



## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Jeff Christian

### **Culwell ' J ' # 1-19**

#### **19-2S-37W Cheyenne,KS**

Start Date: 2019.04.06 @ 16:20:00

End Date: 2019.04.06 @ 22:55:39

Job Ticket #: 63279                      DST #: 1

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

Printed: 2019.04.11 @ 14:33:01



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

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

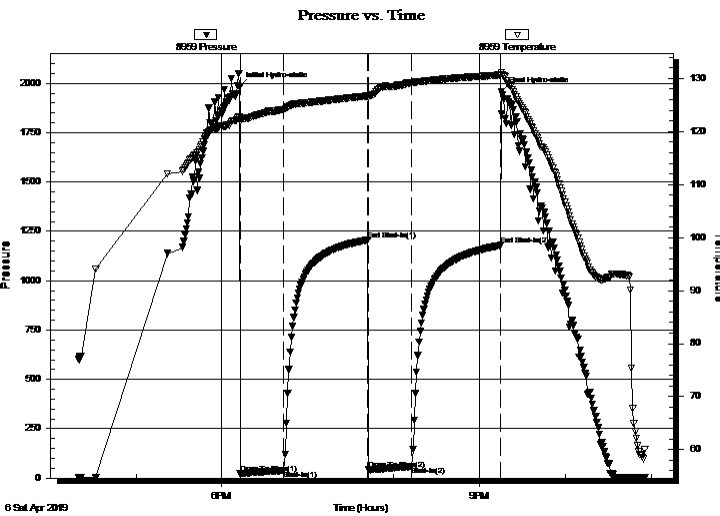
**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
 Job Ticket: 63279 **DST#: 1**  
 Test Start: 2019.04.06 @ 16:20:00

## GENERAL INFORMATION:

Formation: **"Topeka - Deer Creek**  
 Deviated: No Whipstock: ft (KB) Test Type: Conventional Bottom Hole (Initial)  
 Time Tool Opened: 18:12:40 Tester: Martine Salinas  
 Time Test Ended: 22:55:39 Unit No: 82  
 Interval: **4050.00 ft (KB) To 4138.00 ft (KB) (TVD)** Reference Elevations: 3389.00 ft (KB)  
 Total Depth: 4138.00 ft (KB) (TVD) 3384.00 ft (CF)  
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 5.00 ft

**Serial #: 8959 Inside**  
 Press@RunDepth: 58.98 psig @ 4051.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2019.04.06 End Date: 2019.04.06 Last Calib.: 2019.04.06  
 Start Time: 16:20:01 End Time: 22:55:40 Time On Btm: 2019.04.06 @ 18:12:30  
 Time Off Btm: 2019.04.06 @ 21:15:20

**TEST COMMENT:** 30-IF-Surface blow built to 1 1/2"  
 60-ISI-No blow  
 30-FF-Weak surface bubbles @ 3 mins built to 1/4"  
 60-FSI-No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1983.51	122.67	Initial Hydro-static
1	22.49	121.94	Open To Flow (1)
31	39.07	124.10	Shut-In(1)
90	1206.11	126.71	End Shut-In(1)
90	42.63	126.37	Open To Flow (2)
120	58.98	129.16	Shut-In(2)
182	1179.02	130.63	End Shut-In(2)
183	1957.77	131.14	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
75.00	100% Mud	0.37

## Gas Rates

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





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

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

**19-2S-37W Cheyenne,KS**  
**Culwell 'J' # 1-19**  
Job Ticket: 63279 **DST#: 1**  
Test Start: 2019.04.06 @ 16:20:00

## Tool Information

Drill Pipe:	Length: 3855.00 ft	Diameter: 3.80 inches	Volume: 54.08 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 75000.00 lb
			<u>Total Volume: 54.95 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	10.00 ft			String Weight: Initial 62000.00 lb
Depth to Top Packer:	4050.00 ft			Final 62000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	88.00 ft			
Tool Length:	116.00 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			4027.00	
Hydraulic tool	5.00	1113		4032.00	
Jars	5.00	01-07		4037.00	
Safety Joint	3.00	-001		4040.00	
Packer	5.00			4045.00	28.00 Bottom Of Top Packer
Packer	5.00			4050.00	
Stubb	1.00			4051.00	
Recorder	0.00	8959	Inside	4051.00	
Recorder	0.00	8734	Outside	4051.00	
Perforations	17.00			4068.00	
Change Over Sub	1.00			4069.00	
Drill Pipe	63.00			4132.00	
Change Over Sub	1.00			4133.00	
Bullnose	5.00			4138.00	88.00 Bottom Packers & Anchor

**Total Tool Length: 116.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

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

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63279      **DST#: 1**  
Test Start: 2019.04.06 @ 16:20:00

## 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: 68.00 sec/qt	Cushion Volume: bbl		
Water Loss: 5.58 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 600.00 ppm			
Filter Cake: 2.00 inches			

## Recovery Information

Recovery Table

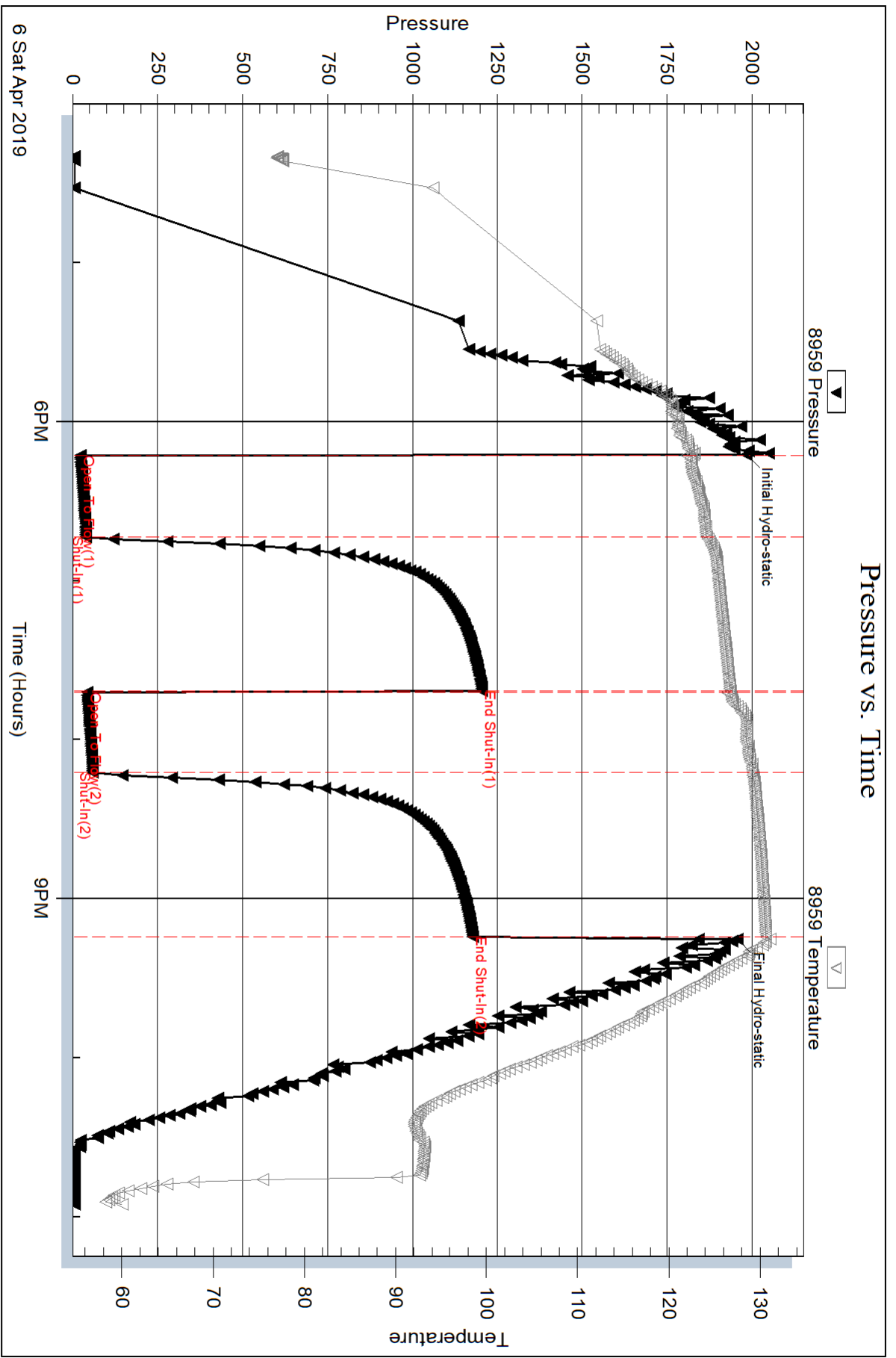
Length ft	Description	Volume bbl
75.00	100% Mud	0.369

