



DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita KS 67202

ATTN: Saman Sharifaie

Laing #1-19

19-2s-38w Cheyenne KS

Start Date: 2019.07.28 @ 19:12:00

End Date: 2019.07.29 @ 02:32:30

Job Ticket #: 65269 DST #: 1

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

Printed: 2019.08.02 @ 10:47:26



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65269

DST#: 1

ATTN: Saman Sharifaie

Test Start: 2019.07.28 @ 19:12:00

GENERAL INFORMATION:

Formation: **Oread**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 21:40:10

Time Test Ended: 02:32:30

Test Type: Conventional Bottom Hole (Initial)

Tester: Ryan Nichols

Unit No: 71

Interval: 4196.00 ft (KB) To 4270.00 ft (KB) (TVD)

Reference Elevations: 3389.00 ft (KB)

Total Depth: 4270.00 ft (KB) (TVD)

3384.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8366 Outside

Press@RunDepth: 16.56 psig @ 4197.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.28

End Date:

2019.07.29

Last Calib.:

2019.07.29

Start Time: 19:12:01

End Time:

02:32:30

Time On Btm:

2019.07.28 @ 21:40:00

Time Off Btm:

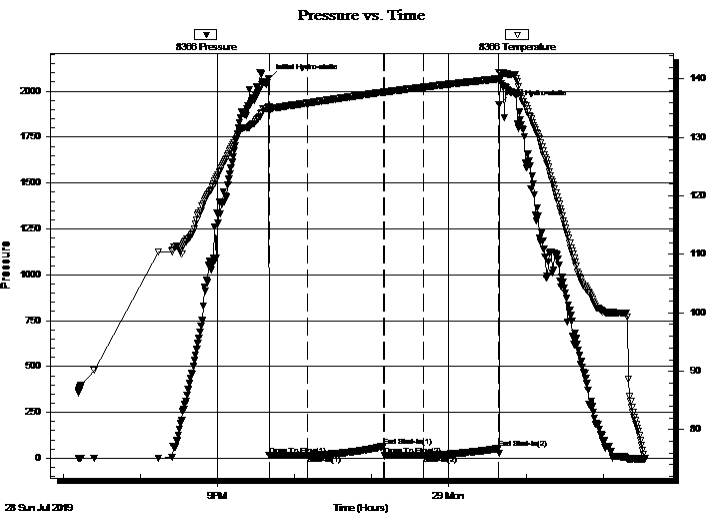
2019.07.29 @ 00:39:00

TEST COMMENT: 30 IF - Surface blow died @ 20 mins

60 ISI - No return

30 FF - No blow

60 FSI - No return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2068.91	135.31	Initial Hydro-static
1	14.75	134.47	Open To Flow (1)
30	15.83	135.88	Shut-In(1)
90	66.11	137.76	End Shut-In(1)
90	15.57	137.76	Open To Flow (2)
120	16.56	138.60	Shut-In(2)
179	53.72	140.04	End Shut-In(2)
179	1925.59	141.12	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
2.00	Mud 100%M	0.01

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
250 N. Water STE 300
Wichita KS 67202
ATTN: Saman Sharifaie

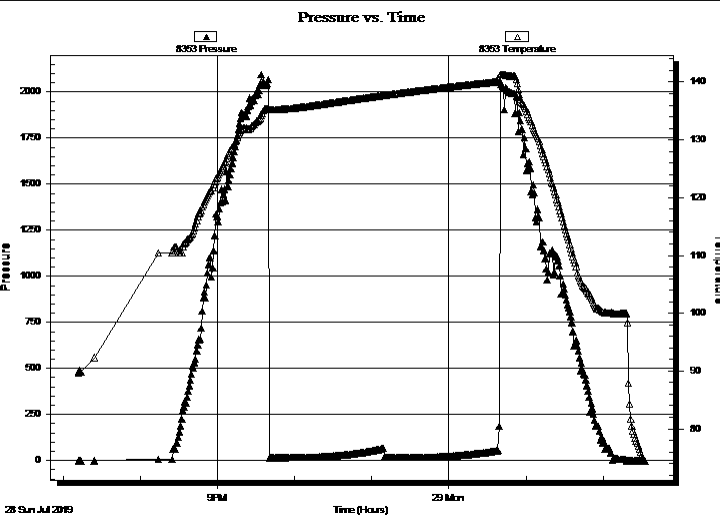
19-2s-38w Cheyenne KS
Laing #1-19
Job Ticket: 65269 **DST#: 1**
Test Start: 2019.07.28 @ 19:12:00

GENERAL INFORMATION:

Formation: Oread			
Deviated: No Whipstock:	ft (KB)	Test Type: Conventional Bottom Hole (Initial)	
Time Tool Opened: 21:40:10		Tester: Ryan Nichols	
Time Test Ended: 02:32:30		Unit No: 71	
Interval: 4196.00 ft (KB) To 4270.00 ft (KB) (TVD)		Reference Elevations: 3389.00 ft (KB)	
Total Depth: 4270.00 ft (KB) (TVD)		3384.00 ft (CF)	
Hole Diameter: 7.88 inches	Hole Condition: Good	KB to GR/CF: 5.00 ft	

Serial #: 8353	Inside				
Press@RunDepth: psig @	4197.00 ft (KB)	Capacity:	8000.00 psig		
Start Date: 2019.07.28	End Date: 2019.07.29	Last Calib.:	2019.07.29		
Start Time: 19:12:01	End Time: 02:32:20	Time On Btm:			
		Time Off Btm:			

TEST COMMENT: 30 IF - Surface blow died @ 20 mins
60 ISI - No return
30 FF - No blow
60 FSI - No return



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

Recovery		
Length (ft)	Description	Volume (bbl)
2.00	Mud 100%M	0.01

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65269

DST#: 1

ATTN: Saman Sharifaie

Test Start: 2019.07.28 @ 19:12:00

Tool Information

Drill Pipe:	Length: 4016.00 ft	Diameter: 3.80 inches	Volume: 56.33 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 20000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 65000.00 lb
			<u>Total Volume: 57.20 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4196.00 ft			Final 58000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	74.00 ft			
Tool Length:	102.00 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			4173.00	
Hydraulic tool	5.00			4178.00	
Jars	5.00			4183.00	
Safety Joint	3.00			4186.00	
Packer	5.00			4191.00	28.00 Bottom Of Top Packer
Packer	5.00			4196.00	
Stubb	1.00			4197.00	
Recorder	0.00	8353	Inside	4197.00	
Recorder	0.00	8366	Outside	4197.00	
Perforations	5.00			4202.00	
Blank Spacing	65.00			4267.00	
Bullnose	3.00			4270.00	74.00 Bottom Packers & Anchor

Total Tool Length: 102.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65269

DST#: 1

ATTN: Saman Sharifaie

Test Start: 2019.07.28 @ 19:12:00

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: 64.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.78 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 1200.00 ppm

Filter Cake: 2.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
2.00	Mud 100%M	0.010

