



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N Water STE 300
Wichita KS 67202-1216

ATTN: Bo Bein, Robert Hend

Popp #1-14

14-9s-26w Sheridan,KS

Start Date: 2018.04.15 @ 00:05:31

End Date: 2018.04.15 @ 07:46:55

Job Ticket #: 63862 DST #: 1

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

Printed: 2018.04.18 @ 14:44:13



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63862

DST#: 1

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.15 @ 00:05:31

GENERAL INFORMATION:

Formation: **Toronto - LKC A**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 01:58:11

Time Test Ended: 07:46:55

Test Type: Conventional Bottom Hole (Initial)

Tester: Ray Schwager, Cade

Unit No: 77

Interval: 3811.00 ft (KB) To 3870.00 ft (KB) (TVD)

Reference Elevations: 2602.00 ft (KB)

Total Depth: 3870.00 ft (KB) (TVD)

2597.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

Serial #: 8360

Inside

Press@RunDepth: 71.69 psig @ 3814.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.04.15

End Date:

2018.04.15

Last Calib.:

2018.04.15

Start Time: 00:05:31

End Time:

07:46:55

Time On Btm:

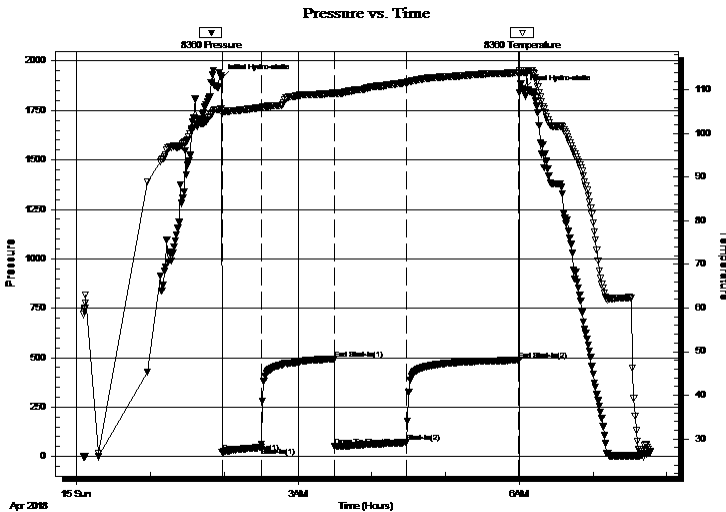
2018.04.15 @ 01:57:41

Time Off Btm:

2018.04.15 @ 06:03:10

TEST COMMENT: 30--IFP-w k thru-out 1/2" to 2" blow
60-ISIP-no blow
60-FFP-surface to 1/2" blow
90-FSIP-no blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1913.61	105.66	Initial Hydro-static
1	21.17	104.57	Open To Flow (1)
33	45.59	105.98	Shut-In(1)
92	493.27	109.26	End Shut-In(1)
93	51.63	109.08	Open To Flow (2)
151	71.69	111.71	Shut-In(2)
242	487.02	113.99	End Shut-In(2)
246	1857.08	114.03	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
110.00	WM 30%W70%M w /show of oil	1.27

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63862

DST#: 1

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.15 @ 00:05:31

Tool Information

Drill Pipe:	Length: 3767.00 ft	Diameter: 3.80 inches	Volume: 52.84 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.70 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 45000.00 lb
			<u>Total Volume: 52.99 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	15.00 ft			String Weight: Initial 37000.00 lb
Depth to Top Packer:	3811.00 ft			Final 37000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	59.00 ft			
Tool Length:	88.00 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			3783.00	
Shut In Tool	5.00			3788.00	
Hydraulic tool	5.00			3793.00	
Jars	5.00			3798.00	
Safety Joint	3.00			3801.00	
Packer	5.00			3806.00	29.00 Bottom Of Top Packer
Packer	5.00			3811.00	
Stubb	1.00			3812.00	
Perforations	2.00			3814.00	
Recorder	0.00	8360	Inside	3814.00	
Recorder	0.00	8673	Outside	3814.00	
Blank Spacing	33.00			3847.00	
Perforations	20.00			3867.00	
Bullnose	3.00			3870.00	59.00 Bottom Packers & Anchor

Total Tool Length: 88.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63862

DST#: 1

ATTN: Bo Bein,Robert Hend

Test Start: 2018.04.15 @ 00:05:31

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:

32000 ppm

Viscosity: 54.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.14 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1200.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
110.00	WM 30%W70%M w/show of oil	1.270

Total Length: 110.00 ft Total Volume: 1.270 bbl

Num Fluid Samples: 0

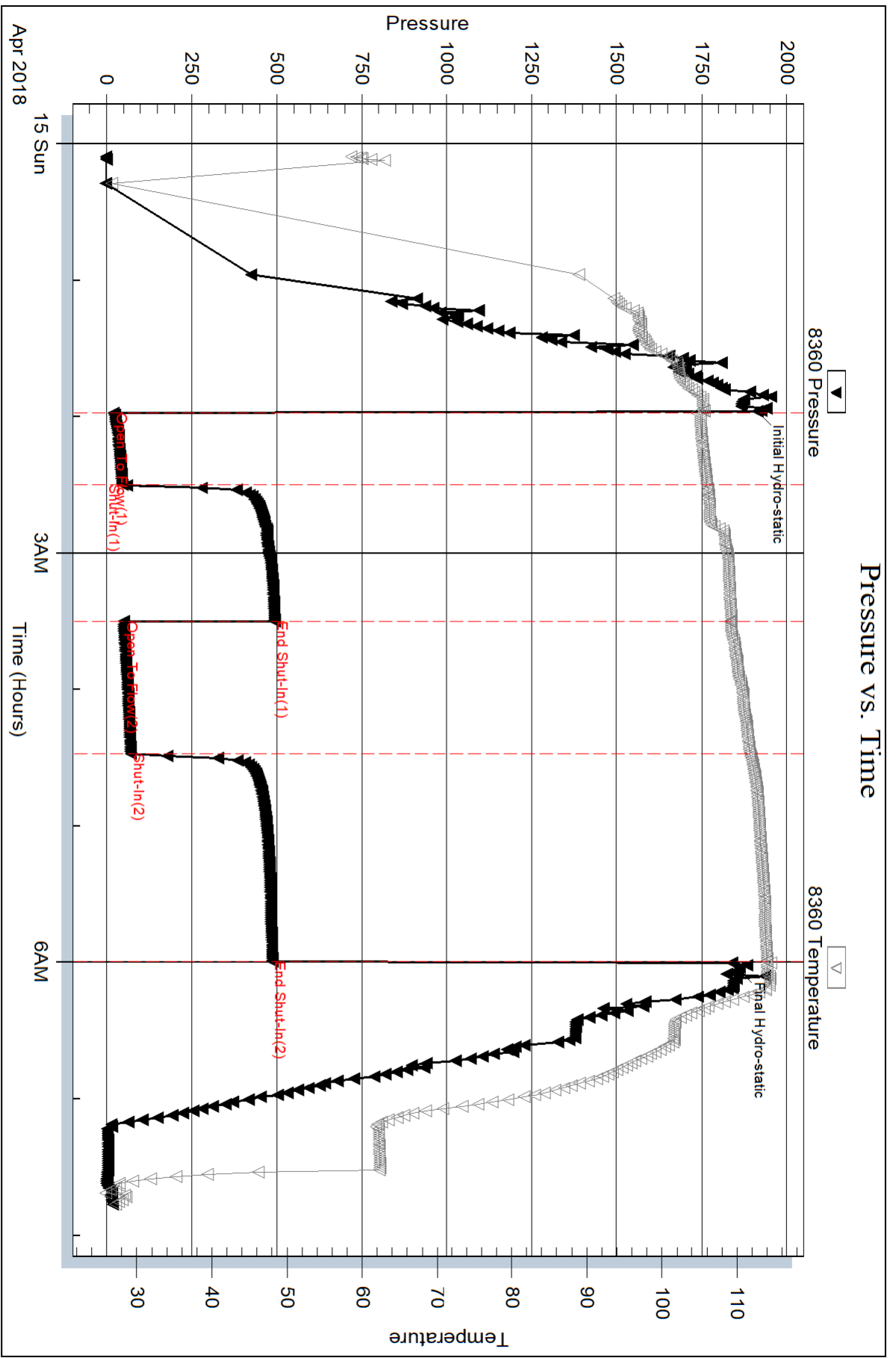
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW .35 @ 45F