Total Length: 75.00 ft      Total Volume: 0.369 bbl

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

Laboratory Name:      Laboratory Location:

Recovery Comments:

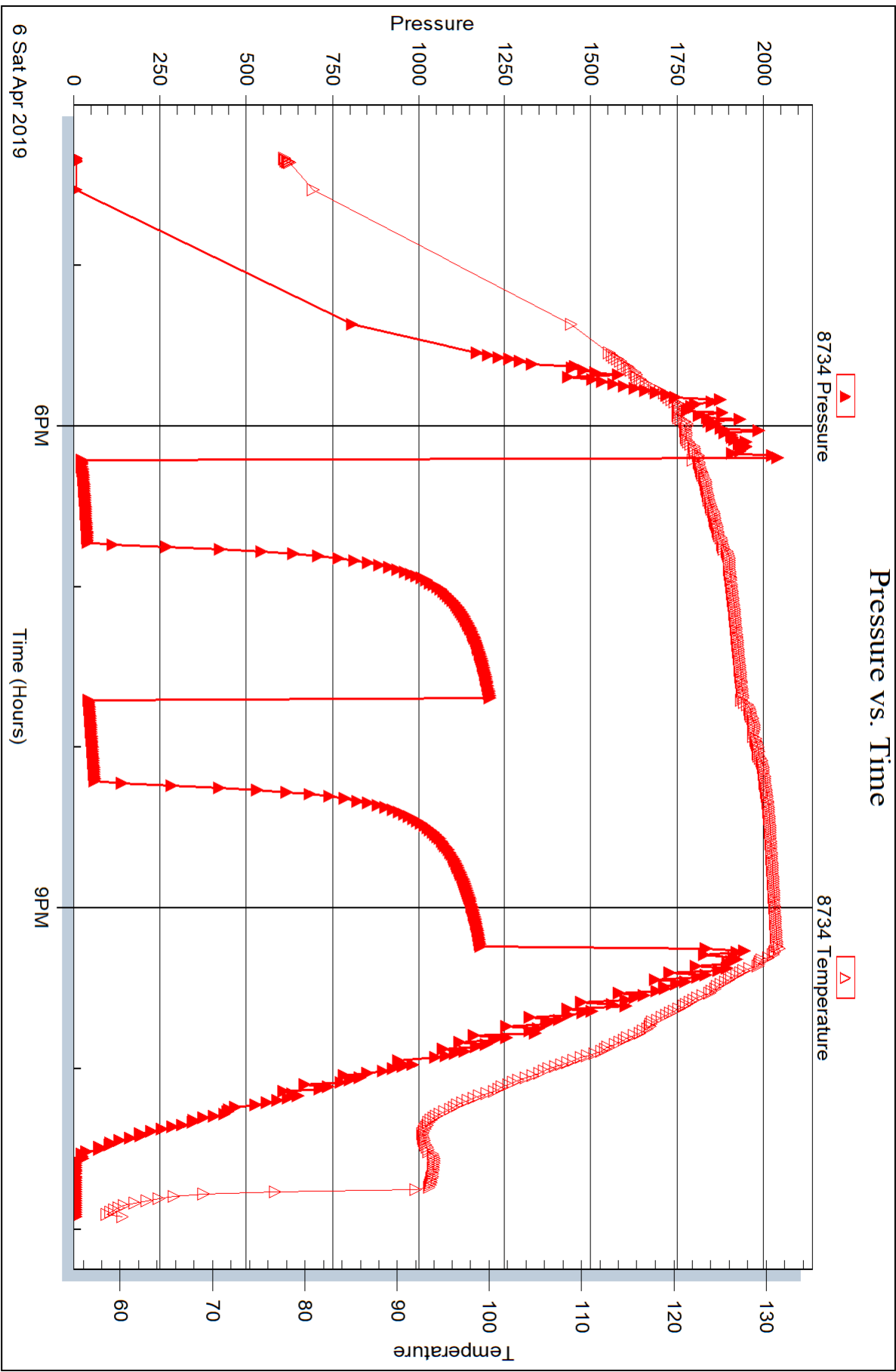


Serial #: 8734

Outside Murfin Drilling Co Inc

Culwell 'J' # 1-19

DST Test Number: 1





## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co Inc**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Jeff Christian

**Culwell ' J ' # 1-19**

**19-2S-37W Cheyenne,KS**

Start Date: 2019.04.07 @ 11:50:00

End Date: 2019.04.07 @ 18:53:00

Job Ticket #: 63280                      DST #: 2

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

Printed: 2019.04.11 @ 14:32:09

Murfin Drilling Co Inc  
19-2S-37W Cheyenne,KS  
Culwell ' J ' # 1-19  
DST # 2  
Oread  
2019.04.07





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

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

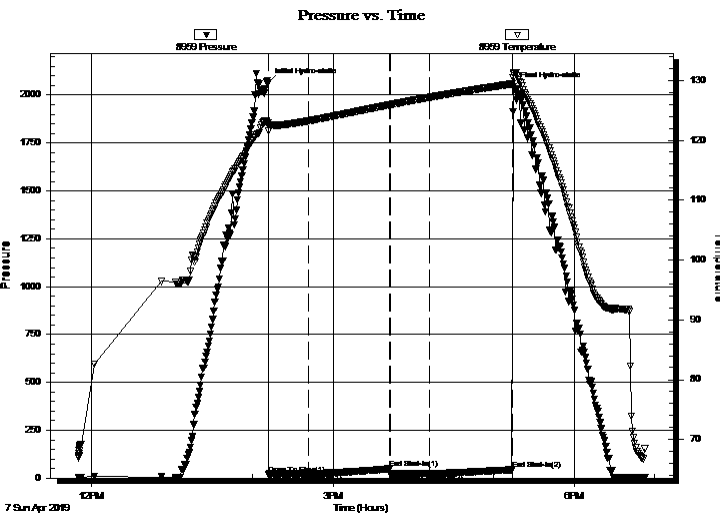
**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63280      **DST#: 2**  
Test Start: 2019.04.07 @ 11:50:00

## GENERAL INFORMATION:

Formation: **Oread**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 14:11:40  
Time Test Ended: 18:53:00  
Interval: **4177.00 ft (KB) To 4260.00 ft (KB) (TVD)**  
Total Depth: 4260.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Good  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Martine Salinas  
Unit No: 82  
Reference Elevations: 3389.00 ft (KB)  
3384.00 ft (CF)  
KB to GR/CF: 5.00 ft

**Serial #: 8959      Inside**  
Press@RunDepth: 23.50 psig @ 4178.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2019.04.07      End Date: 2019.04.07      Last Calib.: 2019.04.07  
Start Time: 11:50:01      End Time: 18:53:00      Time On Btm: 2019.04.07 @ 14:11:30  
Time Off Btm: 2019.04.07 @ 17:14:39

**TEST COMMENT:** 30-IF-Surface blow built to 1/2" @ 10 mins & maintained blow  
60-ISI-No blow  
30-FF-No blow  
60-FSI-No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2066.69	122.93	Initial Hydro-static
1	20.49	121.53	Open To Flow (1)
31	23.14	123.23	Shut-In(1)
91	48.58	125.91	End Shut-In(1)
91	22.18	125.91	Open To Flow (2)
121	23.50	127.15	Shut-In(2)
183	44.26	129.41	End Shut-In(2)
184	2043.20	131.08	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
5.00	100% Mud	0.02
0.00	Oil spots in tool	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  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell 'J' # 1-19**  
Job Ticket: 63280 **DST#: 2**  
Test Start: 2019.04.07 @ 11:50:00

## Tool Information

Drill Pipe:	Length: 3979.00 ft	Diameter: 3.80 inches	Volume: 55.81 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 72000.00 lb
			Total Volume: 56.68 bbl	Tool Chased 0.00 ft
Drill Pipe Above KB:	7.00 ft			String Weight: Initial 64000.00 lb
Depth to Top Packer:	4177.00 ft			Final 64000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	83.00 ft			
Tool Length:	111.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

## Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Shut In Tool	5.00			4154.00	
Hydraulic tool	5.00	1113		4159.00	
Jars	5.00	01-07		4164.00	
Safety Joint	3.00	-001		4167.00	
Packer	5.00			4172.00	28.00 Bottom Of Top Packer
Packer	5.00			4177.00	
Stubb	1.00			4178.00	
Recorder	0.00	8959	Inside	4178.00	
Recorder	0.00	8734	Outside	4178.00	
Perforations	12.00			4190.00	
Change Over Sub	1.00			4191.00	
Drill Pipe	63.00			4254.00	
Change Over Sub	1.00			4255.00	
Bullnose	5.00			4260.00	83.00 Bottom Packers & Anchor