Total Length: 2.00 ft Total Volume: 0.010 bbl

Num Fluid Samples: 0

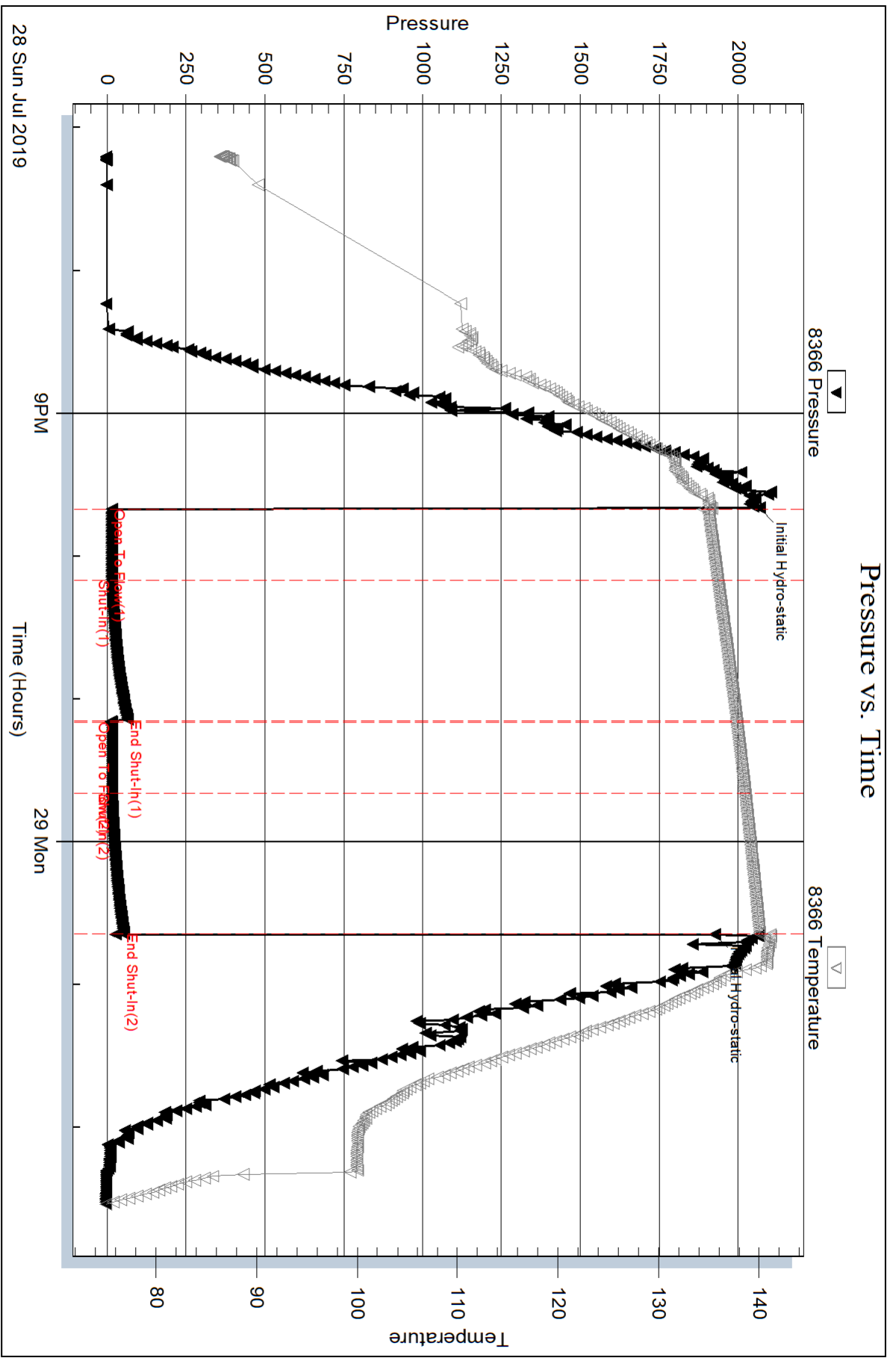
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



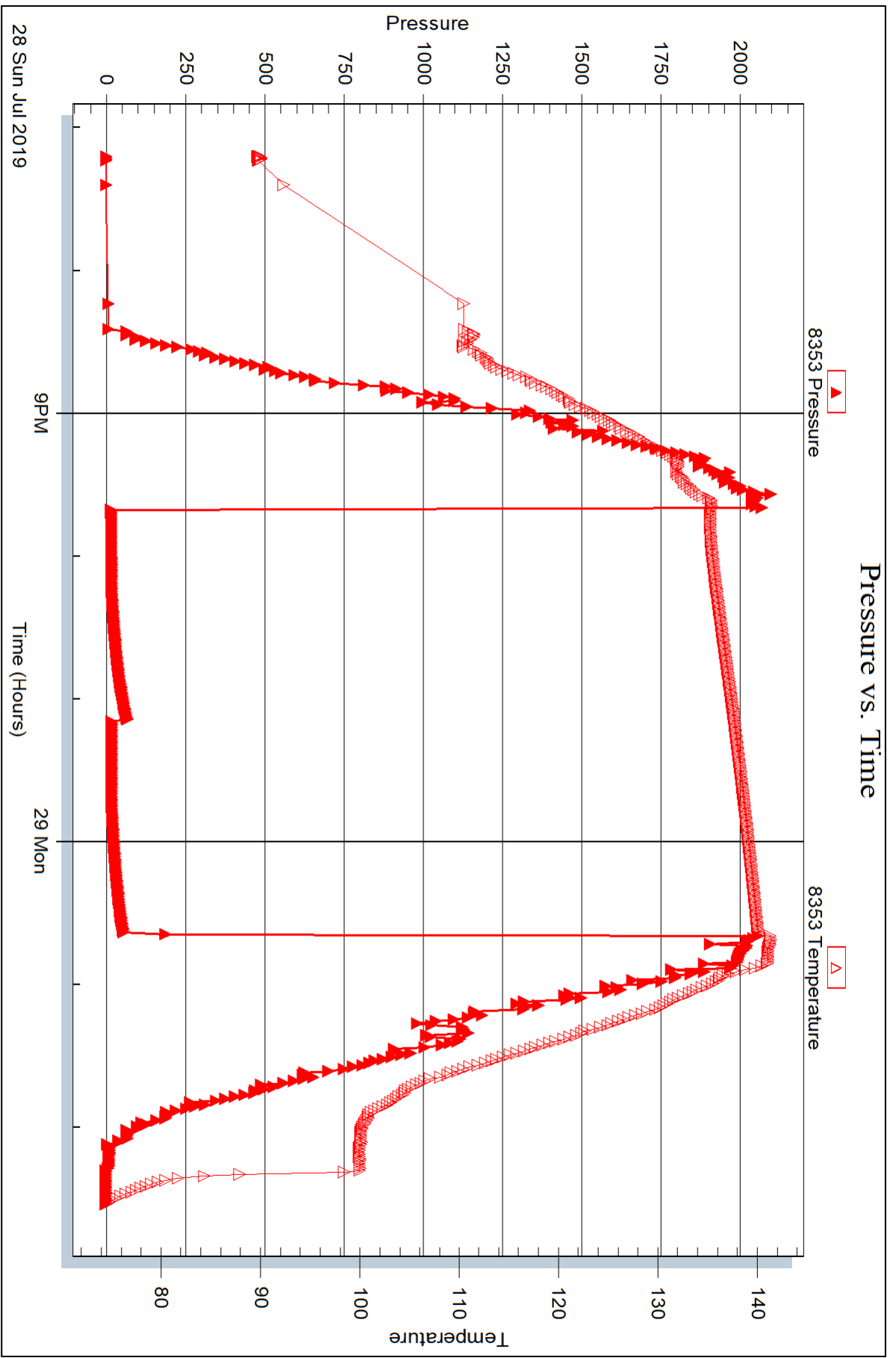
Serial #: 8353

Inside

Murfin Drilling Co. Inc.

Laing #1-19

DST Test Number: 1



Trilobite Testing, Inc

Ref. No: 65269

Printed: 2019.08.02 @ 10:47:28



DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita KS 67202

ATTN: Saman Sharifaie

Laing #1-19

19-2s-38w Cheyenne KS

Start Date: 2019.07.29 @ 11:55:00

End Date: 2019.07.29 @ 18:32:20

Job Ticket #: 65270 DST #: 2

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

Printed: 2019.08.02 @ 10:47:01



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65270

DST#: 2

ATTN: Saman Sharifaie

Test Start: 2019.07.29 @ 11:55:00

GENERAL INFORMATION:

Formation: **LKC " A "**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 13:38:10

Time Test Ended: 18:32:20

Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

Unit No: 71

Interval: 4264.00 ft (KB) To 4330.00 ft (KB) (TVD)

Reference Elevations: 3389.00 ft (KB)

Total Depth: 4330.00 ft (KB) (TVD)

3384.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8366 Outside

Press@RunDepth: 20.57 psig @ 4265.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.29

End Date:

2019.07.29

Last Calib.: 2019.07.29

Start Time: 11:55:01

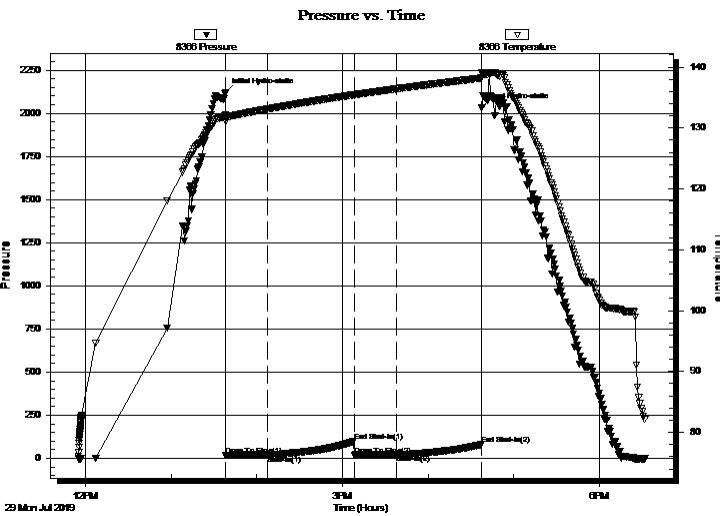
End Time:

18:32:20

Time On Btm: 2019.07.29 @ 13:38:00

Time Off Btm: 2019.07.29 @ 16:37:39

TEST COMMENT: 30 IF - Blow built to 1/4" died to surface
60 ISI - No return
30 FF - No blow
60 FSI - No return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2120.05	132.12	Initial Hydro-static
1	18.95	131.14	Open To Flow (1)
30	20.08	133.10	Shut-In(1)
90	99.19	135.46	End Shut-In(1)
91	18.88	135.41	Open To Flow (2)
120	20.57	136.42	Shut-In(2)
180	80.14	138.19	End Shut-In(2)
180	2031.10	139.04	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100%M	0.02

* 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.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65270

DST#: 2

ATTN: Saman Sharifaie

Test Start: 2019.07.29 @ 11:55:00

GENERAL INFORMATION:

Formation: **LKC " A "**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 13:38:10

Time Test Ended: 18:32:20

Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

Unit No: 71

Interval: **4264.00 ft (KB) To 4330.00 ft (KB) (TVD)**

Total Depth: 4330.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 3389.00 ft (KB)

3384.00 ft (CF)

KB to GR/CF: 5.00 ft

Serial #: 8353

Inside

Press@RunDepth: psig @ 4265.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.29 End Date: 2019.07.29

Last Calib.: 2019.07.29

Start Time: 11:55:01 End Time: 18:32:20

Time On Btm:

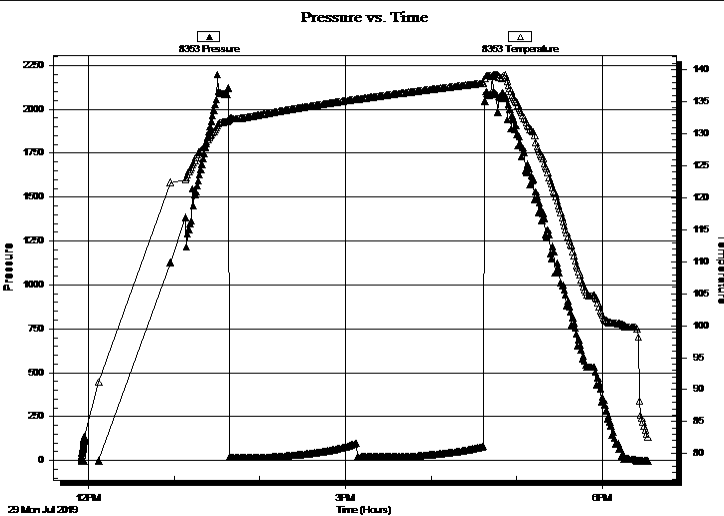
Time Off Btm:

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

60 ISI - No return

30 FF - No blow

60 FSI - No return



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100%M	0.02

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
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DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65270

DST#: 2

ATTN: Saman Sharifaie

Test Start: 2019.07.29 @ 11:55:00

Tool Information

Drill Pipe:	Length: 4078.00 ft	Diameter: 3.80 inches	Volume: 57.20 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 20000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 80000.00 lb
			<u>Total Volume: 58.07 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	19.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4264.00 ft			Final 58000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	66.00 ft			
Tool Length:	94.00 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			4241.00	
Hydraulic tool	5.00			4246.00	
Jars	5.00			4251.00	
Safety Joint	3.00			4254.00	
Packer	5.00			4259.00	28.00 Bottom Of Top Packer
Packer	5.00			4264.00	
Stubb	1.00			4265.00	
Recorder	0.00	8353	Inside	4265.00	
Recorder	0.00	8366	Outside	4265.00	
Perforations	29.00			4294.00	
Blank Spacing	33.00			4327.00	
Bullnose	3.00			4330.00	66.00 Bottom Packers & Anchor

Total Tool Length: 94.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65270

DST#: 2

ATTN: Saman Sharifaie

Test Start: 2019.07.29 @ 11:55:00

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: 62.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.79 in³

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
5.00	Mud 100%M	0.025

Total Length: 5.00 ft Total Volume: 0.025 bbl

Num Fluid Samples: 0

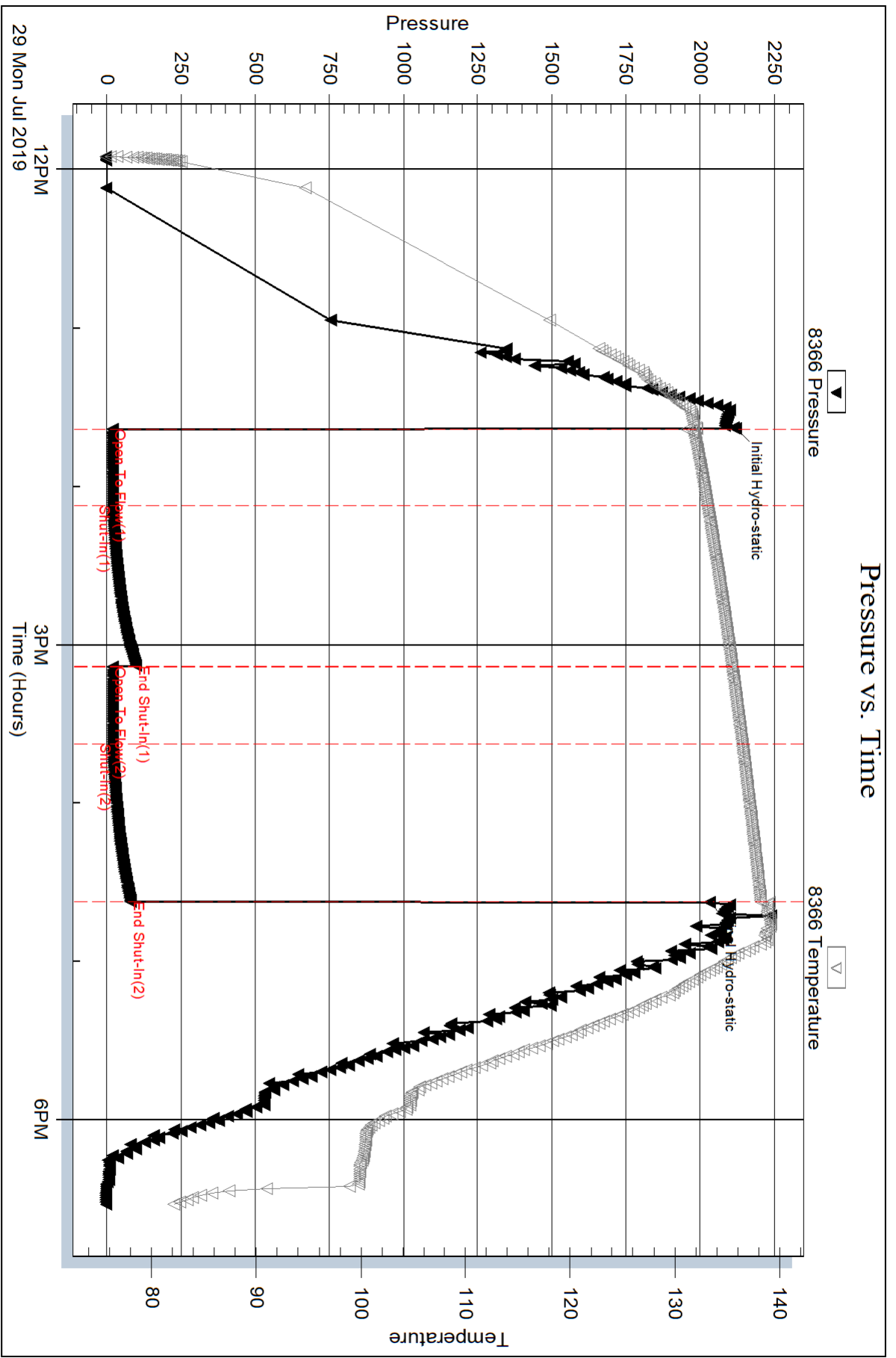
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