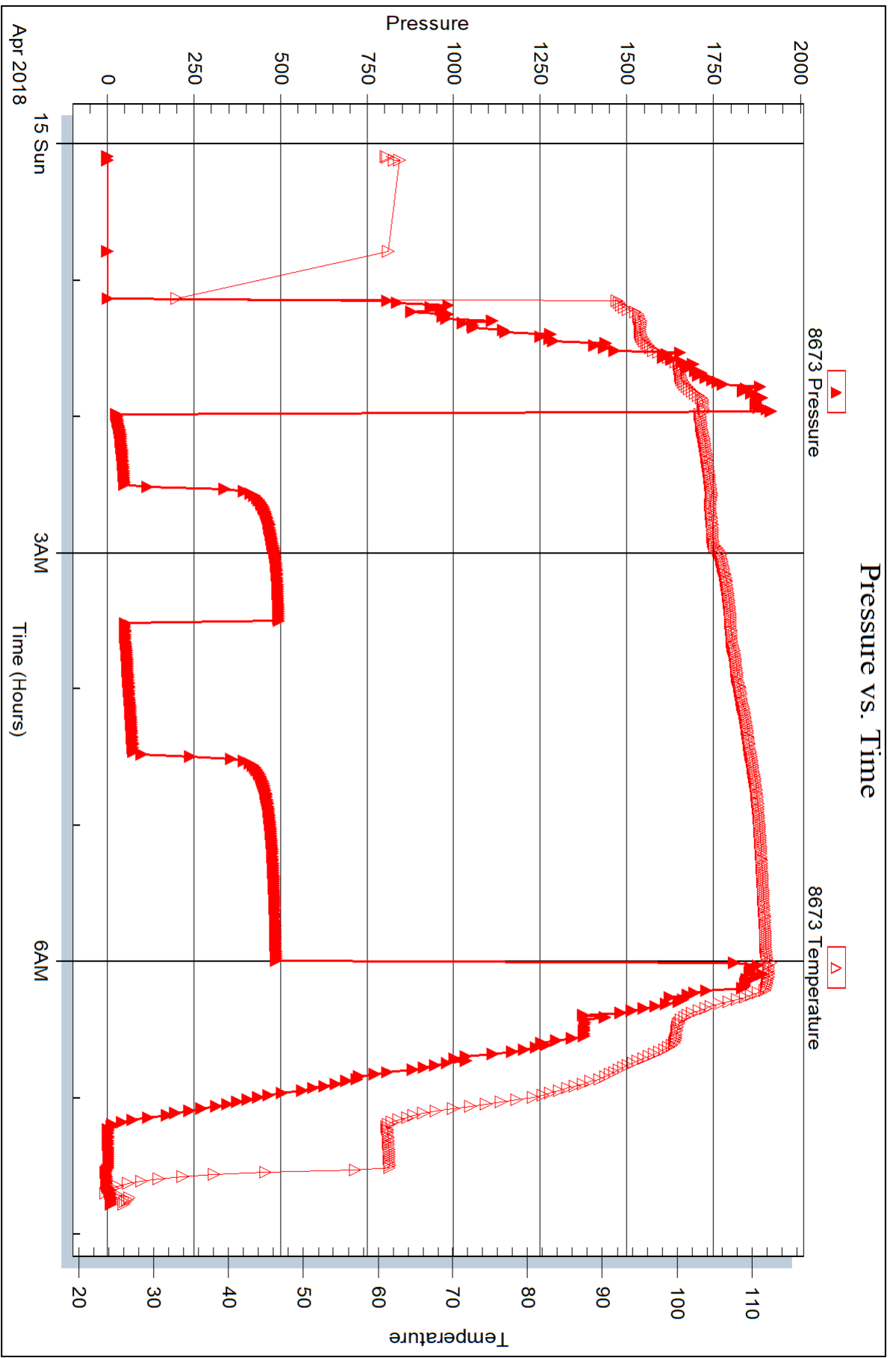


Serial #: 8673

Outside Murfin Drilling Co Inc

Popp #1-14

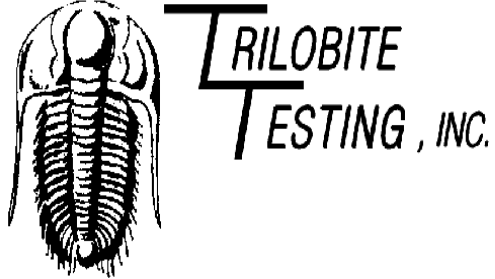
DST Test Number: 1



Trilobite Testing, Inc

Ref. No: 63862

Printed: 2018.04.18 @ 14:44:14



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N Water STE 300
Wichita KS 67202-1216

ATTN: Bo Bein, Robert Hend

Popp #1-14

14-9s-26w Sheridan,KS

Start Date: 2018.04.15 @ 17:25:27

End Date: 2018.04.16 @ 01:15:06

Job Ticket #: 63863 DST #: 2

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

Printed: 2018.04.18 @ 14:43:51



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63863

DST#: 2

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.15 @ 17:25:27

GENERAL INFORMATION:

Formation: **LKC B-D**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:33:37

Time Test Ended: 01:15:06

Test Type: Conventional Bottom Hole (Reset)

Tester: Ray Schwager, Cade

Unit No: 77

Interval: 3866.00 ft (KB) To 3914.00 ft (KB) (TVD)

Reference Elevations: 2602.00 ft (KB)

Total Depth: 3914.00 ft (KB) (TVD)

2597.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

Serial #: 8360

Inside

Press@RunDepth: 169.92 psig @ 3868.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.04.15

End Date:

2018.04.16

Last Calib.:

2018.04.15

Start Time:

17:25:27

End Time:

01:15:06

Time On Btm:

2018.04.15 @ 19:30:07

Time Off Btm:

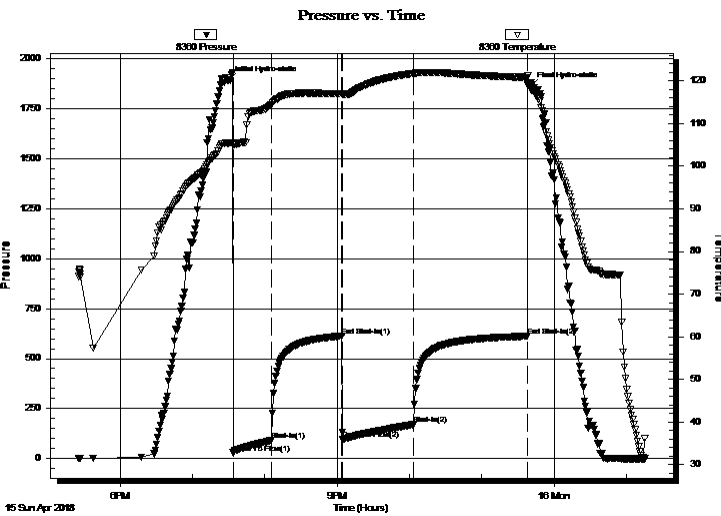
2018.04.15 @ 23:40:06

TEST COMMENT: 30-IFP-weak to BOB in 14 min

60-ISIP-no blow

60-FFP-surface to 4" blow

90-FSIP-no blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1892.84	105.43	Initial Hydro-static
4	28.64	105.11	Open To Flow (1)
36	90.55	114.53	Shut-In(1)
94	612.64	117.04	End Shut-In(1)
95	96.00	116.89	Open To Flow (2)
153	169.92	121.74	Shut-In(2)
248	612.36	120.85	End Shut-In(2)
250	1862.50	119.61	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
315.00	Water	4.15
5.00	CO	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

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63863

DST#: 2

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.15 @ 17:25:27

Tool Information

Drill Pipe:	Length: 3830.00 ft	Diameter: 3.80 inches	Volume: 53.72 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.70 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 55000.00 lb
			<u>Total Volume: 53.87 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	23.00 ft			String Weight: Initial 36000.00 lb
Depth to Top Packer:	3866.00 ft			Final 37000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	48.00 ft			
Tool Length:	77.00 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			3838.00	
Shut In Tool	5.00			3843.00	
Hydraulic tool	5.00			3848.00	
Jars	5.00			3853.00	
Safety Joint	3.00			3856.00	
Packer	5.00			3861.00	29.00 Bottom Of Top Packer
Packer	5.00			3866.00	
Stubb	1.00			3867.00	
Perforations	1.00			3868.00	
Recorder	0.00	8360	Inside	3868.00	
Recorder	0.00	8673	Outside	3868.00	
Blank Spacing	33.00			3901.00	
Perforations	10.00			3911.00	
Bullnose	3.00			3914.00	48.00 Bottom Packers & Anchor

Total Tool Length: 77.00



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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63863

DST#: 2

ATTN: Bo Bein,Robert Hend

Test Start: 2018.04.15 @ 17:25:27

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

29 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

51000 ppm

Viscosity: 58.00 sec/qt

Cushion Volume:

bbf

Water Loss: 7.16 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbf
315.00	Water	4.145
5.00	CO	0.070