**Total Tool Length: 111.00**



**TRILOBITE  
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# DRILL STEM TEST REPORT

**FLUID SUMMARY**

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

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63280      **DST#: 2**  
Test Start: 2019.04.07 @ 11:50:00

## Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 69.00 sec/qt	Cushion Volume: bbl		
Water Loss: 5.58 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 600.00 ppm			
Filter Cake: 2.00 inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	100% Mud	0.025
0.00	Oil spots in tool	0.000

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:

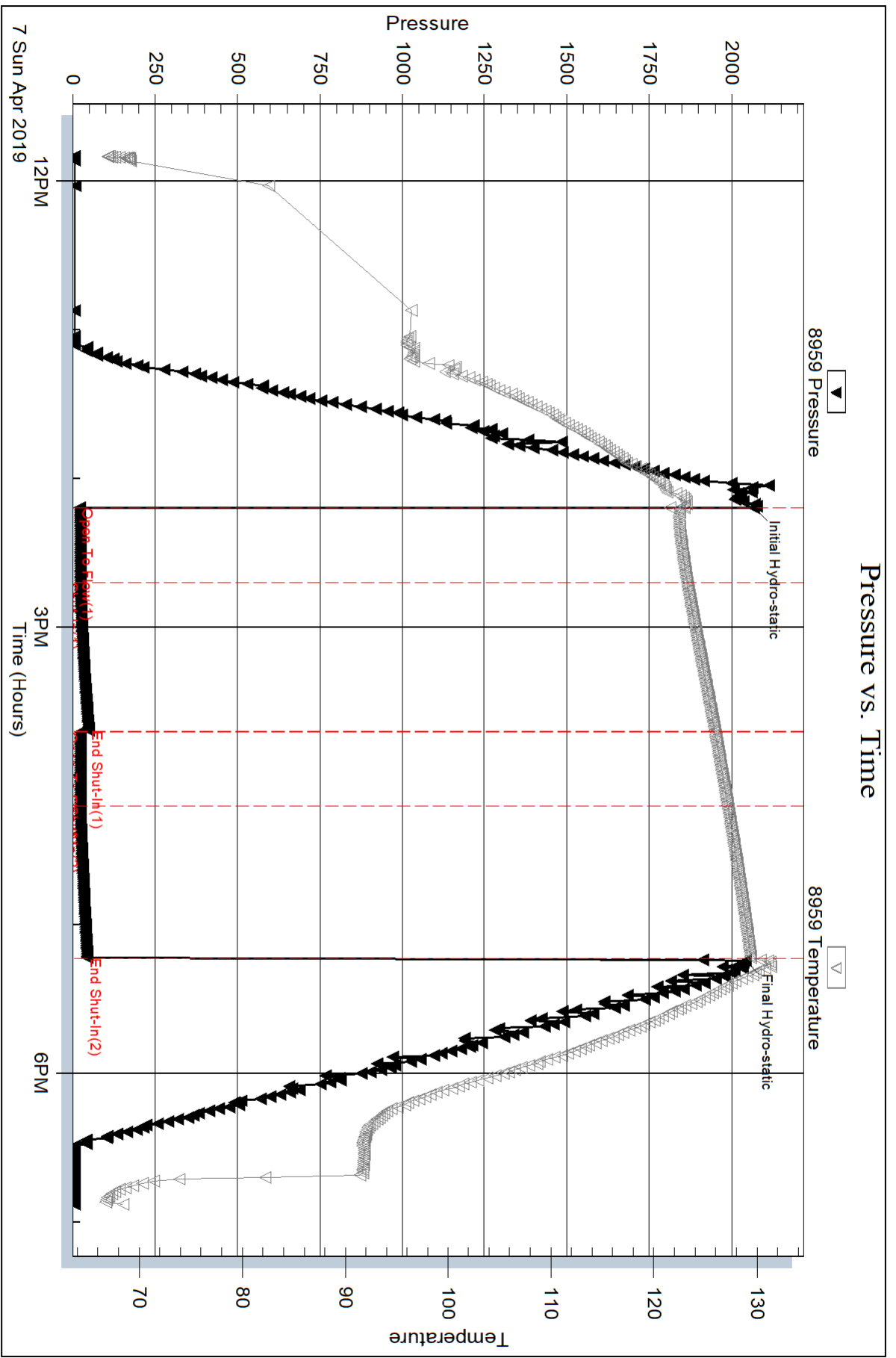
Serial #: 8959

Inside

Murfin Drilling Co Inc

Culwell 'J' # 1-19

DST Test Number: 2

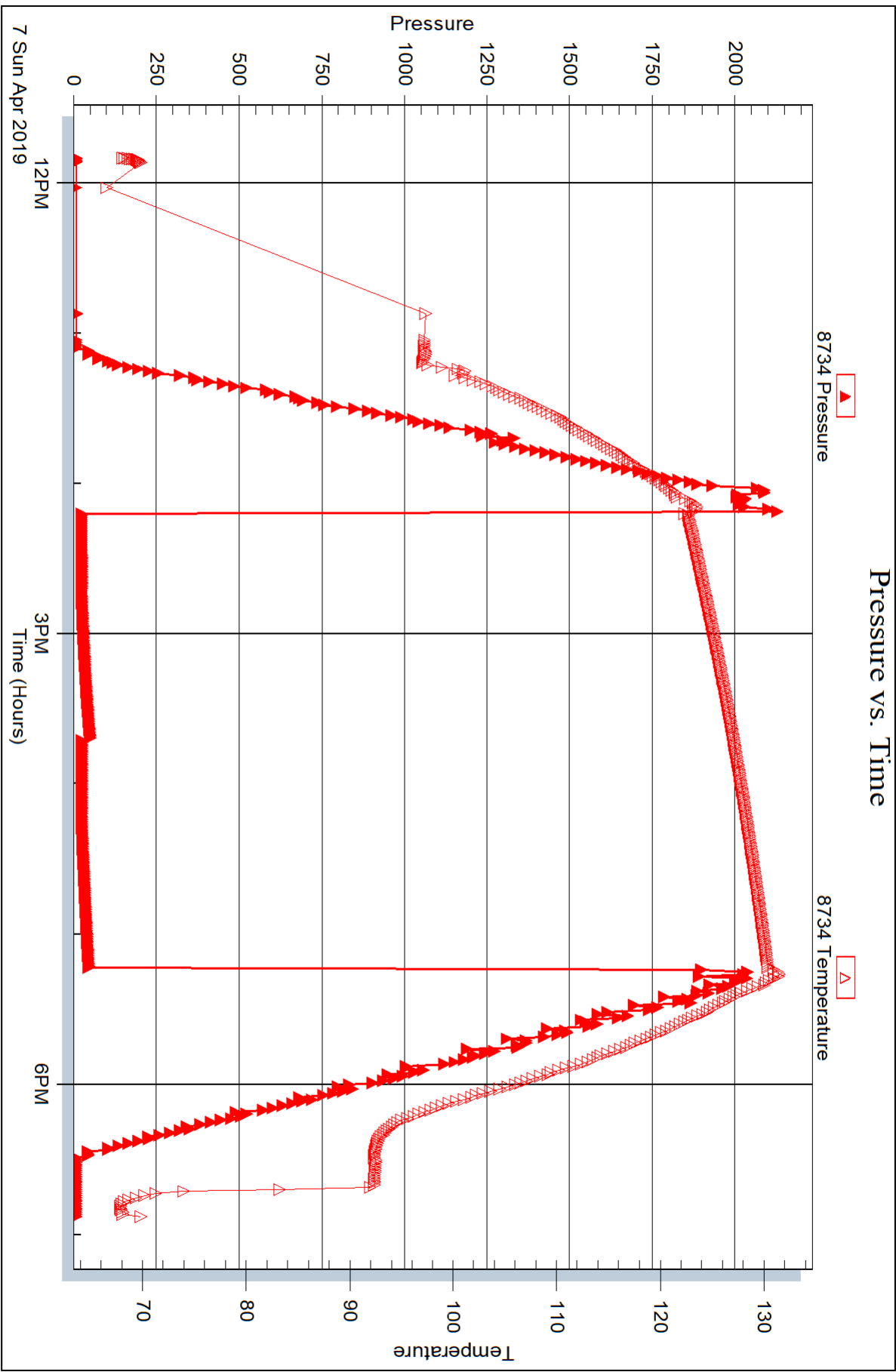


Serial #: 8734

Outside Murfin Drilling Co Inc

Culwell 'J' # 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: Jeff Christian

### **Culwell ' J ' # 1-19**

#### **19-2S-37W Cheyenne,KS**

Start Date: 2019.04.08 @ 10:45:00

End Date: 2019.04.08 @ 19:05:50

Job Ticket #: 63281                      DST #: 3

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

Printed: 2019.04.11 @ 14:30:52



**TRILOBITE TESTING, INC.**

# DRILL STEM TEST REPORT

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

**19-2S-37W Cheyenne, KS**  
**Culwell ' J ' # 1-19**  
 Job Ticket: 63281 **DST#: 3**  
 Test Start: 2019.04.08 @ 10:45:00