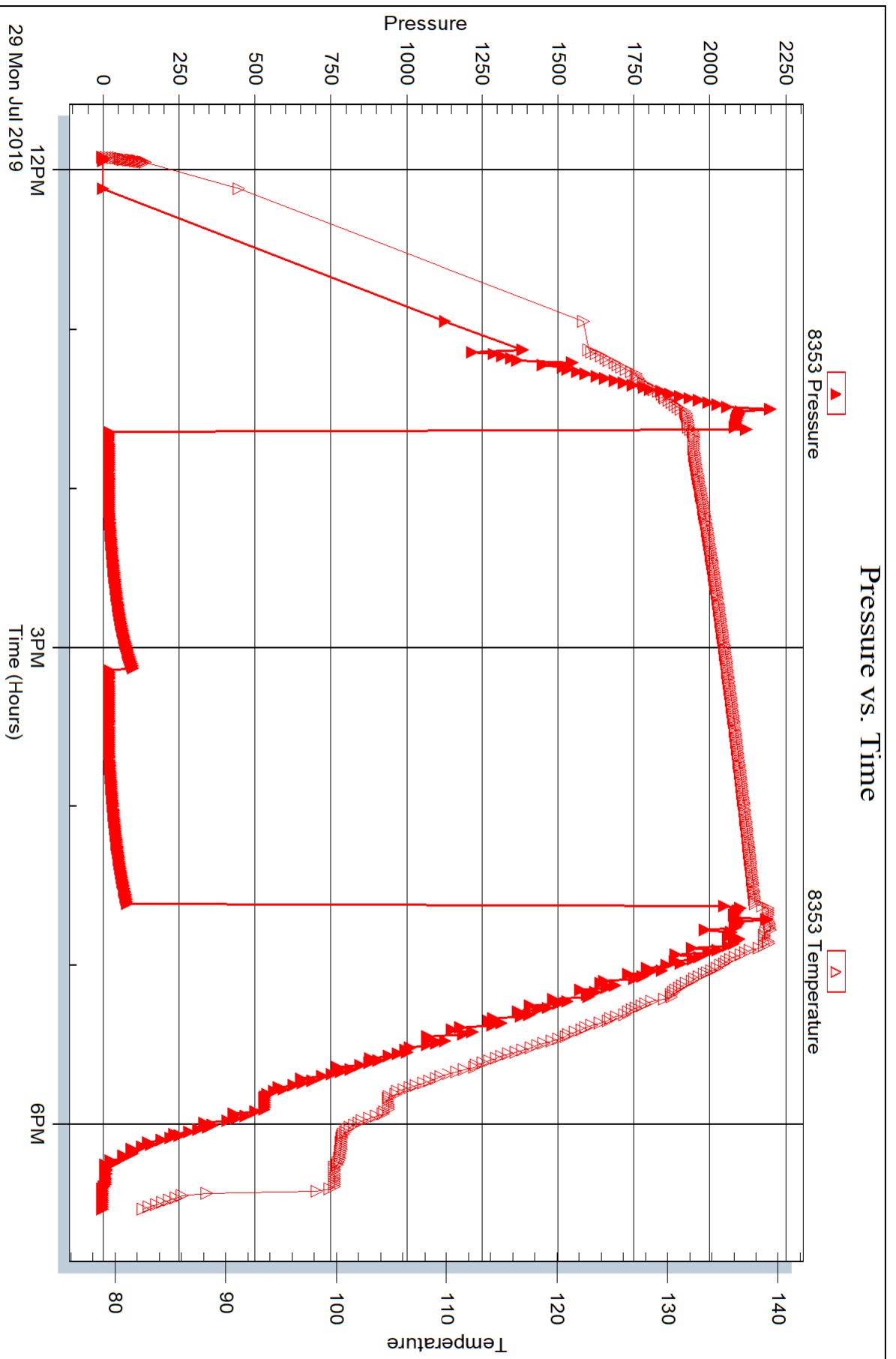
Serial #: 8353

Inside

Murfin Drilling Co. Inc.

Laing #1-19

DST Test Number: 2





DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita KS 67202

ATTN: Saman Sharifaie

Laing #1-19

19-2s-38w Cheyenne KS

Start Date: 2019.07.30 @ 04:19:00

End Date: 2019.07.30 @ 11:58:50

Job Ticket #: 65271 DST #: 3

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

Printed: 2019.08.02 @ 10:46:37

Murfin Drilling Co. Inc. 19-2s-38w Cheyenne KS Laing #1-19 DST # 3 LKC " B - D " 2019.07.30



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65271

DST#: 3

ATTN: Saman Sharifaie

Test Start: 2019.07.30 @ 04:19:00

GENERAL INFORMATION:

Formation: **LKC " B - D "**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 06:37:30

Time Test Ended: 11:58:50

Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

Unit No: 71

Interval: 4320.00 ft (KB) To 4396.00 ft (KB) (TVD)

Reference Elevations: 3389.00 ft (KB)

Total Depth: 4396.00 ft (KB) (TVD)

3384.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8366

Outside

Press@RunDepth: 387.25 psig @ 4321.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.30

End Date:

2019.07.30

Last Calib.:

2019.07.30

Start Time: 04:19:01

End Time:

11:58:50

Time On Btm:

2019.07.30 @ 06:37:10

Time Off Btm:

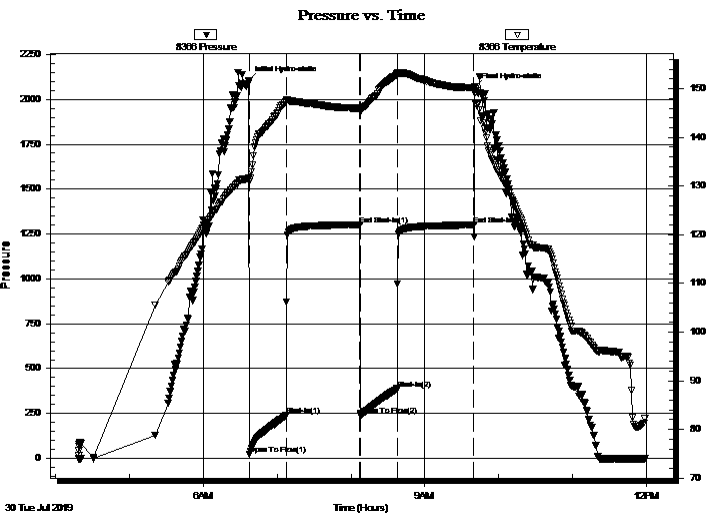
2019.07.30 @ 09:40:30

TEST COMMENT: 30 IF - BOB @ 11 1/2 mins

60 ISI - No return

30 FF - BOB @ 13 mins

60 FSI - No return



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2103.91	131.71	Initial Hydro-static
1	23.96	130.93	Open To Flow (1)
31	239.13	147.42	Shut-In(1)
90	1301.67	145.94	End Shut-In(1)
91	240.25	145.53	Open To Flow (2)
121	387.25	152.96	Shut-In(2)
183	1300.11	150.21	End Shut-In(2)
184	2068.28	149.07	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
60.00	WCM - 45%W - 55%M	0.30
650.00	MCW - 10%M - 90%W	8.05
170.00	WCM - 25%W - 75%M	2.38

* Recovery from multiple tests

Gas Rates

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



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DRILL STEM TEST REPORT

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19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65271

DST#: 3

ATTN: Saman Sharifaie

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Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

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Reference Elevations: 3389.00 ft (KB)

Total Depth: 4396.00 ft (KB) (TVD)

3384.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8353

Inside

Press@RunDepth: psig @ 4321.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.30

End Date:

2019.07.30

Last Calib.:

2019.07.30

Start Time: 04:19:01

End Time:

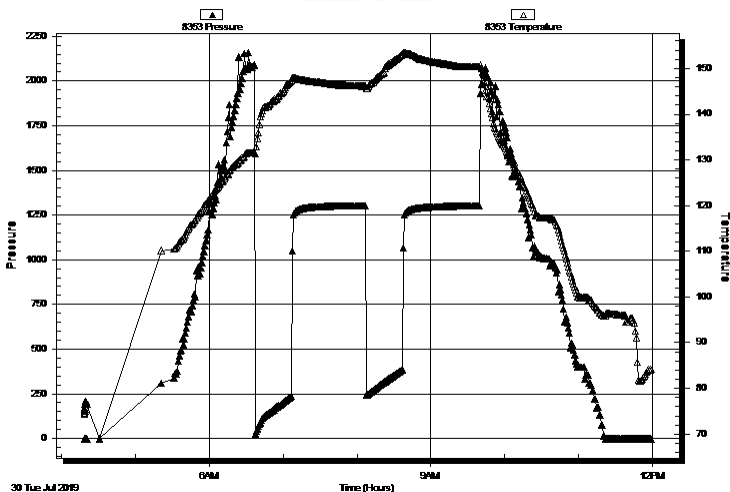
11:58:50

Time On Btm:

Time Off Btm:

TEST COMMENT: 30 IF - BOB @ 11 1/2 mins
60 ISI - No return
30 FF - BOB @ 13 mins
60 FSI - No return

Pressure vs. Time



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
60.00	WCM - 45%W - 55%M	0.30
650.00	MCW - 10%M - 90%W	8.05
170.00	WCM - 25%W - 75%M	2.38

* 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.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65271

DST#: 3

ATTN: Saman Sharifaie

Test Start: 2019.07.30 @ 04:19:00

Tool Information

Drill Pipe:	Length: 4140.00 ft	Diameter: 3.80 inches	Volume: 58.07 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 20000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 58.94 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4320.00 ft			Final 63000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	76.00 ft			
Tool Length:	104.00 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			4297.00	
Hydraulic tool	5.00			4302.00	
Jars	5.00			4307.00	
Safety Joint	3.00			4310.00	
Packer	5.00			4315.00	28.00 Bottom Of Top Packer
Packer	5.00			4320.00	
Stubb	1.00			4321.00	
Recorder	0.00	8353	Inside	4321.00	
Recorder	0.00	8366	Outside	4321.00	
Perforations	7.00			4328.00	
Blank Spacing	65.00			4393.00	
Bullnose	3.00			4396.00	76.00 Bottom Packers & Anchor

Total Tool Length: 104.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65271

DST#: 3

ATTN: Saman Sharifaie

Test Start: 2019.07.30 @ 04:19:00

Mud and Cushion Information

Mud Type: Gel Chem
Mud Weight: 9.00 lb/gal
Viscosity: 73.00 sec/qt
Water Loss: 5.99 in³
Resistivity: ohm.m
Salinity: 1100.00 ppm
Filter Cake: 2.00 inches

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

Oil API: deg API
Water Salinity: ppm

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
60.00	WCM - 45%W - 55%M	0.295
650.00	MCW - 10%M - 90%W	8.052
170.00	WCM - 25%W - 75%M	2.385

Total Length: 880.00 ft Total Volume: 10.732 bbl

Num Fluid Samples: 0

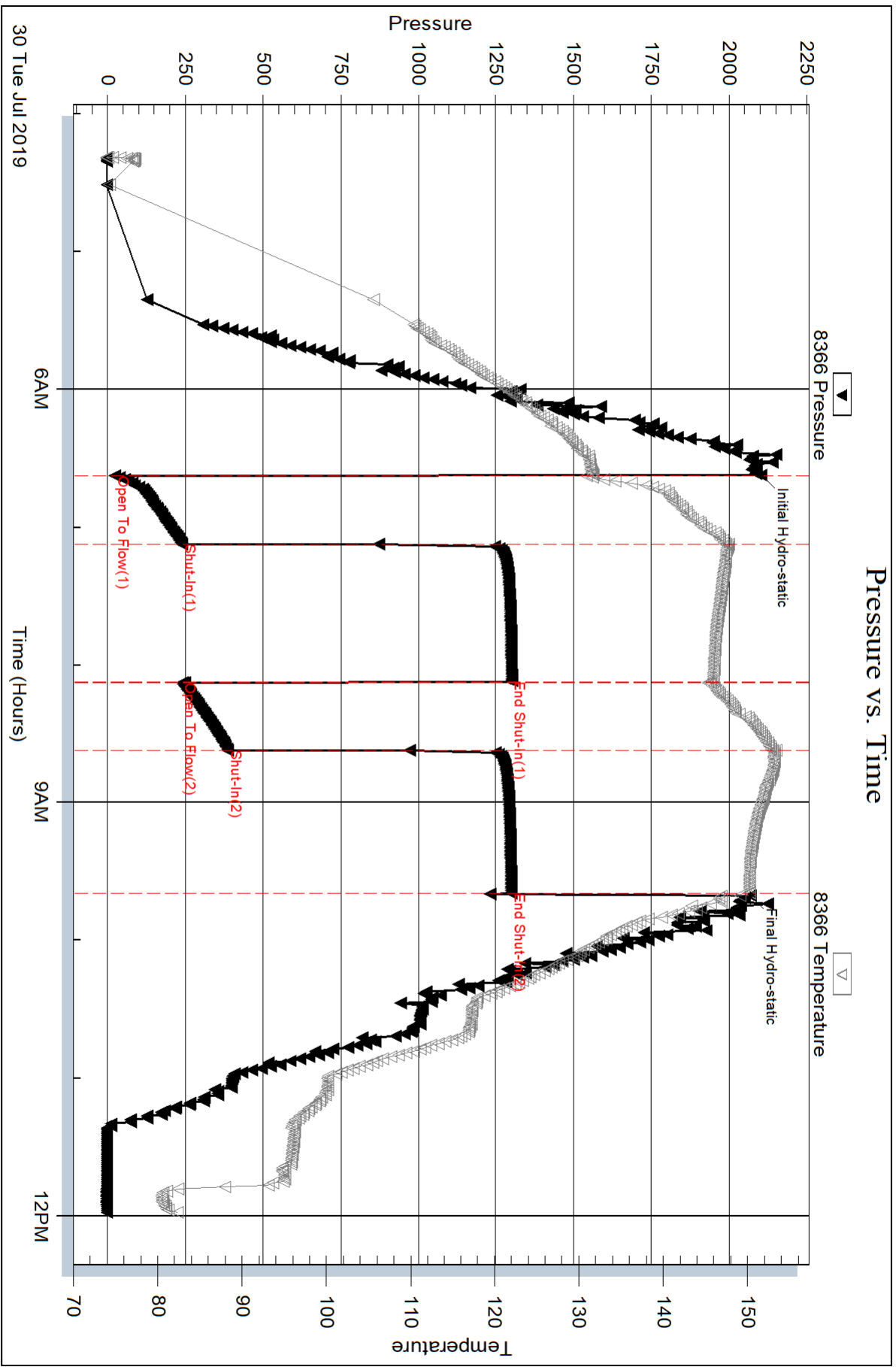
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW = .250 @ 78 DEG F
CHLORIDES = 24,000 PPM



