25
 (D) Initial Shut-In 1238 Circ Sub T-Pulled 1:28
 (E) Second Initial Flow 50 Hourly Standby T-Out 4:05 12/15
 (F) Second Final Flow 87 Mileage 152RT X2 235.60 Comments
 (G) Final Shut-In 1245 Sampler 235.60
 (H) Final Hydrostatic 2311 Straddle Ruined Shale Packer
 Shale Packer Ruined Packer
 Extra Packer Extra Copies
 Extra Recorder Sub Total 0
 Day Standby Total 2046.20
 Accessibility MP/DST Disc't

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90
 Sub Total 2046.20

Approved By [Signature] Our Representative James Winder

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