## GENERAL INFORMATION:

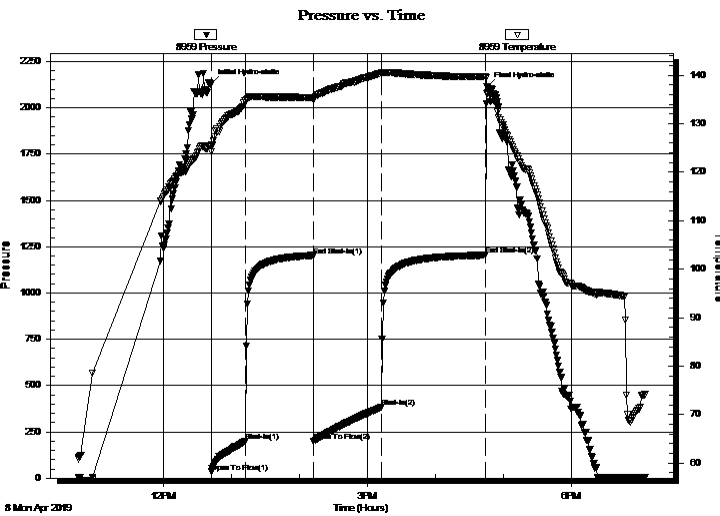
Formation: **LKC " A - D "**  
 Deviated: No Whipstock: ft (KB)  
 Time Tool Opened: 12:42:10  
 Time Test Ended: 19:05:50  
 Interval: **4261.00 ft (KB) To 4406.00 ft (KB) (TVD)**  
 Total Depth: 4406.00 ft (KB) (TVD)  
 Hole Diameter: 7.88 inches Hole Condition: Good  
 Test Type: Conventional Bottom Hole (Reset)  
 Tester: Martine Salinas  
 Unit No: 82  
 Reference Elevations: 3389.00 ft (KB)  
 3384.00 ft (CF)  
 KB to GR/CF: 5.00 ft

## Serial #: 8959

Inside

Press@RunDepth: 382.05 psig @ 4262.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2019.04.08 End Date: 2019.04.08 Last Calib.: 2019.04.08  
 Start Time: 10:45:01 End Time: 19:05:50 Time On Btm: 2019.04.08 @ 12:42:00  
 Time Off Btm: 2019.04.08 @ 16:45:50

TEST COMMENT: 30-IF-BOB (11 inches) @ 13 mins (blow increased to 22 1/4"  
 60-ISI-No blow  
 60-FF-BOB (11 inches) @ 16 1/2 mins (blow increased to 35")  
 90-FSI-No blow



## PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2131.71	125.51	Initial Hydro-static
1	34.18	124.23	Open To Flow (1)
31	198.58	134.74	Shut-In(1)
91	1202.79	135.43	End Shut-In(1)
91	199.94	134.98	Open To Flow (2)
151	382.05	140.41	Shut-In(2)
243	1204.27	139.73	End Shut-In(2)
244	2114.60	136.15	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
565.00	HWCM 29%W, 71%M	6.31
190.00	100% Mud	2.67
0.00	Oil spots in tool	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  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63281      **DST#: 3**  
Test Start: 2019.04.08 @ 10:45:00

**Tool Information**

Drill Pipe:	Length: 4071.00 ft	Diameter: 3.80 inches	Volume: 57.11 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 80000.00 lb
			<u>Total Volume: 57.98 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	15.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4261.00 ft			Final 67000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	145.00 ft			
Tool Length:	173.00 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			4238.00	
Hydraulic tool	5.00	1113		4243.00	
Jars	5.00	01-07		4248.00	
Safety Joint	3.00	-001		4251.00	
Packer	5.00			4256.00	28.00      Bottom Of Top Packer
Packer	5.00			4261.00	
Stubb	1.00			4262.00	
Recorder	0.00	8959	Inside	4262.00	
Recorder	0.00	8734	Outside	4262.00	
Perforations	10.00			4272.00	
Change Over Sub	1.00			4273.00	
Drill Pipe	127.00			4400.00	
Change Over Sub	1.00			4401.00	
Bullnose	5.00			4406.00	145.00      Bottom Packers & Anchor

**Total Tool Length: 173.00**



**TRILOBITE  
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# DRILL STEM TEST REPORT

**FLUID SUMMARY**

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

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63281      **DST#: 3**  
Test Start: 2019.04.08 @ 10:45:00

## 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:	17000 ppm
Viscosity: 64.00 sec/qt	Cushion Volume: bbl		
Water Loss: 5.99 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 600.00 ppm			
Filter Cake: 2.00 inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
565.00	HWCM 29%W, 71%M	6.313
190.00	100% Mud	2.665
0.00	Oil spots in tool	0.000

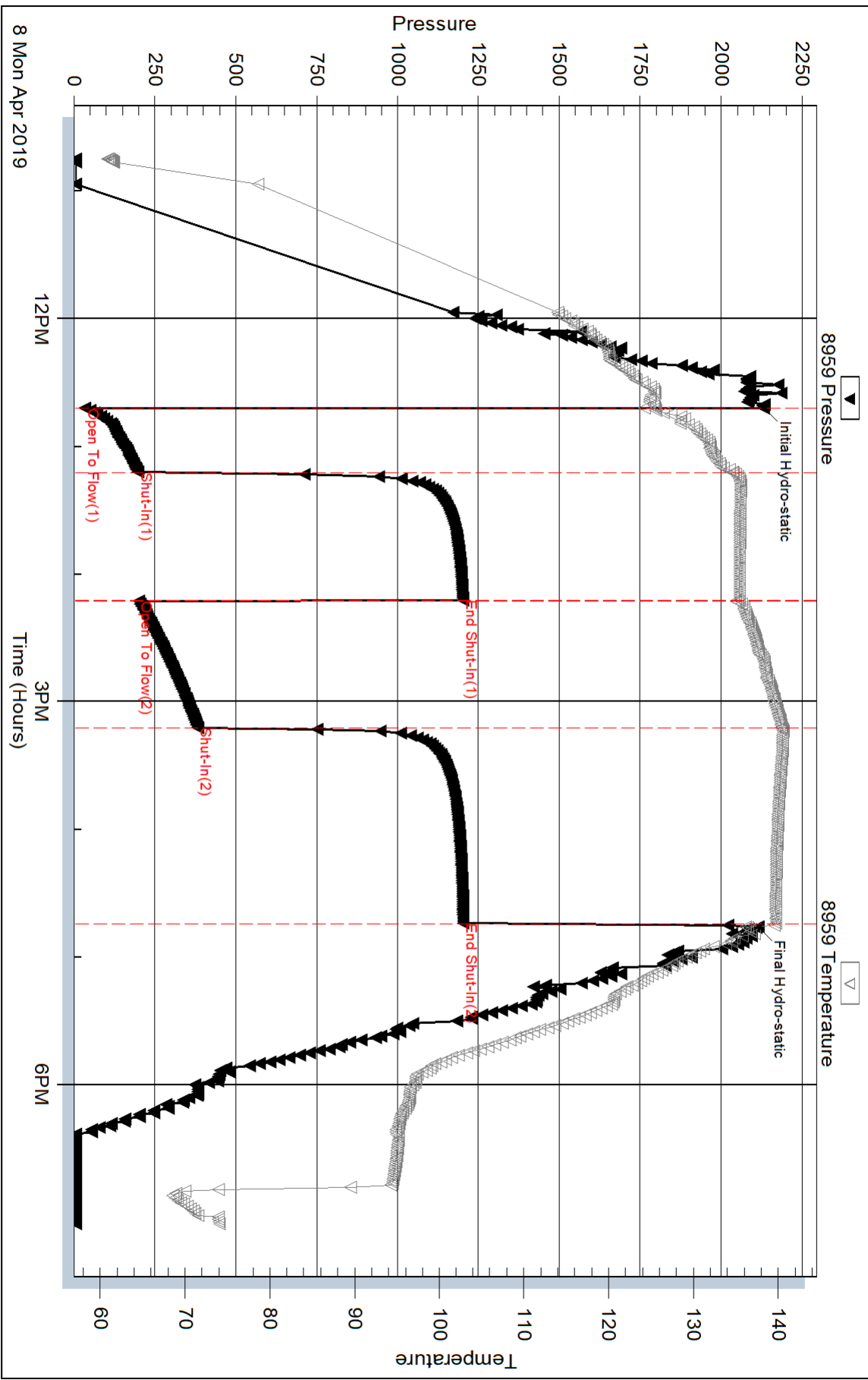
Total Length: 755.00 ft      Total Volume: 8.978 bbl