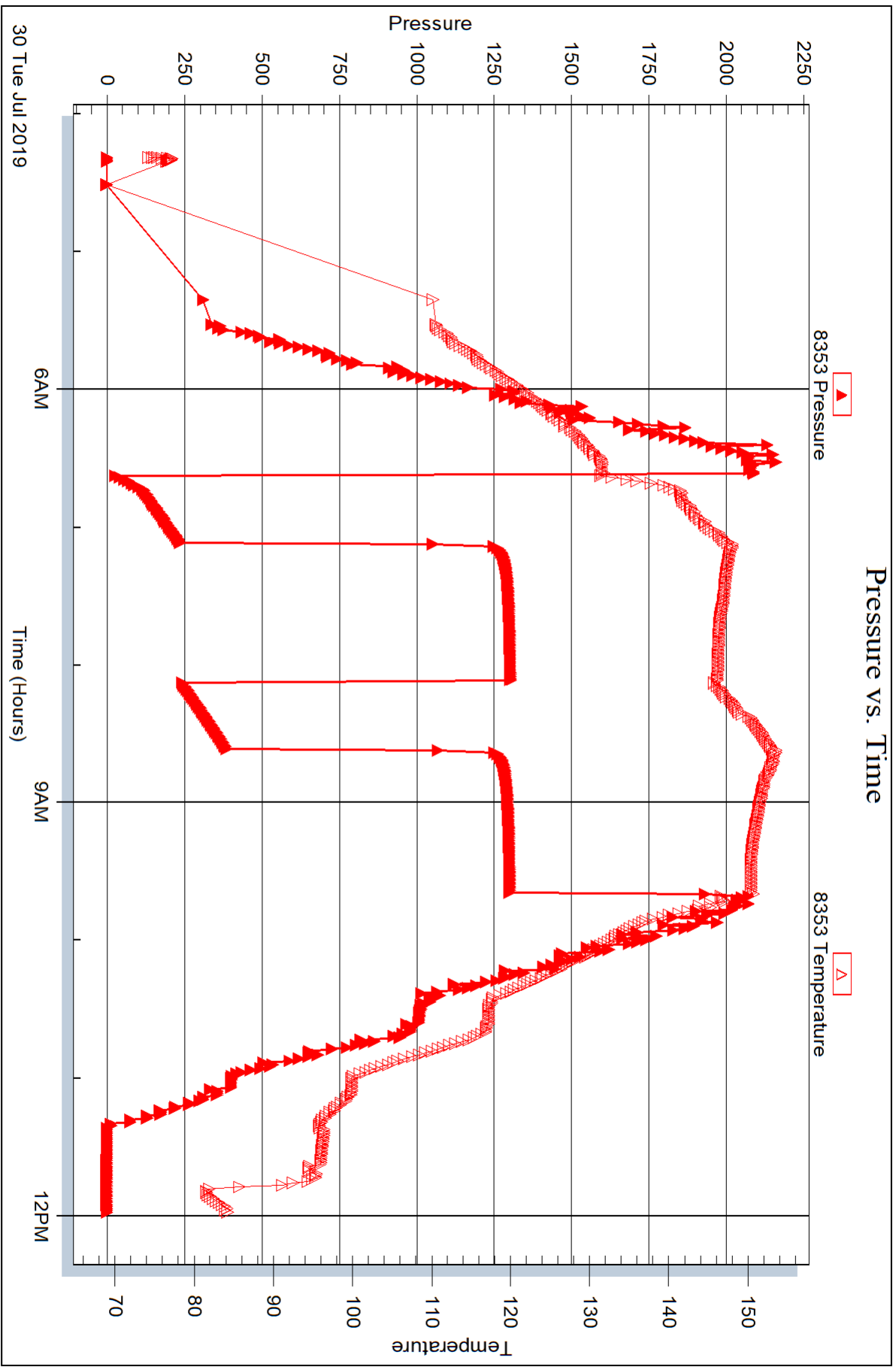
Serial #: 8353

Inside

Murfin Drilling Co. Inc.

Laing #1-19

DST Test Number: 3





DRILL STEM TEST REPORT

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

250 N. Water STE 300
Wichita KS 67202

ATTN: Saman Sharifaie

Laing #1-19

19-2s-38w Cheyenne KS

Start Date: 2019.07.31 @ 06:12:00

End Date: 2019.07.31 @ 13:40:20

Job Ticket #: 65272 DST #: 4

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

Printed: 2019.08.02 @ 10:46:09



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65272

DST#: 4

ATTN: Saman Sharifaie

Test Start: 2019.07.31 @ 06:12:00

GENERAL INFORMATION:

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

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 08:49:20

Time Test Ended: 13:40:20

Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

Unit No: 71

Interval: 4446.00 ft (KB) To 4530.00 ft (KB) (TVD)

Reference Elevations: 3389.00 ft (KB)

Total Depth: 4530.00 ft (KB) (TVD)

3384.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8366 Outside

Press@RunDepth: 19.38 psig @ 4447.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2019.07.31

End Date:

2019.07.31

Last Calib.: 2019.07.31

Start Time: 06:12:01

End Time:

13:40:20

Time On Btm: 2019.07.31 @ 08:49:00

Time Off Btm: 2019.07.31 @ 11:50:20

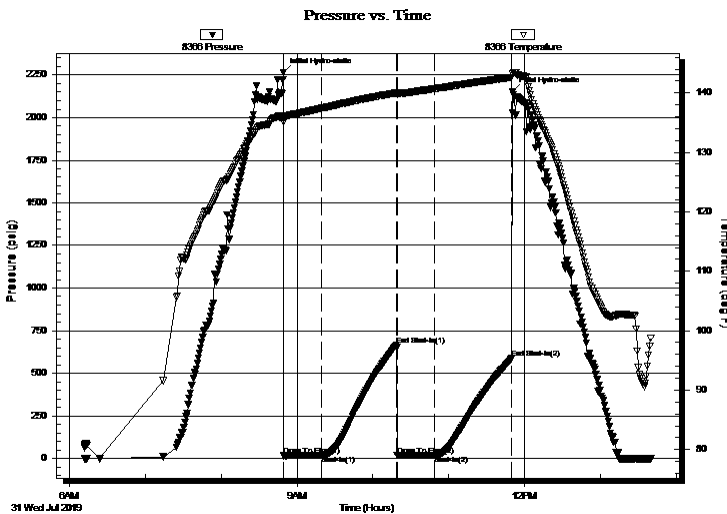
TEST COMMENT: 30 IF - Blow built to 1/4" died @ 28 mins

60 ISI - No return

30 FF - No blow

60 FSI - No return

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2265.38	136.10	Initial Hydro-static
1	15.48	135.06	Open To Flow (1)
30	17.34	137.39	Shut-In(1)
90	665.56	140.00	End Shut-In(1)
91	17.39	139.71	Open To Flow (2)
120	19.38	140.71	Shut-In(2)
181	586.79	142.62	End Shut-In(2)
182	2149.78	143.16	Final Hydro-static

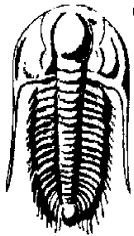
Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100%M	0.02

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.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65272

DST#: 4

ATTN: Saman Sharifaie

Test Start: 2019.07.31 @ 06:12:00

GENERAL INFORMATION:

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

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 08:49:20

Time Test Ended: 13:40:20

Test Type: Conventional Bottom Hole (Reset)

Tester: Ryan Nichols

Unit No: 71

Interval: 4446.00 ft (KB) To 4530.00 ft (KB) (TVD)

Total Depth: 4530.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 3389.00 ft (KB)

3384.00 ft (CF)

KB to GR/CF: 5.00 ft

Serial #: 8353

Inside

Press@RunDepth: psig @ 4447.00 ft (KB)

Start Date: 2019.07.31

End Date:

2019.07.31

Capacity: 8000.00 psig

Last Calib.:

2019.07.31

Start Time: 06:12:01

End Time:

13:40:10

Time On Btm:

Time Off Btm:

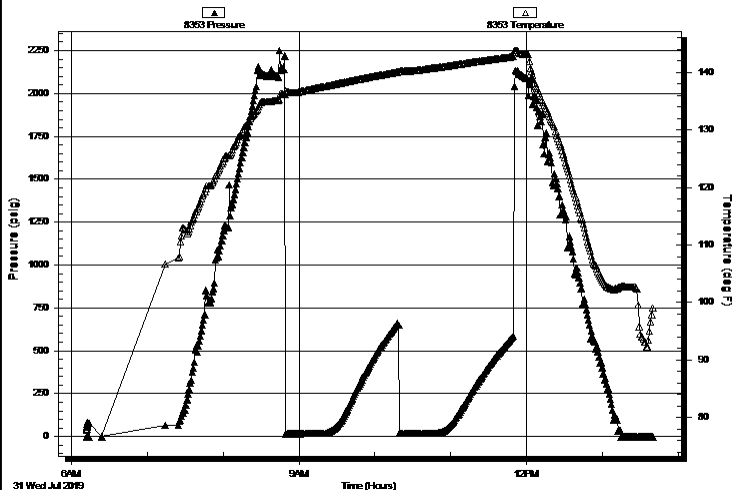
TEST COMMENT: 30 IF - Blow built to 1/4" died @ 28 mins

60 ISI - No return

30 FF - No blow

60 FSI - No return

Pressure vs. Time



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100%M	0.02

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.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65272

DST#: 4

ATTN: Saman Sharifaie

Test Start: 2019.07.31 @ 06:12:00

Tool Information

Drill Pipe:	Length: 4266.00 ft	Diameter: 3.80 inches	Volume: 59.84 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 20000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 60.71 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 60000.00 lb
Depth to Top Packer:	4446.00 ft			Final 60000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	84.00 ft			
Tool Length:	112.00 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			4423.00	
Hydraulic tool	5.00			4428.00	
Jars	5.00			4433.00	
Safety Joint	3.00			4436.00	
Packer	5.00			4441.00	28.00 Bottom Of Top Packer
Packer	5.00			4446.00	
Stubb	1.00			4447.00	
Recorder	0.00	8353	Inside	4447.00	
Recorder	0.00	8366	Outside	4447.00	
Perforations	15.00			4462.00	
Blank Spacing	65.00			4527.00	
Bullnose	3.00			4530.00	84.00 Bottom Packers & Anchor

Total Tool Length: 112.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.