Total Length: 320.00 ft Total Volume: 4.215 bbf

Num Fluid Samples: 0

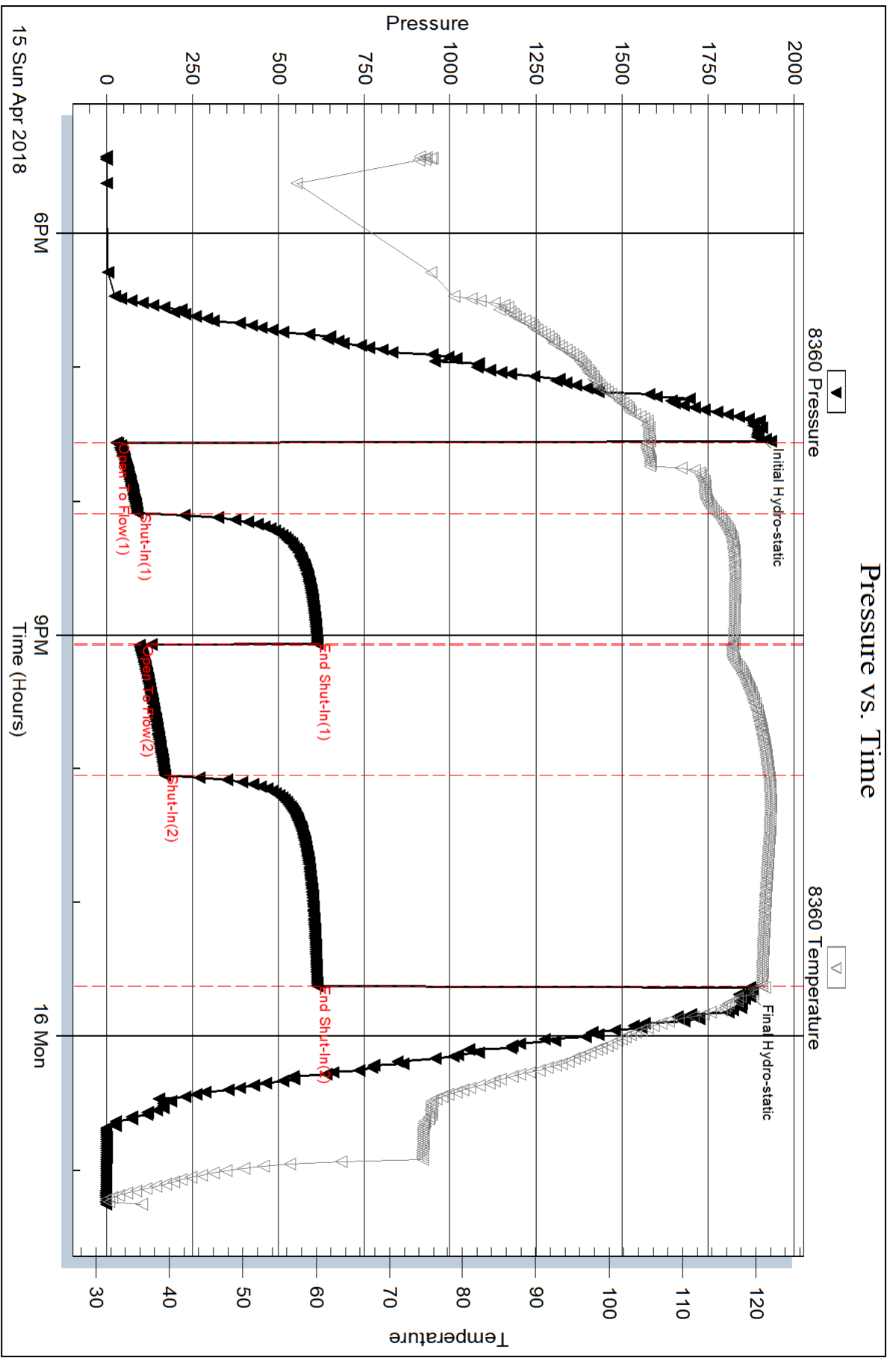
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW .17@60F

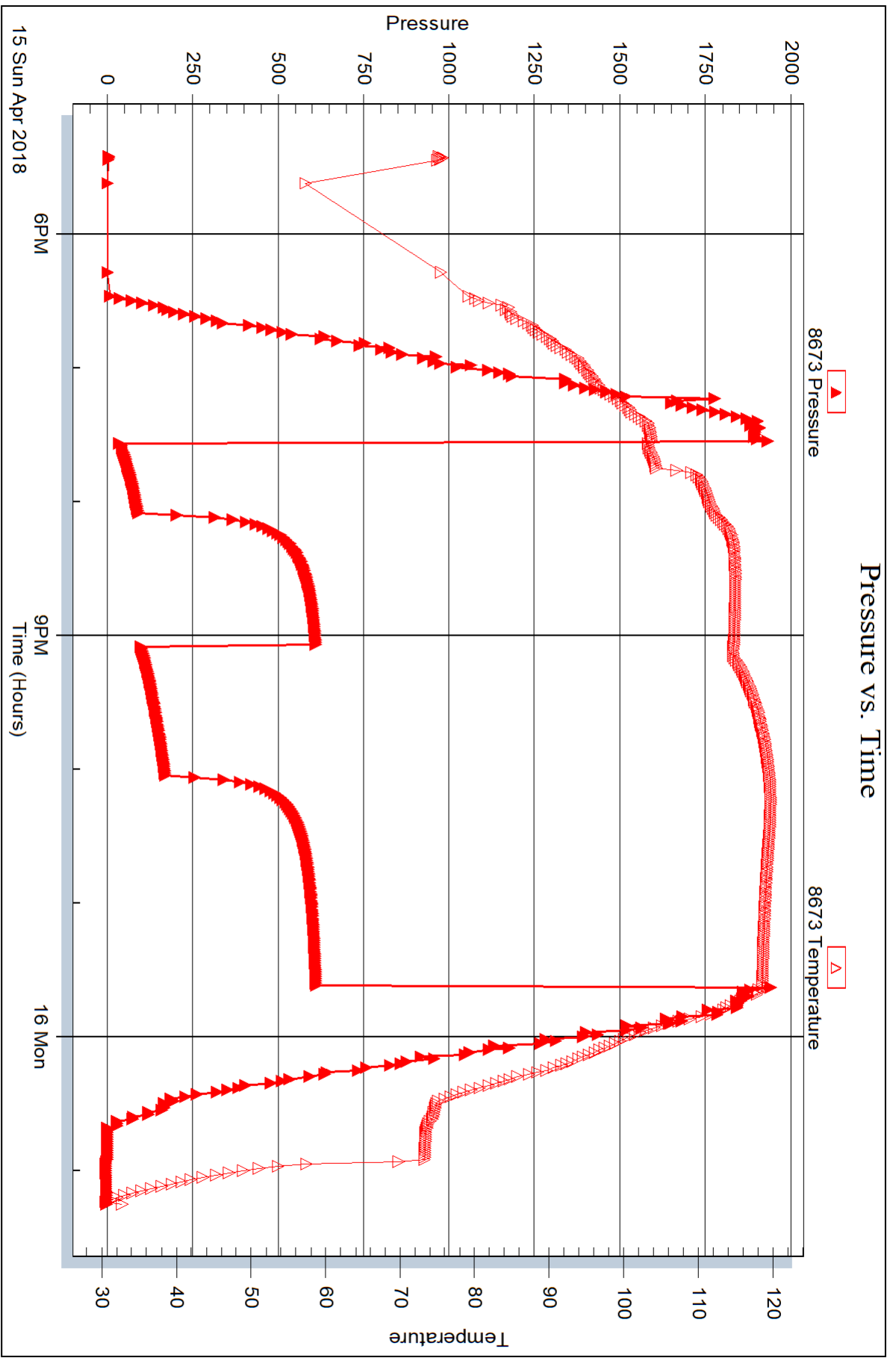


Serial #: 8673

Outside Murfin Drilling Co Inc

Popp #1-14

DST Test Number: 2



Triobite Testing, Inc

Ref. No: 63863

Printed: 2018.04.18 @ 14:43:52



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N Water STE 300
Wichita KS 67202-1216

ATTN: Bo Bein, Robert Hend

Popp #1-14

14-9s-26w Sheridan,KS

Start Date: 2018.04.16 @ 08:10:18

End Date: 2018.04.16 @ 15:35:12

Job Ticket #: 63864 DST #: 3

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

Printed: 2018.04.18 @ 14:43:26



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63864

DST#: 3

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.16 @ 08:10:18

GENERAL INFORMATION:

Formation: **LKC E-F**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 10:00:13

Time Test Ended: 15:35:12

Test Type: Conventional Bottom Hole (Reset)

Tester: Ray Schwager, Cade

Unit No: 77

Interval: 3909.00 ft (KB) To 3932.00 ft (KB) (TVD)

Reference Elevations: 2602.00 ft (KB)

Total Depth: 3932.00 ft (KB) (TVD)

2597.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

Serial #: 8360

Inside

Press@RunDepth: 44.59 psig @ 3911.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.04.16

End Date:

2018.04.16

Last Calib.:

2018.04.16

Start Time: 08:10:18

End Time:

15:35:12

Time On Btm:

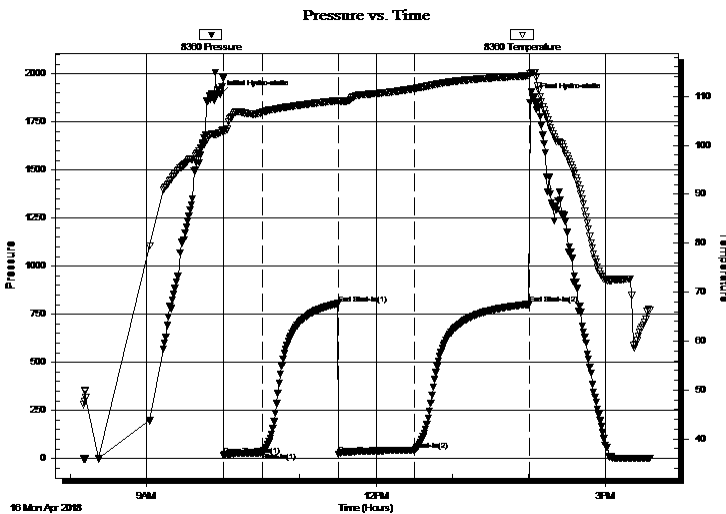
2018.04.16 @ 09:57:58

Time Off Btm:

2018.04.16 @ 14:03:12

TEST COMMENT: 30-IFP-Weak to fair blow 1/2" - 5"
60-ISIP-No blow
60-FFP-Weak to good blow 1 1/2" - 7"
90-FSIP-No blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1892.54	102.60	Initial Hydro-static
3	19.01	102.76	Open To Flow (1)
33	31.25	106.74	Shut-In(1)
93	805.70	109.15	End Shut-In(1)
93	24.10	108.96	Open To Flow (2)
153	44.59	111.61	Shut-In(2)
243	801.90	114.23	End Shut-In(2)
246	1877.33	114.89	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
60.00	HO&GCM 10%G30%O10%W50%M	0.57
10.00	CO	0.14
0.00	170'GIP	0.00

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

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63864

DST#: 3

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.16 @ 08:10:18

Tool Information

Drill Pipe:	Length: 3863.00 ft	Diameter: 3.80 inches	Volume: 54.19 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.70 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 50000.00 lb
			<u>Total Volume: 54.34 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	13.00 ft			String Weight: Initial 37000.00 lb
Depth to Top Packer:	3909.00 ft			Final 38000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	23.00 ft			
Tool Length:	52.00 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			3881.00	
Shut In Tool	5.00			3886.00	
Hydraulic tool	5.00			3891.00	
Jars	5.00			3896.00	
Safety Joint	3.00			3899.00	
Packer	5.00			3904.00	29.00 Bottom Of Top Packer
Packer	5.00			3909.00	
Stubb	1.00			3910.00	
Perforations	1.00			3911.00	
Recorder	0.00	8360	Inside	3911.00	
Recorder	0.00	8673	Outside	3911.00	
Perforations	18.00			3929.00	
Bullnose	3.00			3932.00	23.00 Bottom Packers & Anchor

Total Tool Length: 52.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63864

DST#: 3

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.16 @ 08:10:18

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

38 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 58.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.17 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
60.00	HO&GCM 10%G30%O10%W50%M	0.568
10.00	CO	0.140
0.00	170'GIP	0.000

Total Length: 70.00 ft Total Volume: 0.708 bbl

Num Fluid Samples: 0

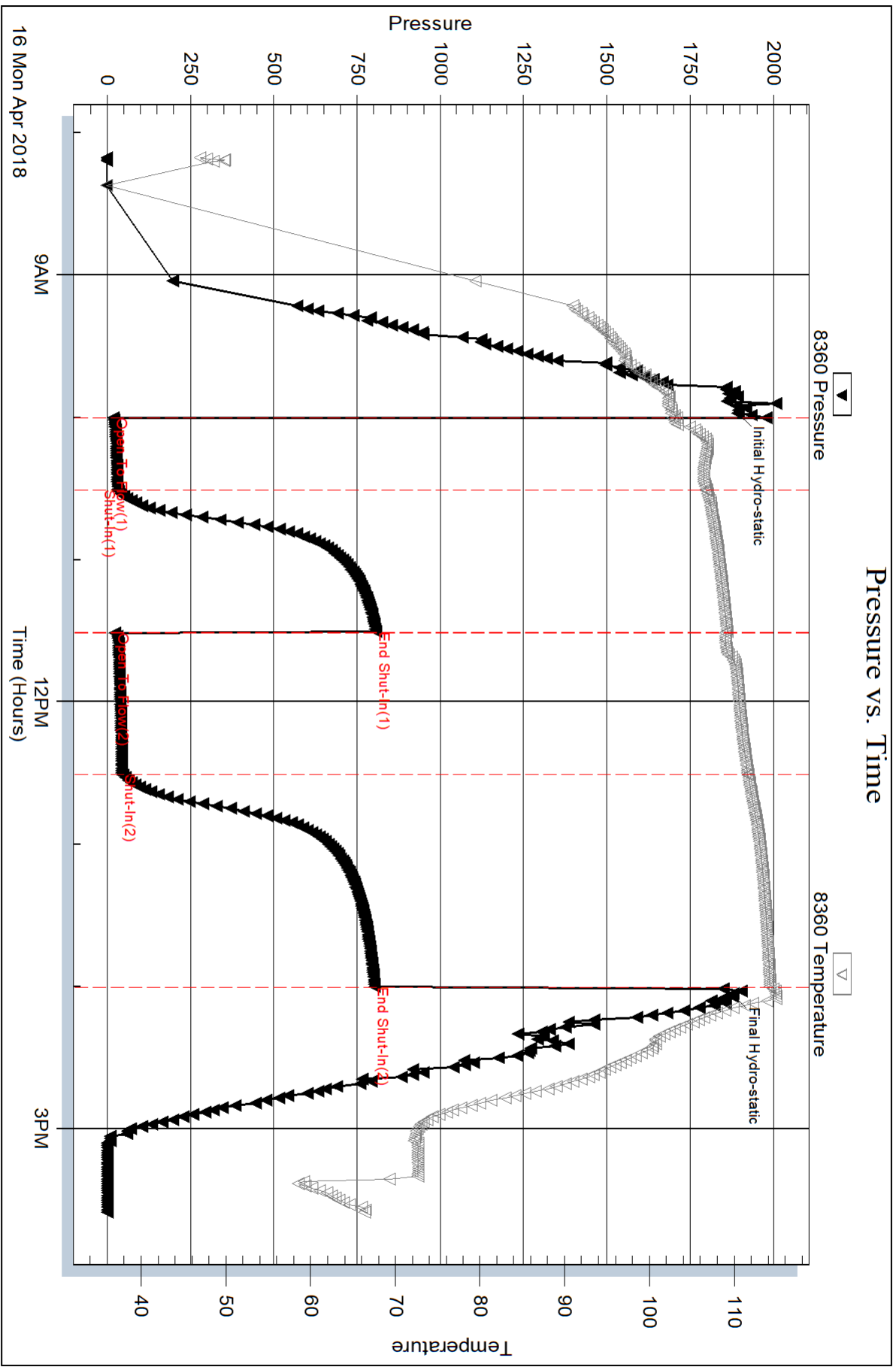
Num Gas Bombs: 0

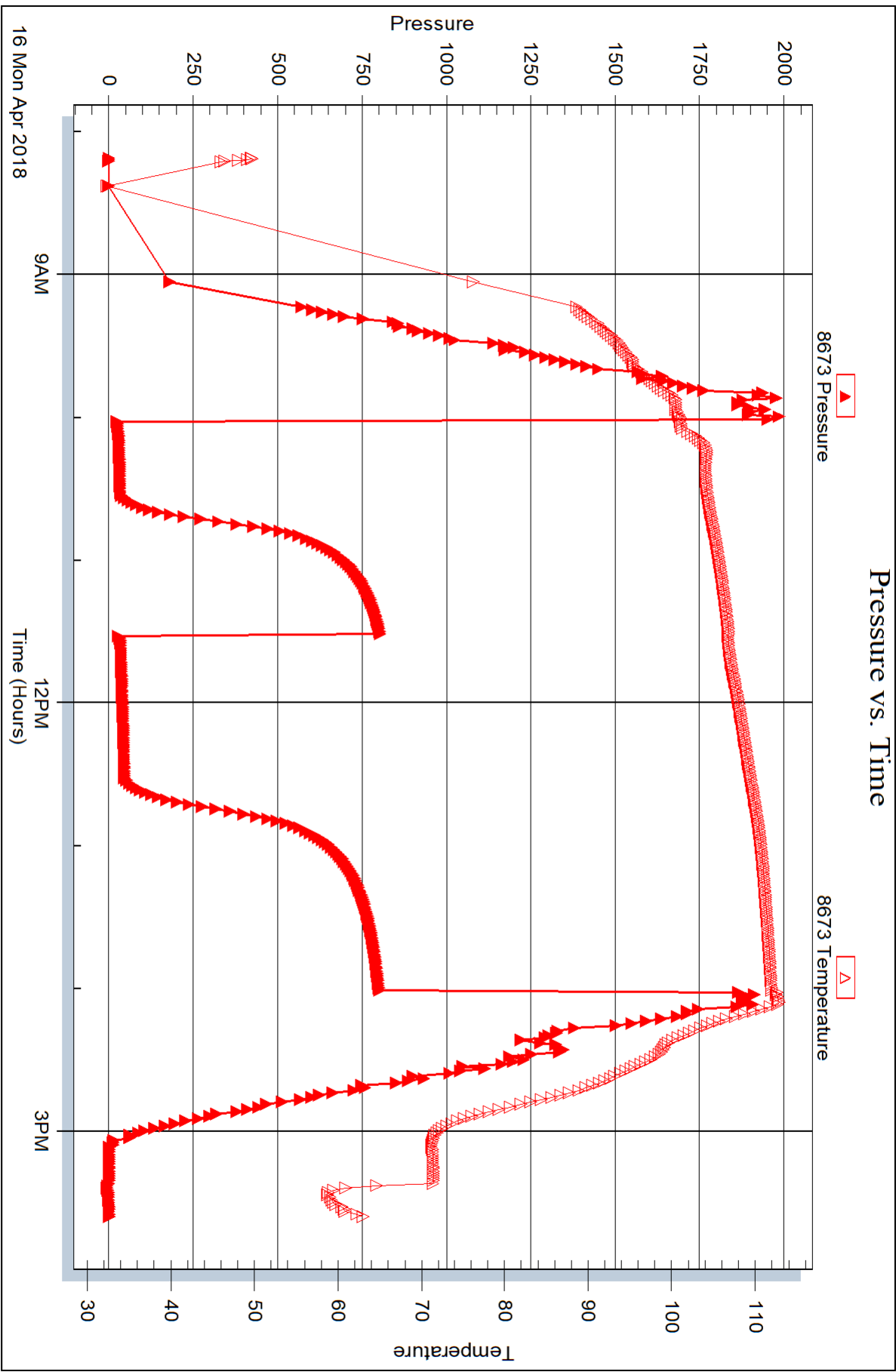
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N Water STE 300
Wichita KS 67202-1216