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

Laboratory Name:      Laboratory Location:

Recovery Comments: RW = .375 @ 76 degs = 17,000PPM

### Pressure vs. Time

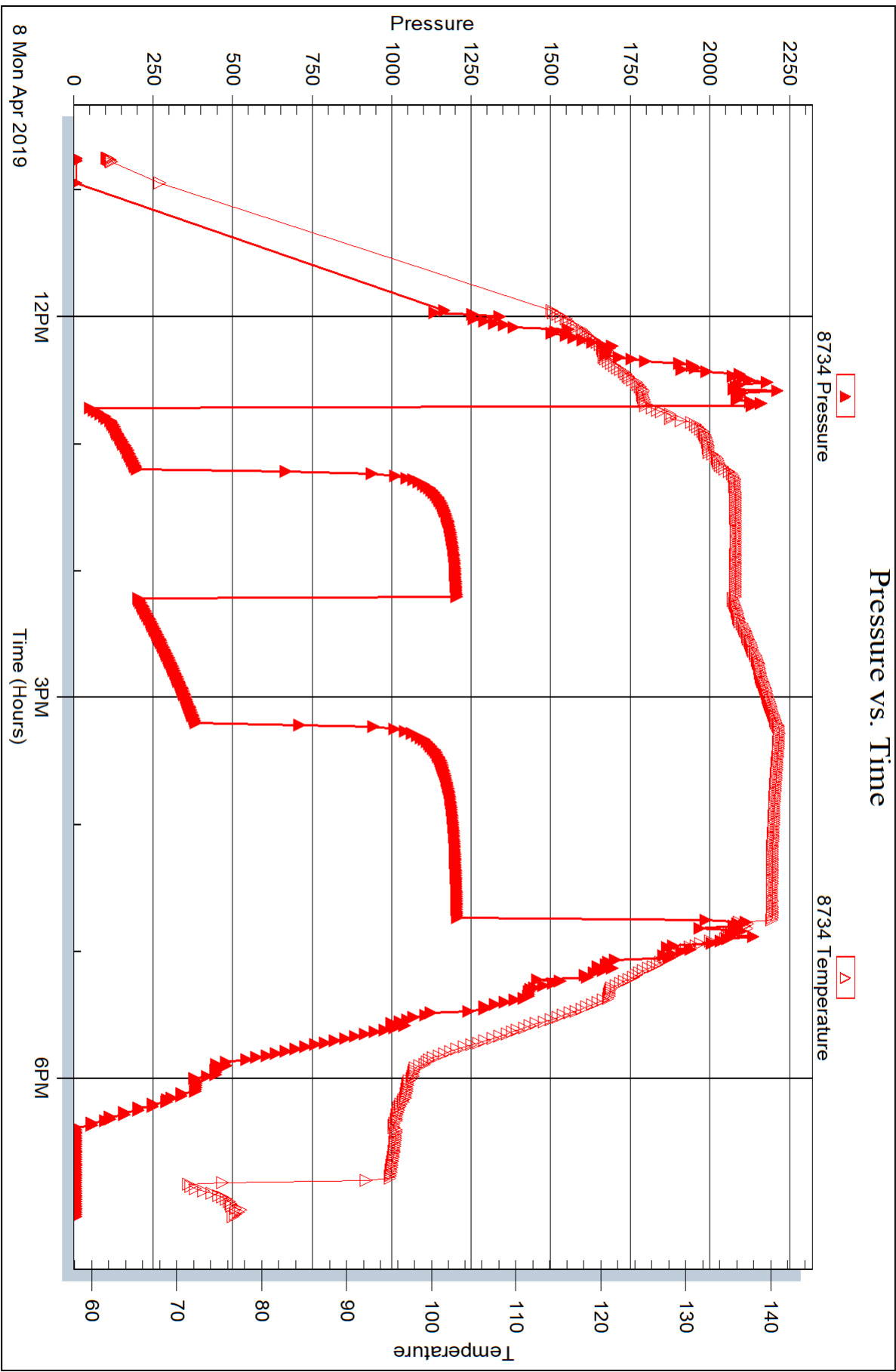


Serial #: 8734

Outside Murfin Drilling Co Inc

Culwell 'J' # 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: Jeff Christian

### **Culwell ' J ' # 1-19**

#### **19-2S-37W Cheyenne,KS**

Start Date: 2019.04.09 @ 03:45:00

End Date: 2019.04.09 @ 12:29:10

Job Ticket #: 63282                      DST #: 4

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

Printed: 2019.04.11 @ 14:26:48

Murfin Drilling Co INC

19-2S-37W Cheyenne,KS

Culwell ' J ' # 1-19

DST # 4

LKC " G "

2019.04.09









**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

Murfin Drilling Co INC  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63282      **DST#: 4**  
Test Start: 2019.04.09 @ 03:45:00

**Tool Information**

Drill Pipe:	Length: 4229.00 ft	Diameter: 3.80 inches	Volume: 59.32 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 90000.00 lb
			<u>Total Volume: 60.19 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	34.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4400.00 ft			Final 67000.00 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:

<b>Tool Description</b>	<b>Length (ft)</b>	<b>Serial No.</b>	<b>Position</b>	<b>Depth (ft)</b>	<b>Accum. Lengths</b>
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Shut In Tool	5.00			4377.00	
Hydraulic tool	5.00	1113		4382.00	
Jars	5.00	01-07		4387.00	
Safety Joint	3.00	-001		4390.00	
Packer	5.00			4395.00	28.00      Bottom Of Top Packer
Packer	5.00			4400.00	
Stubb	1.00			4401.00	
Recorder	0.00	8959	Inside	4401.00	
Recorder	0.00	8734	Outside	4401.00	
Perforations	13.00			4414.00	
Change Over Sub	1.00			4415.00	
Drill Pipe	31.00			4446.00	
Change Over Sub	1.00			4447.00	
Bullnose	5.00			4452.00	52.00      Bottom Packers & Anchor

**Total Tool Length: 80.00**



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co INC  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63282      **DST#: 4**  
Test Start: 2019.04.09 @ 03:45:00

## 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: ppm
Viscosity: 70.00 sec/qt	Cushion Volume: bbl	
Water Loss: 5.99 in <sup>3</sup>	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 600.00 ppm		
Filter Cake: 2.00 inches		

## Recovery Information

Recovery Table

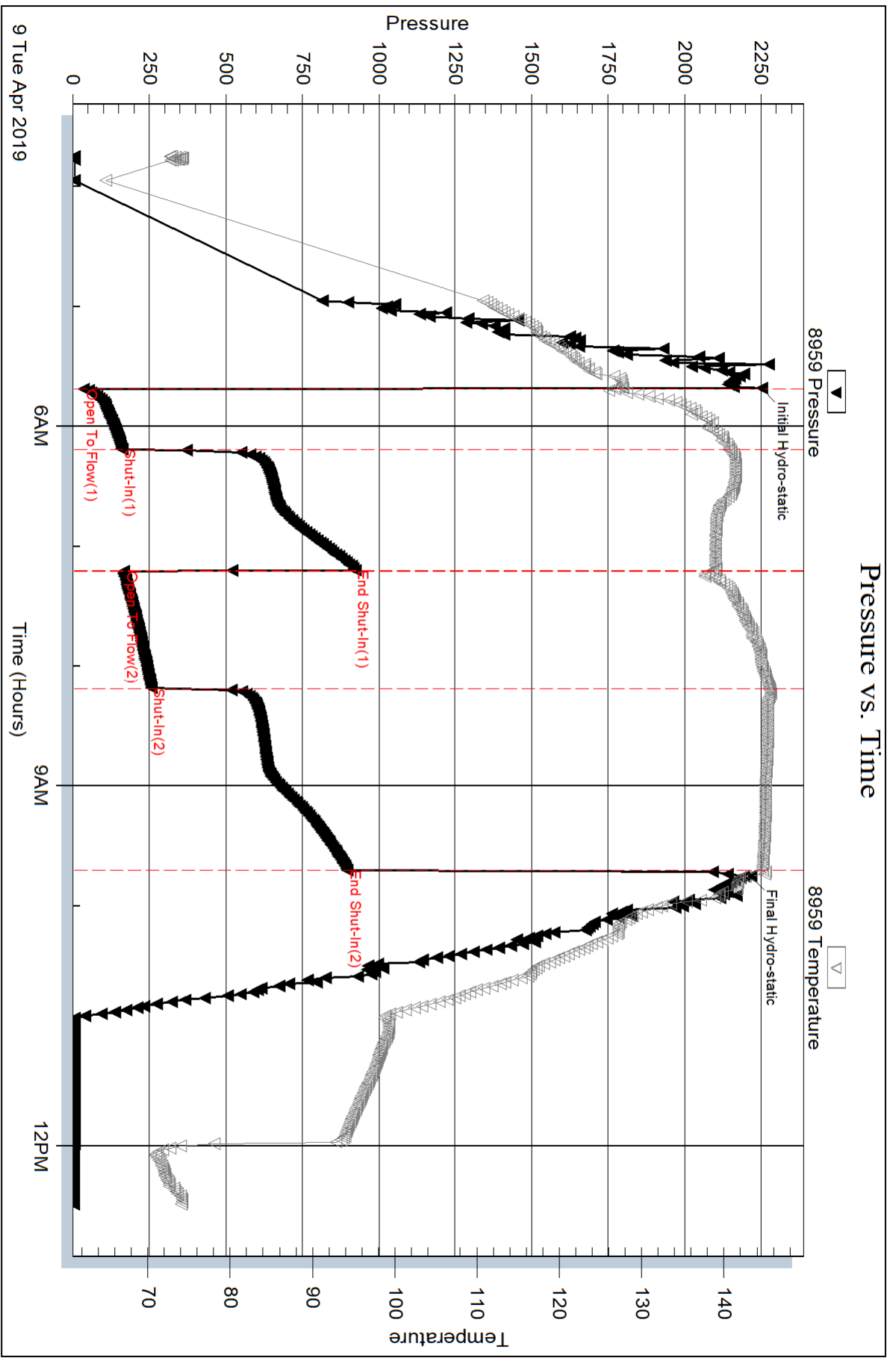
Length ft	Description	Volume bbl
501.00	GMCO 29%G, 21%M, 50%O	5.415
90.00	CGO 18%G, 82%O	1.262
0.00	280' GIP	0.000