19-2s-38w Cheyenne KS

250 N. Water STE 300
Wichita KS 67202

Laing #1-19

Job Ticket: 65272

DST#: 4

ATTN: Saman Sharifaie

Test Start: 2019.07.31 @ 06:12:00

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: 62.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.59 in³

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
5.00	Mud 100%M	0.025

Total Length: 5.00 ft Total Volume: 0.025 bbl

Num Fluid Samples: 0

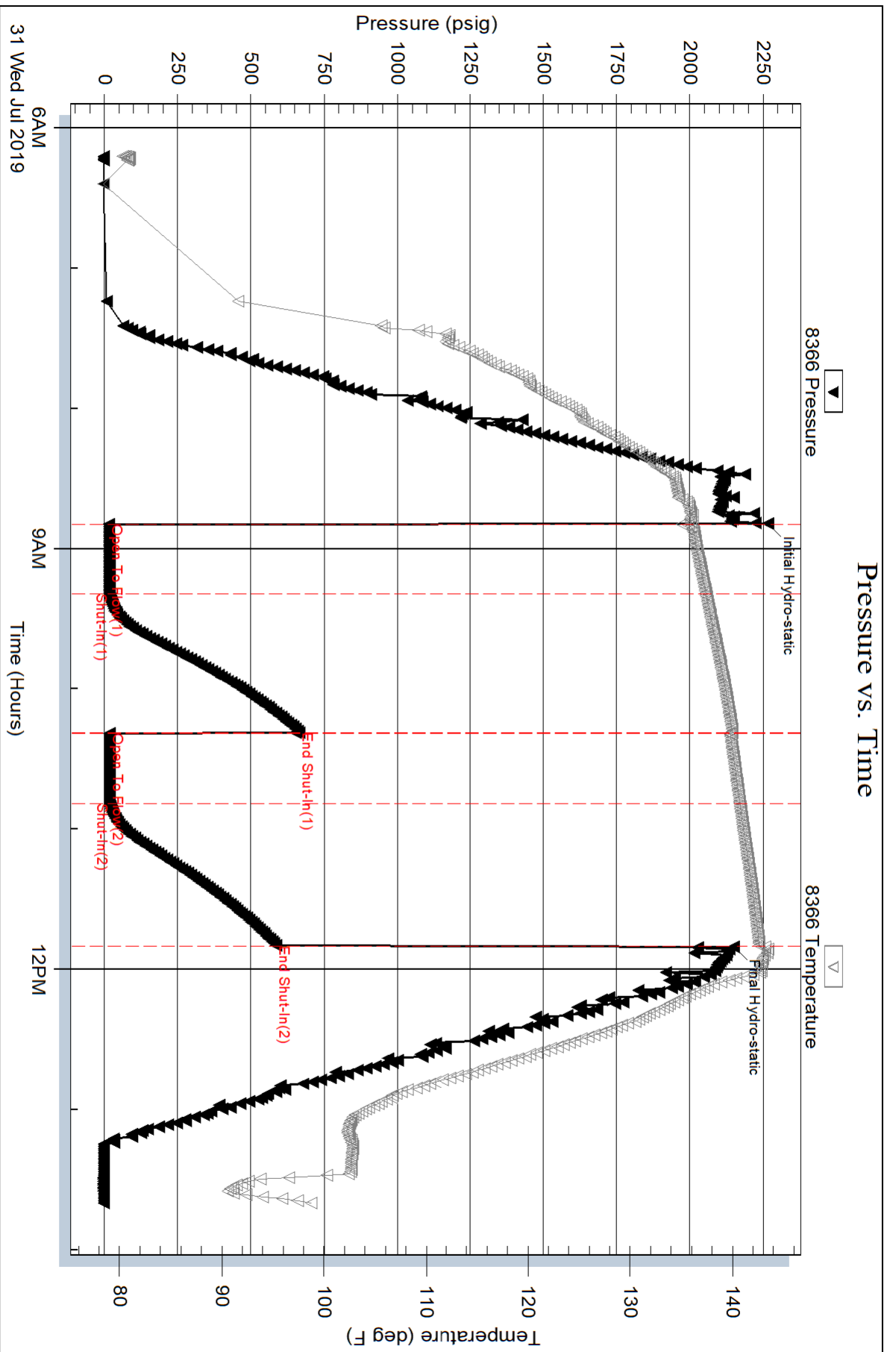
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



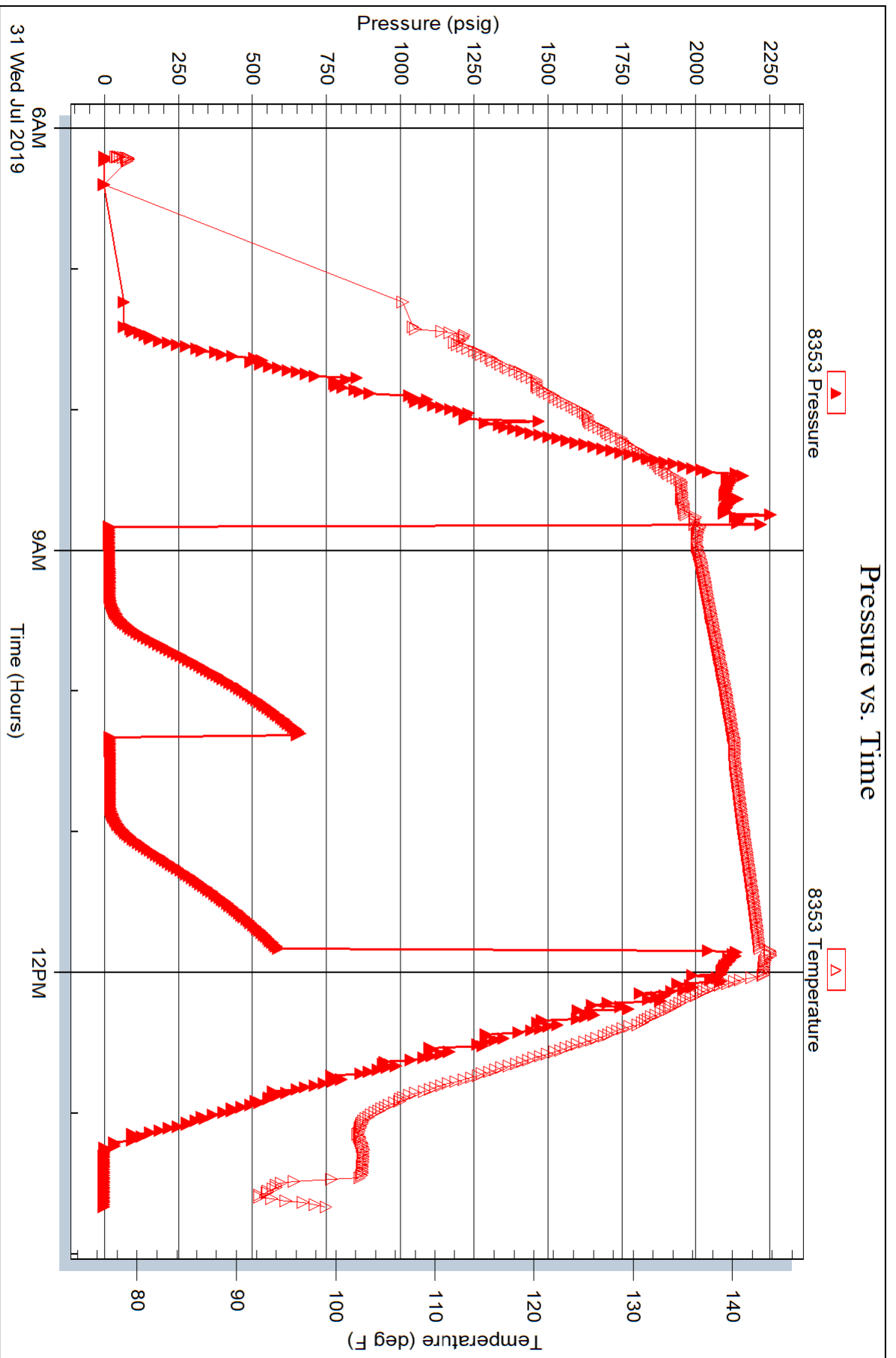
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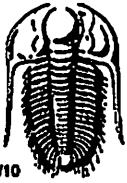
Inside

Murfin Drilling Co. Inc.