ATTN: Bo Bein, Robert Hend

Popp #1-14

14-9s-26w Sheridan,KS

Start Date: 2018.04.17 @ 04:05:31

End Date: 2018.04.17 @ 11:20:10

Job Ticket #: 63865 DST #: 4

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

Printed: 2018.04.18 @ 14:43:05



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63865

DST#: 4

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.17 @ 04:05:31

GENERAL INFORMATION:

Formation: **LKC H - J**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 05:40:56

Time Test Ended: 11:20:10

Test Type: Conventional Bottom Hole (Reset)

Tester: Ray Schwager, Cade

Unit No: 77

Interval: 3963.00 ft (KB) To 4031.00 ft (KB) (TVD)

Reference Elevations: 2602.00 ft (KB)

Total Depth: 4031.00 ft (KB) (TVD)

2597.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

Serial #: 8360

Inside

Press@RunDepth: 46.50 psig @ 3966.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.04.17

End Date:

2018.04.17

Last Calib.:

2018.04.17

Start Time:

04:05:31

End Time:

11:20:10

Time On Btm:

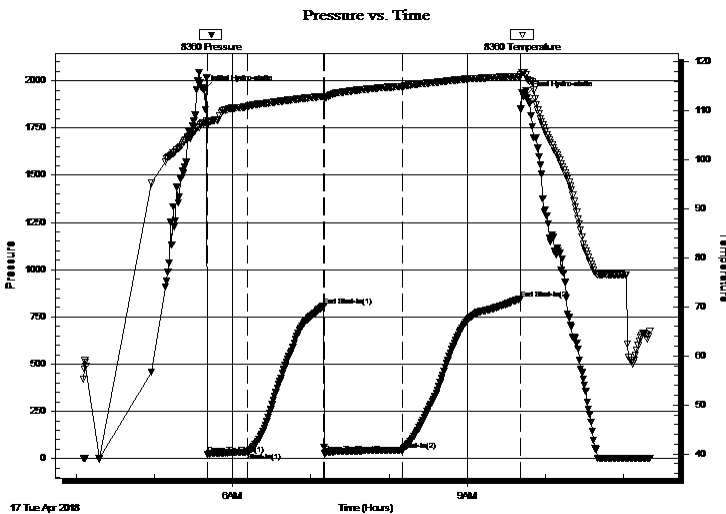
2018.04.17 @ 05:38:26

Time Off Btm:

2018.04.17 @ 09:44:25

TEST COMMENT: 30-IFP-weak to a fair blow 1/2" - 4 3/4" blow
60-ISIP-no blow
60-FFP-weak to BOB in 35 min
90-FSIP-no blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1953.80	107.53	Initial Hydro-static
3	21.40	107.14	Open To Flow (1)
33	33.98	110.87	Shut-In(1)
92	809.31	112.96	End Shut-In(1)
92	25.36	112.74	Open To Flow (2)
152	46.50	114.96	Shut-In(2)
243	845.97	117.05	End Shut-In(2)
246	1920.52	117.82	Final Hydro-static

Recovery

Gas Rates

Length (ft)	Description	Volume (bbl)
62.00	HO&GCM 10%GAS 30%OIL 60%MUD	0.60
10.00	CO	0.14
0.00	365' GIP	0.00

	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

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63865

DST#: 4

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.17 @ 04:05:31

Tool Information

Drill Pipe:	Length: 3922.00 ft	Diameter: 3.80 inches	Volume: 55.02 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.70 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 50000.00 lb
			<u>Total Volume: 55.17 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	18.00 ft			String Weight: Initial 38000.00 lb
Depth to Top Packer:	3963.00 ft			Final 38000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	68.00 ft			
Tool Length:	97.00 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			3935.00	
Shut In Tool	5.00			3940.00	
Hydraulic tool	5.00			3945.00	
Jars	5.00			3950.00	
Safety Joint	3.00			3953.00	
Packer	5.00			3958.00	29.00 Bottom Of Top Packer
Packer	5.00			3963.00	
Stubb	1.00			3964.00	
Perforations	2.00			3966.00	
Recorder	0.00	8360	Inside	3966.00	
Recorder	0.00	8673	Outside	3966.00	
Blank Spacing	33.00			3999.00	
Perforations	29.00			4028.00	
Bullnose	3.00			4031.00	68.00 Bottom Packers & Anchor

Total Tool Length: 97.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63865

DST#: 4

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.17 @ 04:05:31

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

41 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.14 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
62.00	HO&GCM 10%GAS 30%OIL 60%MUD	0.596
10.00	CO	0.140
0.00	365' GIP	0.000