Total Length: 591.00 ft      Total Volume: 6.677 bbl

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

Laboratory Name:      Laboratory Location:

Recovery Comments: Gravity of oil = 30.5 @ 75deg  
Gravity corrected to 29 @ 60deg  
Pulled 35k over string w eight coming off bottom

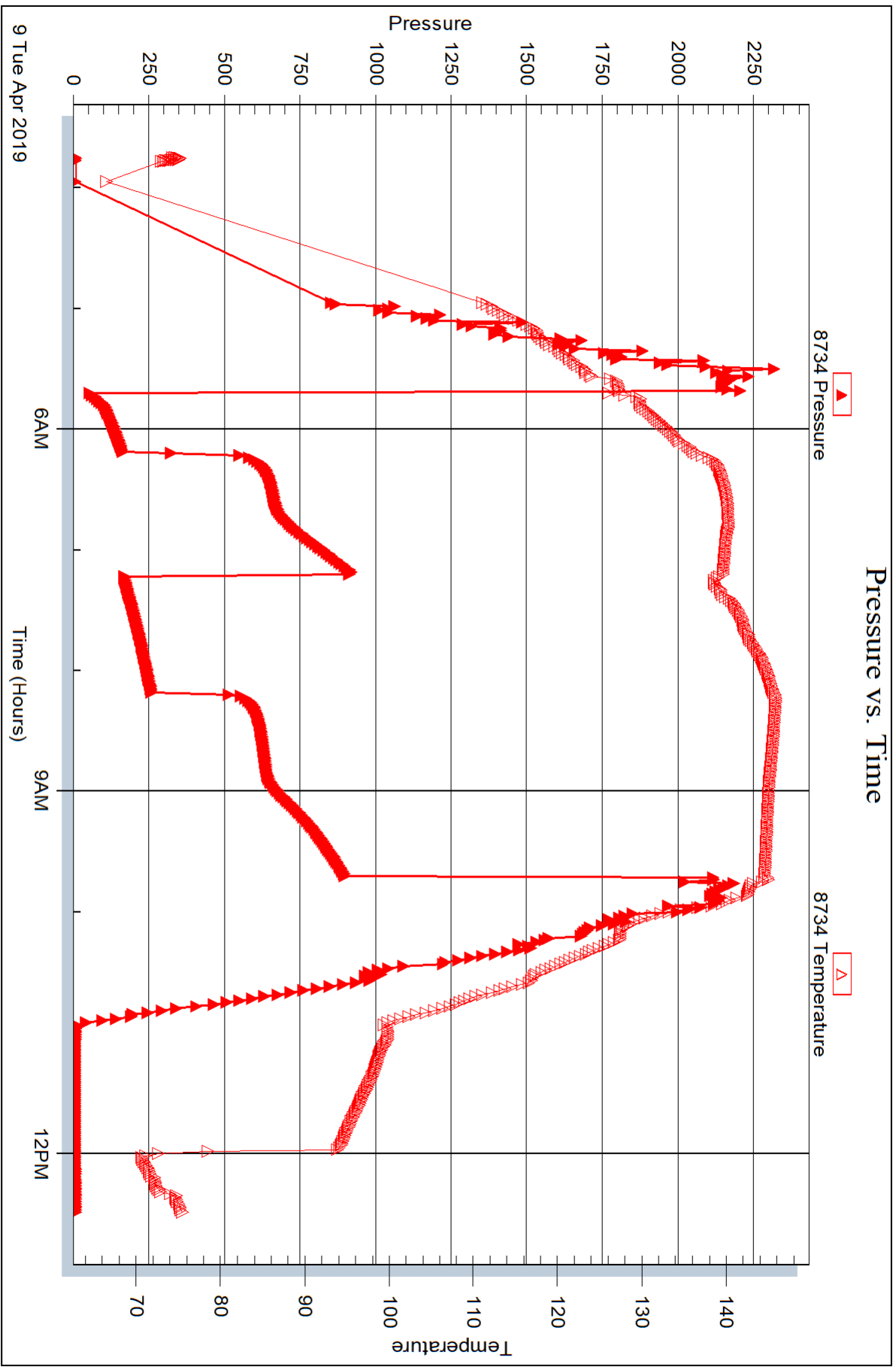


Serial #: 8734

Outside Murfin Drilling Co INC

Culwell 'J' # 1-19

DST Test Number: 4





## DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co INC**

250 N. Water STE 300  
Wichita, KS 67202

ATTN: Jeff Christian

### **Culwell ' J ' # 1-19**

#### **19-2S-37W Cheyenne,KS**

Start Date: 2019.04.10 @ 00:12:00

End Date: 2019.04.10 @ 06:58:30

Job Ticket #: 63283                      DST #: 5

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

Printed: 2019.04.11 @ 14:24:50



**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

Murfin Drilling Co INC  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63283      **DST#: 5**  
Test Start: 2019.04.10 @ 00:12:00

## GENERAL INFORMATION:

Formation: **LKC "H - J"**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 02:18:30  
Time Test Ended: 06:58:30  
Interval: **4448.00 ft (KB) To 4540.00 ft (KB) (TVD)**  
Total Depth: 4540.00 ft (KB) (TVD)  
Hole Diameter: 7.88 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Martine Salinas Shaw  
Unit No: 82  
Reference Elevations: 3389.00 ft (KB)  
3384.00 ft (CF)  
KB to GR/CF: 5.00 ft

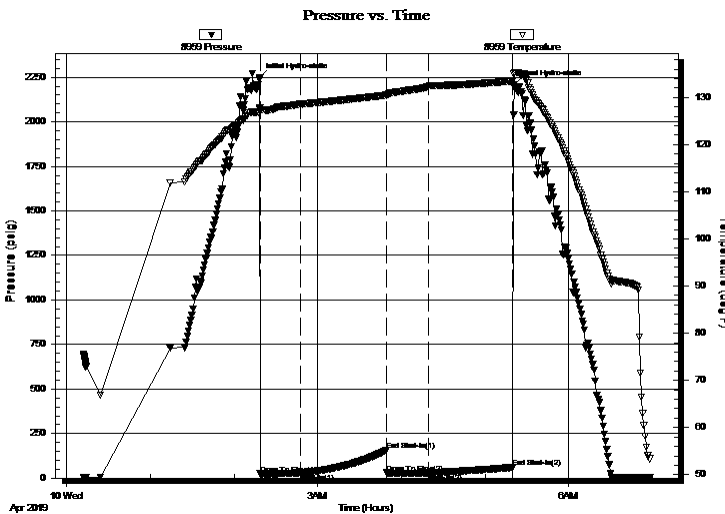
## Serial #: 8959

Inside

Press@RunDepth: 28.52 psig @ 4449.00 ft (KB) Capacity: 8000.00 psig  
Start Date: 2019.04.10 End Date: 2019.04.10 Last Calib.: 2019.04.10  
Start Time: 00:12:01 End Time: 06:58:30 Time On Btm: 2019.04.10 @ 02:18:20  
Time Off Btm: 2019.04.10 @ 05:20:50

TEST COMMENT: 30-IF-Surface blow built to 1 1/4'  
60-ISI-No blow back  
30-FF-No blow  
60-FSI-No blow