Laing #1-19

DST Test Number: 4





TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 65269

Well Name & No. Laing # 1-19 Test No. 1 Date 7/28/19
 Company Murfin Drilling Co. Inc. Elevation 3389 KB 3384 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Saman Sharifie Rig Murfin # 3
 Location: Sec. 19 Twp 25 Rge. 38 W Co. Cheyenne State KS

Interval Tested 4196 - 4270 Zone Tested Oread
 Anchor Length 74' Drill Pipe Run 4016' Mud Wt. 8.8
 Top Packer Depth 4191 Drill Collars Run 177' Vis 64
 Bottom Packer Depth 4196 Wt. Pipe Run 0' WL 6.8
 Total Depth 4270 Chlorides 1200 ppm System LCM 4
 Blow Description 30 IF - Surface blow died @ 23 mins
60 ISI - No return
30 EF - No blow
60 FSI - No return

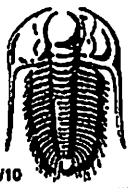
Rec	Feet of	%gas	%oil	%water	%mud
<u>2'</u>	<u>Mud</u>			<u>100</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 2' BHT 140° Gravity < API RW < @ < F Chlorides < ppm

(A) Initial Hydrostatic <u>2069</u>	<input checked="" type="checkbox"/> Test <u>1300</u>	T-On Location <u>18:45</u>
(B) First Initial Flow <u>15</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>19:12</u>
(C) First Final Flow <u>16</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>21:40</u>
(D) Initial Shut-In <u>66</u>	<input type="checkbox"/> Circ Sub _____	T-Pulled <u>00:38</u>
(E) Second Initial Flow <u>16</u>	<input type="checkbox"/> Hourly Standby _____	T-Out <u>02:25</u>
(F) Second Final Flow <u>17</u>	<input checked="" type="checkbox"/> Mileage <u>135 RT</u> <u>135</u>	Comments _____
(G) Final Shut-In <u>54</u>	<input type="checkbox"/> Sampler _____	_____
(H) Final Hydrostatic <u>1926</u>	<input type="checkbox"/> Straddle _____	<input type="checkbox"/> EM Tool _____
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer _____	<input type="checkbox"/> Ruined Shale Packer _____
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer _____	<input type="checkbox"/> Ruined Packer _____
Final Flow <u>30</u>	<input type="checkbox"/> Extra Recorder _____	<input type="checkbox"/> Extra Copies _____
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby _____	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility _____	Total <u>1760</u>
	Sub Total <u>1760</u>	MP/DST Disc't _____

Approved By _____ Our Representative Ryan J. Nichols

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. 65270

Well Name & No. Laing #1-19 Test No. 2 Date 7/29/19
 Company Martin Drilling Co. Inc. Elevation 3389 KB 3384 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Saman Sharif Rig Martin # 3
 Location: Sec. 19 Twp 2S Rge. 38W Co. Cheyenne State KS

Interval Tested 4264 - 4330 Zone Tested LKC "A"
 Anchor Length 66' Drill Pipe Run 4078' Mud Wt. 9.0
 Top Packer Depth 4259 Drill Collars Run 177' Vis 62
 Bottom Packer Depth 4264 Wt. Pipe Run 0' WL 6.8
 Total Depth 4330 Chlorides 1100 ppm System LCM 3
 Blow Description 30 IF - Blow built to 1/4" died to surface
60 ISI - No return
30 FF - No blow
60 FSI - No return

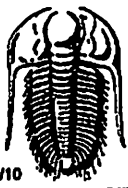
Rec	Feet of	%gas	%oil	%water	%mud
<u>5'</u>	<u>Mud</u>			<u>100</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 5 BHT 138° Gravity — API RW — @ — F Chlorides — ppm

(A) Initial Hydrostatic <u>2120</u>	<input checked="" type="checkbox"/> Test <u>1300</u>	T-On Location <u>11:30</u>
(B) First Initial Flow <u>19</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>11:55</u>
(C) First Final Flow <u>20</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>13:38</u>
(D) Initial Shut-In <u>99</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>16:38</u>
(E) Second Initial Flow <u>19</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>18:30</u>
(F) Second Final Flow <u>21</u>	<input checked="" type="checkbox"/> Mileage <u>135 RT</u> ¹³⁵	Comments
(G) Final Shut-In <u>80</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>2031</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> EM Tool
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Shale Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Ruined Packer
Final Flow <u>30</u>	<input type="checkbox"/> Extra Recorder	<input type="checkbox"/> Extra Copies
Final Shut-In <u>10</u>	<input type="checkbox"/> Day Standby	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility	Total <u>1760</u>
	Sub Total <u>1760</u>	MP/DST Disc't

Approved By _____ Our Representative Ag 2 Wilb

Triobite 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. 65271

Well Name & No. Lains # 1-19 Test No. 3 Date 7/30/19
 Company Martin Drilling Co. Inc. Elevation 3389 KB 3384 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Saman Sharifie Rig Martin # 3
 Location: Sec. 19 Twp 25 Rge. 38W Co. Cheyenne State KS

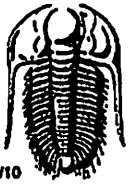
Interval Tested 4320 - 4396 Zone Tested LKC "B-D"
 Anchor Length 76' Drill Pipe Run 4140' Mud Wt. 9.1
 Top Packer Depth 4315 Drill Collars Run 177' Vis 73
 Bottom Packer Depth 4320 Wt. Pipe Run 0' WL 6.0
 Total Depth 4396 Chlorides 1100 ppm System LCM 4
 Blow Description 30 IF - BoB @ 11 1/2 mins
60 ISI - No return
30 FF - BoB @ 13 mins
60 FSI - No return

Rec	Feet of	%gas	%oil	%water	%mud
<u>170</u>	<u>WCM</u>		<u>25</u>	<u>75</u>	
<u>650</u>	<u>MCW</u>		<u>90</u>	<u>10</u>	
<u>60</u>	<u>WCM</u>		<u>45</u>	<u>55</u>	

Rec Total 680' BHT 150° Gravity — API RW 250 @ 78 °F Chlorides 24,000 ppm

(A) Initial Hydrostatic <u>2104</u>	<input checked="" type="checkbox"/> Test <u>1300</u>	T-On Location <u>03:45</u>
(B) First Initial Flow <u>24</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>04:19</u>
(C) First Final Flow <u>239</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>06:37</u>
(D) Initial Shut-In <u>1302</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>09:39</u>
(E) Second Initial Flow <u>240</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>12:00</u>
(F) Second Final Flow <u>387</u>	<input checked="" type="checkbox"/> Mileage <u>135 XT 135</u>	Comments _____
(G) Final Shut-In <u>1300</u>	<input type="checkbox"/> Sampler	_____
(H) Final Hydrostatic <u>2068</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> EM Tool
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Shale Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Ruined Packer
Final Flow <u>30</u>	<input type="checkbox"/> Extra Recorder	<input type="checkbox"/> Extra Copies
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility	Total <u>1760</u>
	Sub Total <u>1760</u>	MP/DST Disc't _____

Approved By _____ Our Representative [Signature]
 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.



TRIBOLITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 65272

Well Name & No. Laing # 1-19 Test No. 4 Date 7/31/19
 Company Murfin Drilling Co. Inc. Elevation 3389 KB 3384 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Saman Sharifie Rig Murfin # 3
 Location: Sec. 19 Twp 25 Rge. 38W Co. Cheyenne State KS

Interval Tested 4446 - 4530 Zone Tested LKC "H-J"
 Anchor Length 84' Drill Pipe Run 4266' Mud Wt. 9.0
 Top Packer Depth 4441 Drill Collars Run 177' Vis 62
 Bottom Packer Depth 4446 Wt. Pipe Run 0' WL 5.6
 Total Depth 4530 Chlorides 1000 ppm System LCM 5
 Blow Description 30 IF - Blow built to 1/4" died @ 28 mins
60 ISI - No return
30 FF - No blow
60 FSI - No return

Rec	Feet of	%gas	Spots	%oil	%water	%mud
5'	OS Mud				100	

Rec Total 5' BHT 143° Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2265 Test 1300 T-On Location 05:30
 (B) First Initial Flow 15 Jars 250 T-Started 06:12
 (C) First Final Flow 17 Safety Joint 75 T-Open 08:49
 (D) Initial Shut-In 666 Circ Sub — T-Pulled 11:49
 (E) Second Initial Flow 17 Hourly Standby — T-Out 13:30
 (F) Second Final Flow 19 Mileage 135 RTx2 Comments Loaded tools
 (G) Final Shut-In 567 Sampler 135+135 @ 8:00 on 8/2/19
 (H) Final Hydrostatic 2150 Straddle — EM Tool —
 Shale Packer — Ruined Shale Packer —
 Extra Packer — Ruined Packer —
 Extra Recorder — Extra Copies —
 Day Standby 1.5d 6.5h Sub Total 800
 Accessibility — Total 2695
 Sub Total 1895 MP/DST Disc't —

Approved By _____ Our Representative Ry 2 Nishid
 Tribolite 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.