Total Length: 72.00 ft Total Volume: 0.736 bbl

Num Fluid Samples: 0

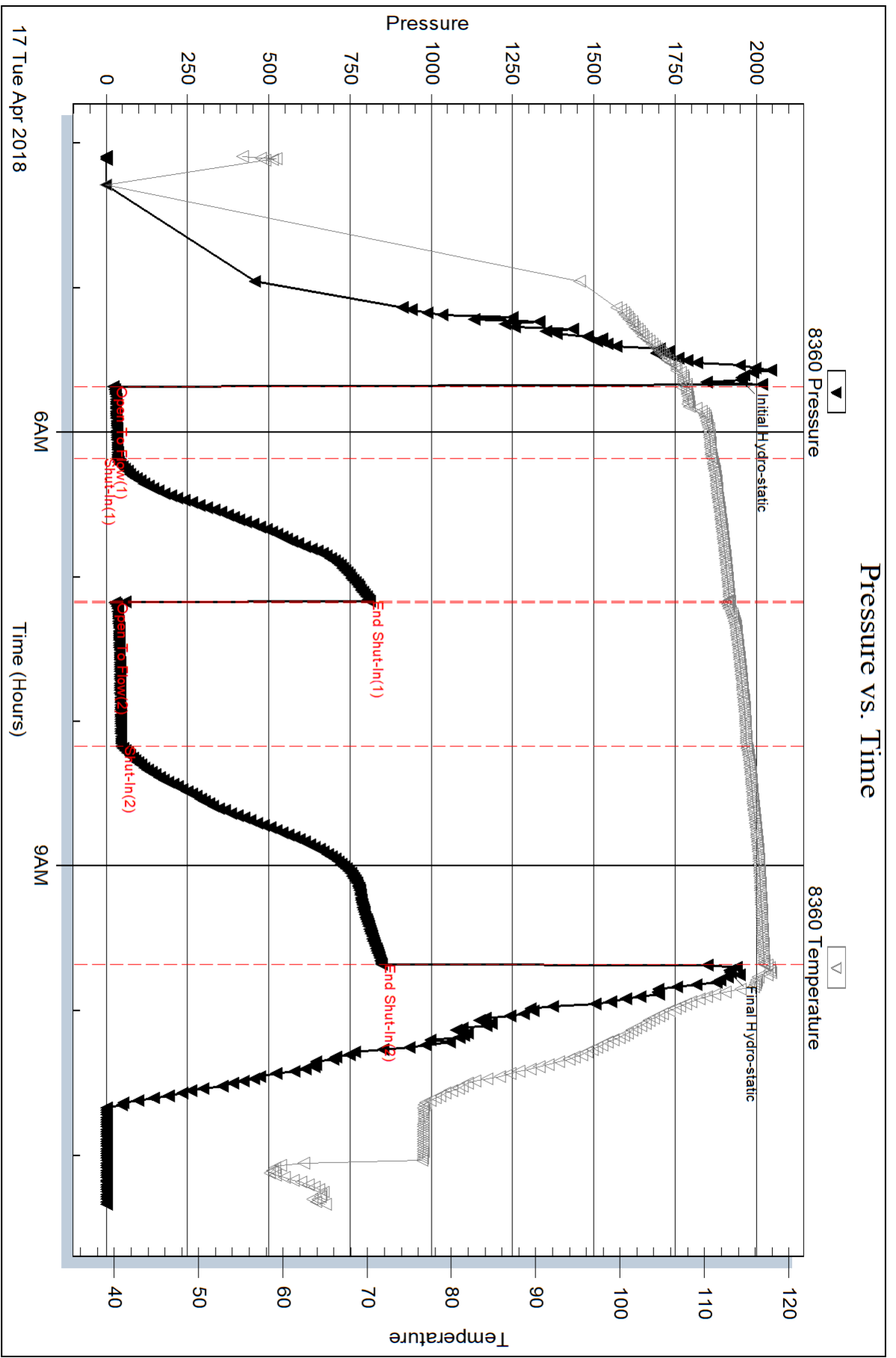
Num Gas Bombs: 0

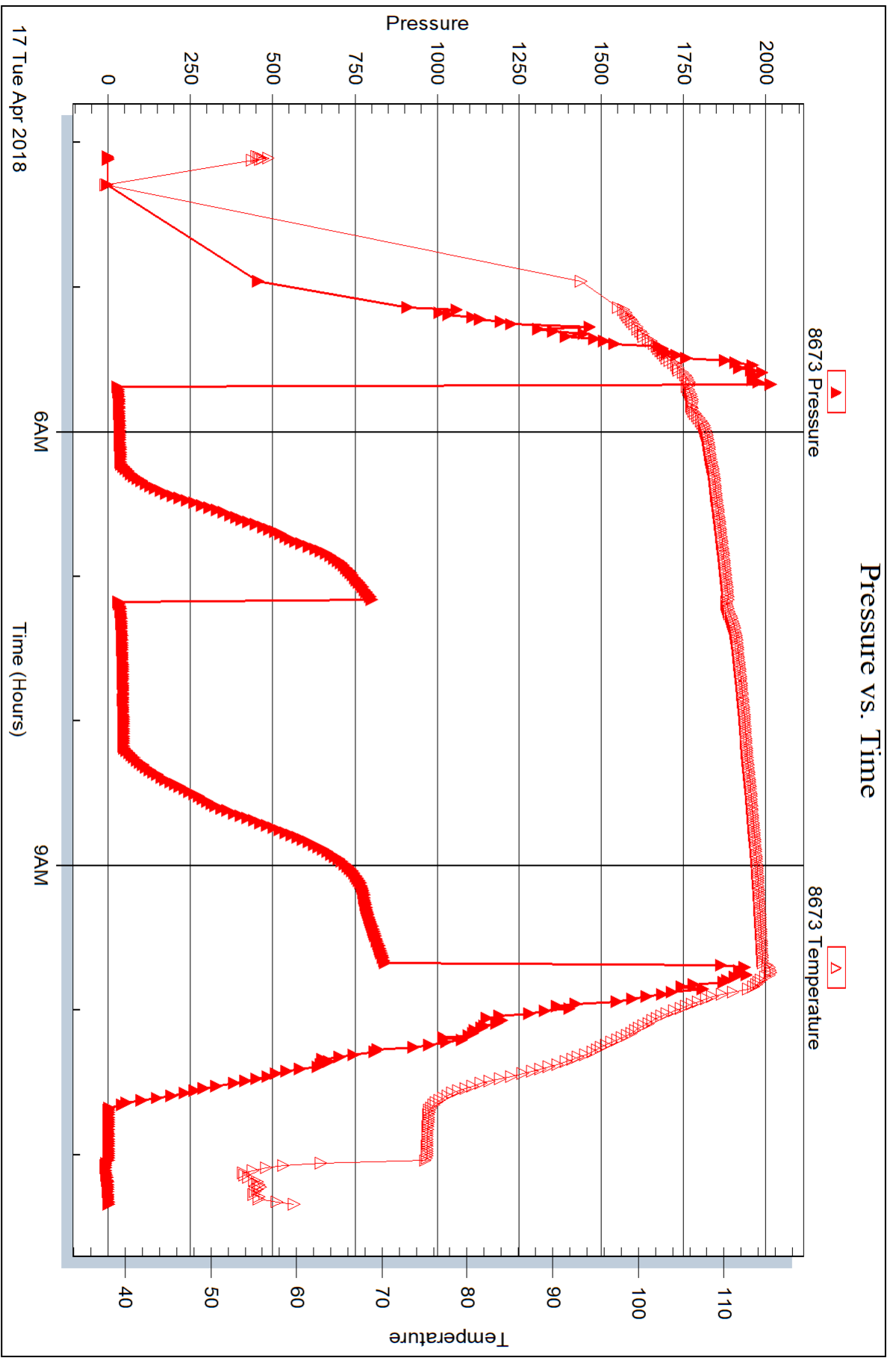
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N Water STE 300
Wichita KS 67202-1216

ATTN: Bo Bein, Robert Hend

Popp #1-14

14-9s-26w Sheridan,KS

Start Date: 2018.04.17 @ 17:36:04

End Date: 2018.04.17 @ 23:58:58

Job Ticket #: 63866 DST #: 5

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

Printed: 2018.04.18 @ 14:42:08



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63866

DST#: 5

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.17 @ 17:36:04

GENERAL INFORMATION:

Formation: **LKC K**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:28:59

Time Test Ended: 23:58:58

Test Type: Conventional Bottom Hole (Reset)

Tester: Ray Schwager, Cade

Unit No: 77

Interval: 4029.00 ft (KB) To 4052.00 ft (KB) (TVD)

Reference Elevations: 2602.00 ft (KB)

Total Depth: 4052.00 ft (KB) (TVD)

2597.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 5.00 ft

Serial #: 8360

Inside

Press@RunDepth: 31.66 psig @ 4030.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.04.17

End Date:

2018.04.17

Last Calib.:

2018.04.18

Start Time: 17:36:04

End Time:

23:58:58

Time On Btm:

2018.04.17 @ 19:26:29

Time Off Btm:

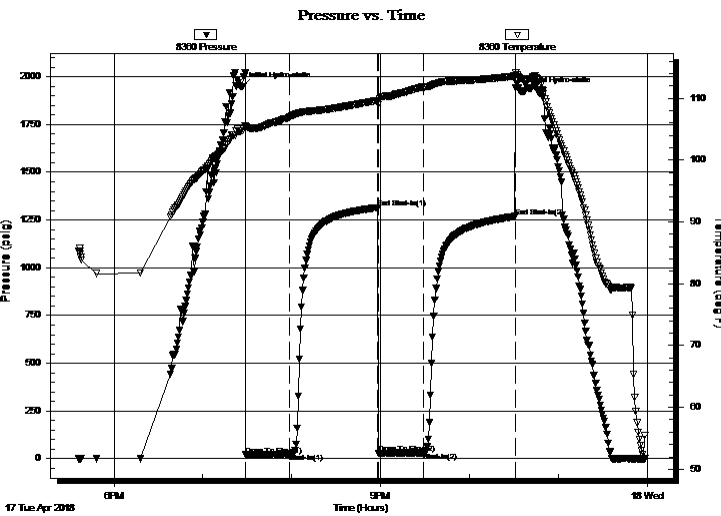
2018.04.17 @ 22:36:13

TEST COMMENT: 30-IFP-w k bl thru-out 1/2" to 3/4" bl

60-ISIP-no blow

30-FFP-no blow

60-FSIP-no bow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1948.66	104.75	Initial Hydro-static
3	20.00	105.28	Open To Flow (1)
32	26.22	106.95	Shut-In(1)
92	1314.49	109.65	End Shut-In(1)
92	28.08	108.92	Open To Flow (2)
123	31.66	111.77	Shut-In(2)
185	1268.30	113.59	End Shut-In(2)
190	1924.31	113.09	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
10.00	Mud	0.05

* 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

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63866

DST#: 5

ATTN: Bo Bein, Robert Hend

Test Start: 2018.04.17 @ 17:36:04

Tool Information

Drill Pipe:	Length: 3985.00 ft	Diameter: 3.80 inches	Volume: 55.90 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.70 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 30.00 ft	Diameter: 2.25 inches	Volume: 0.15 bbl	Weight to Pull Loose: 50000.00 lb
			<u>Total Volume: 56.05 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	15.00 ft			String Weight: Initial 38000.00 lb
Depth to Top Packer:	4029.00 ft			Final 38000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	23.00 ft			
Tool Length:	52.00 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			4001.00	
Shut In Tool	5.00			4006.00	
Hydraulic tool	5.00			4011.00	
Jars	5.00			4016.00	
Safety Joint	3.00			4019.00	
Packer	5.00			4024.00	29.00 Bottom Of Top Packer
Packer	5.00			4029.00	
Stubb	1.00			4030.00	
Recorder	0.00	8360	Inside	4030.00	
Recorder	0.00	8673	Outside	4030.00	
Perforations	19.00			4049.00	
Bullnose	3.00			4052.00	23.00 Bottom Packers & Anchor

Total Tool Length: 52.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co Inc

14-9s-26w Sheridan,KS

250 N Water STE 300
Wichita KS 67202-1216

Popp #1-14

Job Ticket: 63866

DST#: 5

ATTN: Bo Bein,Robert Hend

Test Start: 2018.04.17 @ 17:36:04

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: 54.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.15 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1200.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
10.00	Mud	0.049

Total Length: 10.00 ft Total Volume: 0.049 bbl

Num Fluid Samples: 0

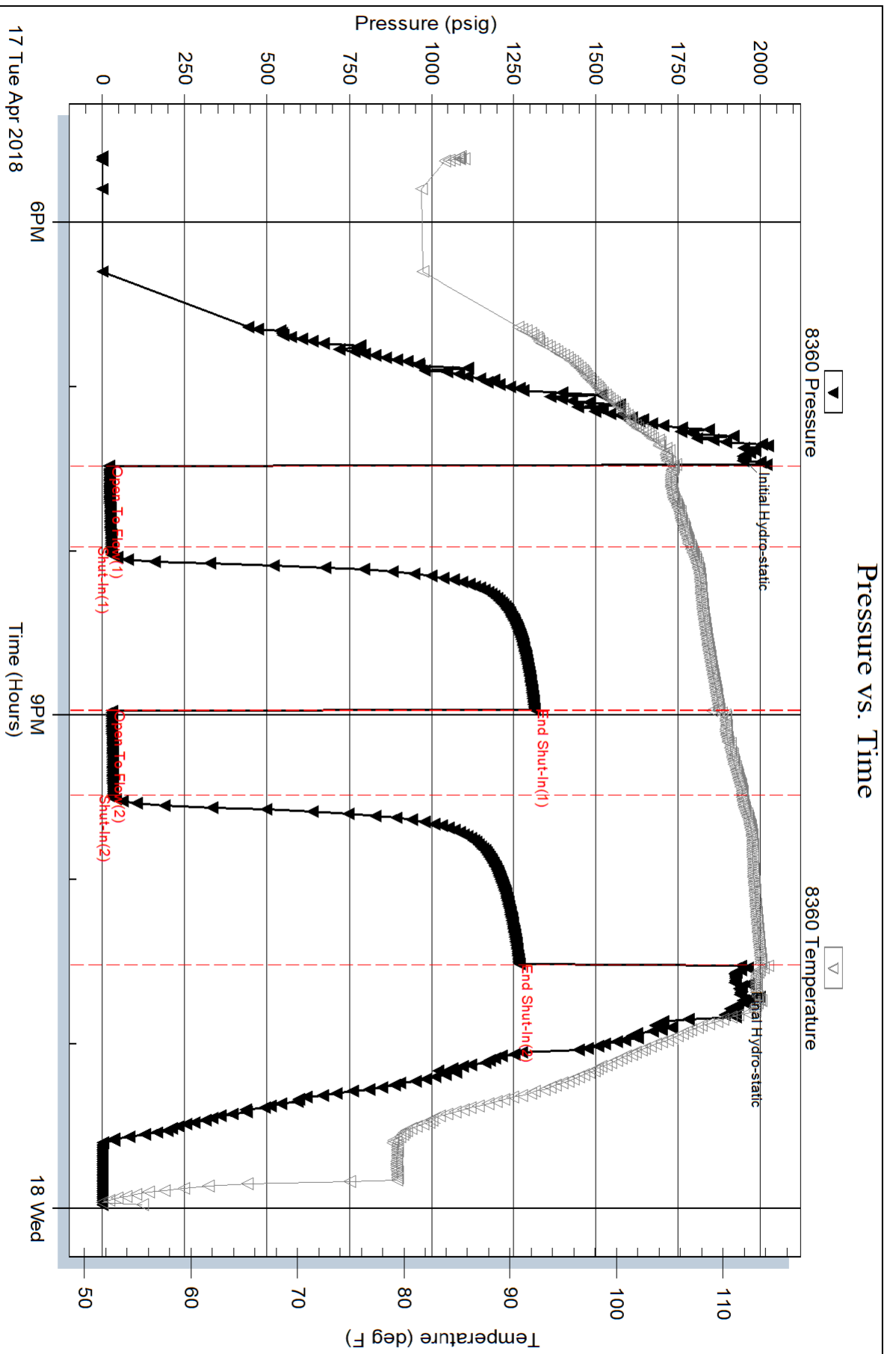
Num Gas Bombs: 0

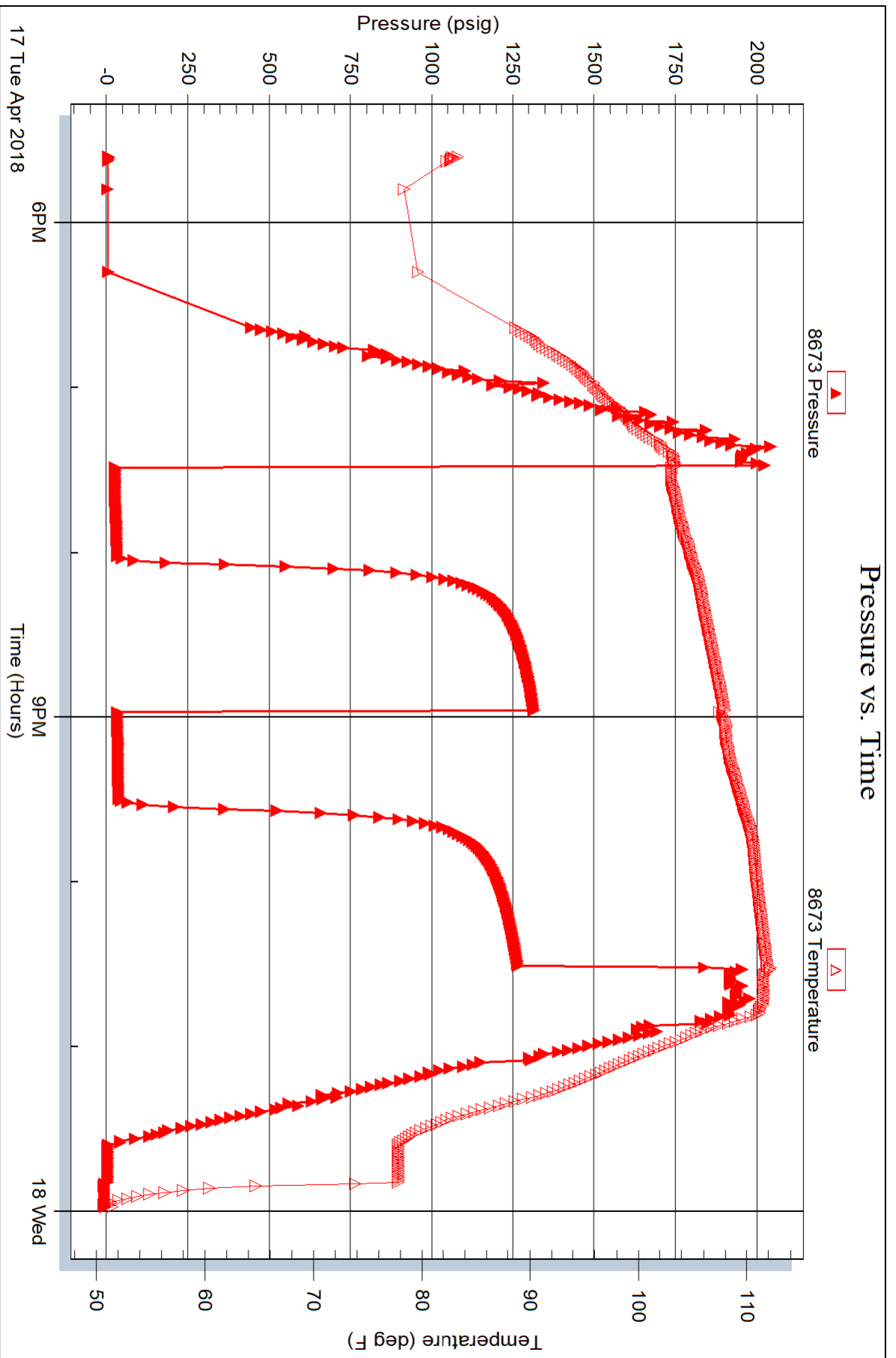
Serial #:

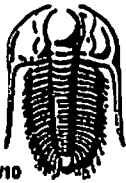
Laboratory Name:

Laboratory Location:

Recovery Comments:







TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63862

Well Name & No. Popp 1-14 Test No. 1 Date 4-14-18
 Company Murfin Drilling Co. Inc Elevation 2602 KB 2592 GL
 Address 250 N. WATER ST. 300 Wichita, KS 67202-1216
 Co. Rep / Geo. Robert H Rig Murfin 16
 Location: Sec. 14 Twp 9^s Rge. 26^w Co. Sheridan State Ks

Interval Tested 3811-3870 Zone Tested Toronto-LKC "A"
 Anchor Length .59 Drill Pipe Run 3767 Mud Wt. 9.2
 Top Packer Depth 3806 Drill Collars Run 30 Vis 54
 Bottom Packer Depth 3811 Wt. Pipe Run — WL 7.2
 Total Depth 3870 Chlorides 1200 ppm System LCM —

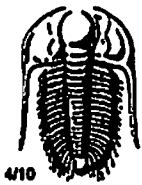
Blow Description I FP - Weak Blow thru - out 1/2" to 2" Blow
TSTP - NO Blow
FFP - surface to 1/2" Blow
FSTP - NO Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>110</u>	<u>WM</u>		<u>30</u>	<u>70</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 110 BHT 113 Gravity — API RW .35 @ 45 °F Chlorides 32000 ppm
 (A) Initial Hydrostatic 1913 Test 1050 T-On Location 2215
 (B) First Initial Flow 21 Jars 250 T-Started 0005
 (C) First Final Flow 45 Safety Joint 75 T-Open 0155
 (D) Initial Shut-In 493 Circ Sub _____ T-Pulled 0555
 (E) Second Initial Flow 51 Hourly Standby _____ T-Out 0746
 (F) Second Final Flow 71 Mileage 135 RT 116rt Comments _____
 (G) Final Shut-In 487 Sampler _____
 (H) Final Hydrostatic 1857 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90
 Sub Total 1491
 Sub Total 1491

Approved By _____ Our Representative RAY SCHWAGY Thank you
 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. Cade



TRIOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63863

Well Name & No. Popp 1-14 Test No. 2 Date 4-15-18
 Company Murfin Drilling Co Inc Elevation 2602 KB 2597 GL
 Address 250 N. WATER STE 300 WICHITA, K0 67202-1216
 Co. Rep / Geo. Robert Hendrix Rig Murfin 16
 Location: Sec. 14 Twp 9^s Rge. 26^w Co. Sheeidan State K

Interval Tested 3866-3914 Zone Tested LKC B-0
 Anchor Length 48 Drill Pipe Run _____ Mud Wt. 9.1
 Top Packer Depth 3811 Drill Collars Run 30 Vis 58
 Bottom Packer Depth 3866 Wt. Pipe Run _____ WL 7.2
 Total Depth 3914 Chlorides 1500 ppm System LCM _____

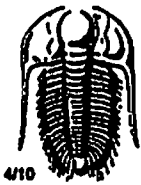
Blow Description IFP-WEAK TO BOBIN 14min
ISIP-NO BLOW
FFP-SURFACE TO 4" BLOW
FSTIP-NO BLOW

Rec	Feet of	%gas	%oil	%water	%mud
<u>5</u>	<u>CO</u>				
<u>315</u>	<u>WATER</u>				
____	____				
____	____				
____	____				

Rec Total 320 BHT 126 Gravity 29 API RW 117 @ 60 °F Chlorides 51000 ppm
 (A) Initial Hydrostatic 1892 Test 1050 T-On Location 1645
 (B) First Initial Flow 28 Jars 250 T-Started 1925
 (C) First Final Flow 90 Safety Joint 7.5 T-Open 1910
 (D) Initial Shut-In 612 Circ Sub _____ T-Pulled 2310
 (E) Second Initial Flow 96 Hourly Standby _____ T-Out 0115
 (F) Second Final Flow 169 Mileage 116 Comments _____
 (G) Final Shut-In 612 Sampler _____
 (H) Final Hydrostatic 1862 Straddle _____ Ruined Shale Packer _____
 Shale Packer _____ Ruined Packer _____
 Extra Packer _____ Extra Copies _____

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90
 Sub Total 1491
 Total 1491
 MP/DST Disc't _____

Approved By _____ Our Representative Ray Schwager Thank you
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Test Ticket

NO. 63864

Well Name & No. Popp 1-14 Test No. 83 Date 4-16-18
 Company Murfin Drilling Co Inc Elevation 2602 KB 2597 GL
 Address 250 N. Water St. E 300 Wichita, Ks 67202-1716
 Co. Rep / Geo. Robert Hendrix Flg Murfin 16
 Location: Sec. 14 Twp 9^s Rge. 26^w Co. Sheridan State Ks

Interval Tested 3909-3932 Zone Tested LKL EF
 Anchor Length 23' Drill Pipe Run 3863 Mud Wt. 9.1
 Top Packer Depth 3904 Drill Collars Run 30 Vis 58
 Bottom Packer Depth 3909 Wt. Pipe Run - WL 7.2
 Total Depth 3932 Chlorides 1500 ppm System LCM -

Blow Description FFP - Weak to fair blow 1/2" - 5" blow
FSIP - NO Blow
FFP - Weak to good blow 1 1/2" - 7" blow
FSIP - NO Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>170'</u>	<u>GIP</u>				
<u>10'</u>	<u>CO</u>				
<u>60'</u>	<u>HO & GCM</u>	<u>10%</u>	<u>70%</u>	<u>10%</u>	<u>50%</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

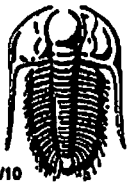
Rec Total 70 BHT 114 Gravity 38 API RW - @ - °F Chlorides - ppm

(A) Initial Hydrostatic 1892 Test 1050 T-On Location 0715
 (B) First Initial Flow 19 Jars 250 T-Started 0810
 (C) First Final Flow 51 Safety Joint 75 T-Open 0955
 (D) Initial Shut-In 805 Circ Sub _____ T-Pulled 1355
 (E) Second Initial Flow 24 Hourly Standby _____ T-Out 1535
 (F) Second Final Flow 44 Mileage 116 Comments _____
 (G) Final Shut-In 801 Sampler _____
 (H) Final Hydrostatic 1877 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90

Sub Total 1491 Total 1491 MP/DST Disc't _____

Approved By _____ Our Representative RAY SCHWAGER THANK YOU
 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.
 Cade



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63865

Well Name & No. Popp 1-14 Test No. 4 Date 4-17-18
 Company Murfin Drilling CO Inc Elevation 2602 KB 2597 GL
 Address 250 N. Wacker St E 300 Wichita, Ks 67208-1216
 Co. Rep / Geo. Robert Hendrix Rig Murfin 16
 Location: Sec. 14 Twp 9' Rge. 26" Co. Sheldon State Ks

Interval Tested 3963-4031 Zone Tested LKC HET
 Anchor Length 69' Drill Pipe Run 3988 Mud Wt. 9.3
 Top Packer Depth 3954 Drill Collars Run 30 Vis 52
 Bottom Packer Depth 3963 Wt. Pipe Run - WL 7.2
 Total Depth 4031 Chlorides 1500 ppm System LCM -

Blow Description IFP - WEAK TO FAIR BLOW 1/2" TO 4 3/4" BLOW
ISIP - NO BLOW
FSP - WEAK TO BOB 35 min
FSEIP - NO BLOW

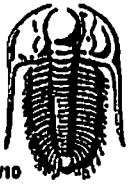
Rec	Feet of	%gas	%oil	%water	%mud
<u>365</u>	<u>GIP</u>				
<u>10</u>	<u>CO</u>				
<u>62</u>	<u>H0+6CM</u>	<u>10</u>	<u>30</u>		<u>60</u>

Rec Total 72 BHT 117 Gravity 41 API RW - @ - °F Chlorides - ppm

(A) Initial Hydrostatic 1953 Test 1150 T-On Location 0345
 (B) First Initial Flow 21 Jars 250 T-Started 0405
 (C) First Final Flow 33 Safety Joint 75 T-Open 0540
 (D) Initial Shut-In 809 Circ Sub _____ T-Pulled 0940
 (E) Second Initial Flow 25 Hourly Standby _____ T-Out 1120
 (F) Second Final Flow 46 Mileage 116 Comments _____
 (G) Final Shut-In 845 Sampler _____
 (H) Final Hydrostatic 1920 Straddle _____ Ruined Shale Packer _____
 Shale Packer _____ Ruined Packer _____
 Extra Packer _____ Extra Copies _____

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90
 Sub Total 0
 Total 1591
 MP/DST Disc't _____
 Sub Total 1591

Approved By _____ Our Representative Ray Schuoger Thank you
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63866

Well Name & No. Rapp 1-14 Test No. 5 Date 4-17-18
 Company Murfin Drilling CO. Inc. Elevation 2602 KB 2597 GL
 Address 250 N. Ward St. E 300 Wichita, Ks 67202 1216
 Co. Rep / Geo. Robert Hendrix Rig Murfin 16
 Location: Sec. 14 Twp 9^s Rge. 76^w Co. Sheridan State Ks

Interval Tested 4029-4052 Zone Tested LKC K
 Anchor Length 23 Drill Pipe Run 3985 Mud Wt. 9.3
 Top Packer Depth 4024 Drill Collars Run 30 Vis 50
 Bottom Packer Depth 4029 Wt. Pipe Run — WL 7.6
 Total Depth 4052 Chlorides 2400 ppm System LCM —

Blow Description IEP-WEAK Blow then - out 1/2" to 3/4" Blow
ISIP- NO Blow
FPP- NO Blow
FSTIP- NO Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>10</u>	<u>Mud</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 10 BHT 113 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic <u>1948</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>1715</u>
(B) First Initial Flow <u>20</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>1735</u>
(C) First Final Flow <u>26</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>1930</u>
(D) Initial Shut-In <u>1314</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>2230</u>
(E) Second Initial Flow <u>28</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>2358</u>
(F) Second Final Flow <u>31</u>	<input checked="" type="checkbox"/> Mileage <u>116</u>	Comments
(G) Final Shut-In <u>1268</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>1924</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
	<input type="checkbox"/> Day Standby	Total <u>1591</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>1591</u>	

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

Approved By _____

Our Representative Ray Schwager *Thank You*

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