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2248.15	127.86	Initial Hydro-static
1	22.97	127.01	Open To Flow (1)
30	25.65	128.57	Shut-In(1)
91	155.51	130.47	End Shut-In(1)
91	28.74	130.40	Open To Flow (2)
121	28.52	132.34	Shut-In(2)
182	59.91	133.46	End Shut-In(2)
183	2207.65	135.29	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
5.00	OSM 5%O, 95%M	0.02
0.00	Heavy oil spots in tool	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  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63283      **DST#: 5**  
Test Start: 2019.04.10 @ 00:12:00

## Tool Information

Drill Pipe:	Length: 4259.00 ft	Diameter: 3.80 inches	Volume: 59.74 bbl	Tool Weight: 2500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 2.75 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 177.00 ft	Diameter: 2.25 inches	Volume: 0.87 bbl	Weight to Pull Loose: 80000.00 lb
			<u>Total Volume: 60.61 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	16.00 ft			String Weight: Initial 65000.00 lb
Depth to Top Packer:	4448.00 ft			Final 65000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	92.00 ft			
Tool Length:	120.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

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

Shut In Tool	5.00			4425.00	
Hydraulic tool	5.00	1113		4430.00	
Jars	5.00	01-07		4435.00	
Safety Joint	3.00	-001		4438.00	
Packer	5.00			4443.00	28.00 Bottom Of Top Packer
Packer	5.00			4448.00	
Stubb	1.00			4449.00	
Recorder	0.00	8959	Inside	4449.00	
Recorder	0.00	8734	Outside	4449.00	
Perforations	21.00			4470.00	
Change Over Sub	1.00			4471.00	
Drill Pipe	63.00			4534.00	
Change Over Sub	1.00			4535.00	
Bullnose	5.00			4540.00	92.00 Bottom Packers & Anchor

**Total Tool Length: 120.00**





**TRILOBITE  
TESTING, INC.**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Murfin Drilling Co INC  
250 N. Water STE 300  
Wichita, KS 67202  
ATTN: Jeff Christian

**19-2S-37W Cheyenne,KS**  
**Culwell ' J ' # 1-19**  
Job Ticket: 63283      **DST#: 5**  
Test Start: 2019.04.10 @ 00:12:00

## 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: 70.00 sec/qt	Cushion Volume: bbl		
Water Loss: 5.59 in <sup>3</sup>	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 600.00 ppm			
Filter Cake: 2.00 inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	OSM 5%O, 95%M	0.025
0.00	Heavy oil spots in tool	0.000

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:

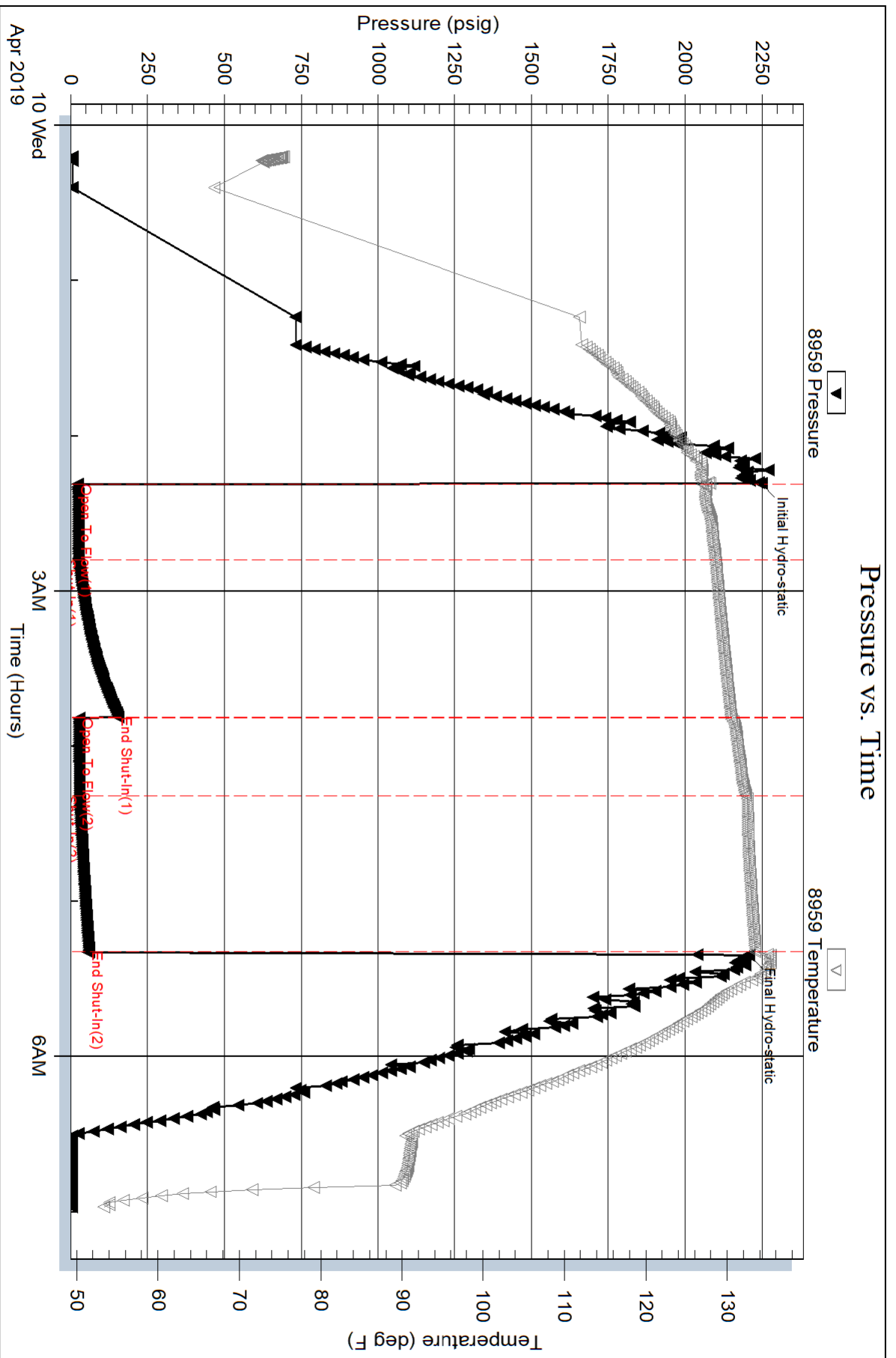
Serial #: 8959

Inside

Murfin Drilling Co INC

Culwell 'J' # 1-19

DST Test Number: 5

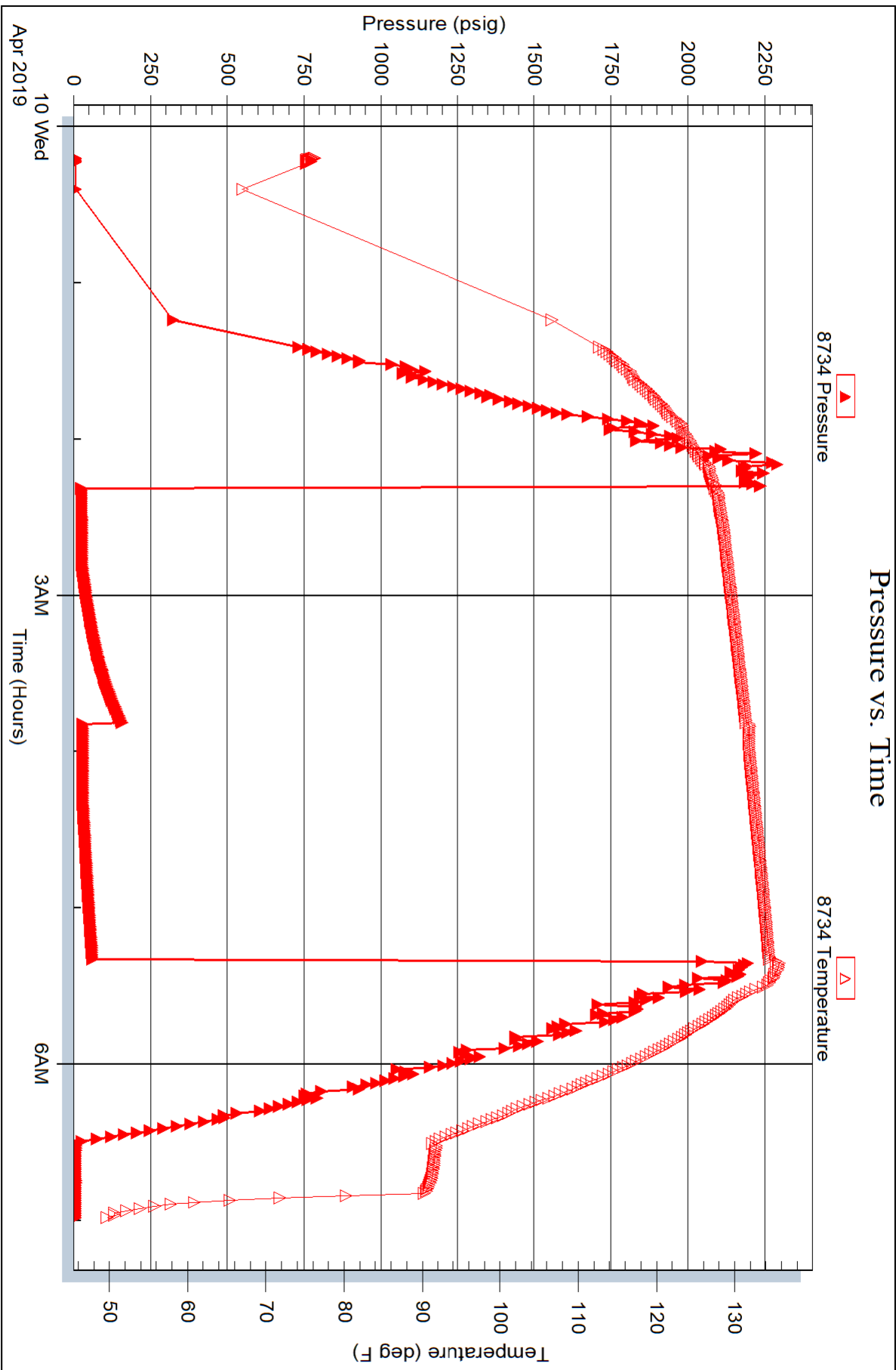


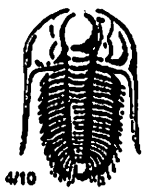
Serial #: 8734

Outside Murfin Drilling Co INC

Culwell 'J' # 1-19

DST Test Number: 5





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63279

Well Name & No. Culwell 'J' #1-19 Test No. 1 Date 04-06-19  
 Company Murfin Drilling Co INC Elevation 3389 KB 3384 GL  
 Address 250 N. Water, STE 300, Wichita, KS 67202  
 Co. Rep / Geo. Jeff Christian Rig Murfin #3  
 Location: Sec. 19 Twp 2S. Rge. 37W. Co. Cherokee State KS

Interval Tested 4050 - 4138 Zone Tested Topeka - Deer Creek  
 Anchor Length 88' Drill Pipe Run 3855 Mud Wt. 8.8  
 Top Packer Depth 4045 Drill Collars Run 177 Vls 68  
 Bottom Packer Depth 4050 Wt. Pipe Run — WL 5.6  
 Total Depth 4138 Chlorides 600 ppm System LCM 5H  
 Blow Description IF - S. blow built to 1 1/2"  
ISI - No blow  
FF - Weak surface bubbles @ 3 mins built to 1/4"  
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>75</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 75 BHT 131 Gravity — API RW — @ — F Chlorides — ppm

(A) Initial Hydrostatic <u>1984</u>	<input checked="" type="checkbox"/> Test <u>1300</u>	T-On Location <u>15:10</u>
(B) First Initial Flow <u>22</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>16:20</u>
(C) First Final Flow <u>39</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>18:13</u>
(D) Initial Shut-In <u>1206</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>21:13</u>
(E) Second Initial Flow <u>43</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>22:56</u>
(F) Second Final Flow <u>59</u>	<input checked="" type="checkbox"/> Mileage <u>132 RT.</u> 132	Comments
(G) Final Shut-In <u>1179</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>1958</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>30</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby	Total <u>1757</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>1757</u>	

Approved By

Jeff Christian

Our Representative

Matt Johnson

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 of 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.



# TRIOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63280

Well Name & No. Culwell 'J' #1-19 Test No. 2 Date 04-07-19  
 Company Murfin Drilling Co INC Elevation 3389 KB 3384 GL  
 Address 250 N. Water, STE. 300, Wichita, KS 67202  
 Co. Rep / Geo. JEFF Christian Rig Murfin #3  
 Location: Sec. 19 Twp 2S. Rge. 37W. Co. Cheyenne State K5

Interval Tested 4177-4260 Zone Tested Oread  
 Anchor Length 83' Drill Pipe Run 3979 Mud Wt. 8.9  
 Top Packer Depth 4172 Drill Collars Run 177 Vis 69  
 Bottom Packer Depth 4177 Wt. Pipe Run — WL 5.6  
 Total Depth 4260 Chlorides 600 ppm System LCM 4#

Blow Description IF. S. blow built to 1/2" @ 10 mins & maintained blow  
ISI - No blow  
FF - No blow  
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>5</u>	<u>Mud</u>			<u>100</u>	
<u>0</u>	<u>Oil spots in tool</u>				

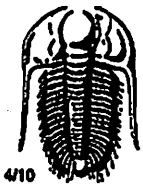
Rec Total 5 BHT 131 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2067  Test 1300 T-On Location 11:30  
 (B) First Initial Flow 20  Jars 250 T-Started 11:50  
 (C) First Final Flow 23  Safety Joint 75 T-Open 14:12  
 (D) Initial Shut-In 49  Circ Sub \_\_\_\_\_ T-Pulled 17:12  
 (E) Second Initial Flow 22  Hourly Standby \_\_\_\_\_ T-Out 18:53  
 (F) Second Final Flow 24  Mileage 132RT 132 Comments \_\_\_\_\_  
 (G) Final Shut-In 44  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 2043  Straddle \_\_\_\_\_  Ruined Shale Packer \_\_\_\_\_  
 Shale Packer \_\_\_\_\_  Ruined Packer \_\_\_\_\_  
 Extra Packer \_\_\_\_\_  Extra Copies \_\_\_\_\_  
 Extra Recorder \_\_\_\_\_ Sub Total 0  
 Day Standby \_\_\_\_\_ Total 1757  
 Accessibility \_\_\_\_\_ MP/DST Disc't \_\_\_\_\_  
 Sub Total 1757

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

Approved By [Signature] Our Representative [Signature]

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63281

Well Name & No. Culwell 'S' #1-19 Test No. 3 Date 04-08-19  
 Company Murfin Drilling Co Inc Elevation 3389 KB 3384 GL  
 Address 250 N. Water, STE. 300, Wichita, KS 67202  
 Co. Rep / Geo. Jeff Christian Rig Murfin #3  
 Location: Sec. 19 Twp 2S. Rge. 37W. Co. Cheyenne State KS.

Interval Tested 4261 - 4406 Zone Tested LKC "A-D"  
 Anchor Length 145' Drill Pipe Run 4071 Mud Wt. 9.2  
 Top Packer Depth 4256 Drill Collars Run 177 Vls 64  
 Bottom Packer Depth 4261 Wt. Pipe Run --- WL 6.0  
 Total Depth 4406 Chlorides 600 ppm System LCM 3#  
 Blow Description IF - 1/4" blow built to B.O.B (11 inches) @ 13 mins (blow increased to 22' 1/4")  
ISE - No blow  
FF - S. blow built to B.O.B (11 inches) @ 16 1/2 mins (blow increased to 35")  
EST - No blow

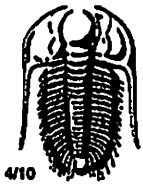
Rec	Feet of	%gas	%oil	%water	%mud
<u>565</u>	<u>HWCM</u>		<u>29</u>	<u>71</u>	
<u>190</u>	<u>Mud</u>			<u>100</u>	
<u>0</u>	<u>Oil spots in tool</u>				

Rec Total 755 BHT 136 Gravity --- API RW 375 @ 76 °F Chlorides 17,000 ppm

(A) Initial Hydrostatic <u>2132</u>	<input checked="" type="checkbox"/> Test <u>1300</u>	T-On Location <u>10:30</u>
(B) First Initial Flow <u>34</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>10:45</u>
(C) First Final Flow <u>199</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>12:43</u>
(D) Initial Shut-In <u>1203</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>16:43</u>
(E) Second Initial Flow <u>200</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>19:06</u>
(F) Second Final Flow <u>382</u>	<input checked="" type="checkbox"/> Mileage <u>132 RT</u> 132	Comments <u>ISE - Bled off floor</u>
(G) Final Shut-In <u>1204</u>	<input type="checkbox"/> Sampler	<u>Mainifold 2 mins FSI - bled</u>
(H) Final Hydrostatic <u>2115</u>	<input type="checkbox"/> Straddle	<u>off manifold 2 mins</u>
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Shale Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Ruined Packer
Final Flow <u>60</u>	<input type="checkbox"/> Extra Recorder	<input type="checkbox"/> Extra Copies
Final Shut-In <u>90</u>	<input type="checkbox"/> Day Standby	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility	Total <u>1757</u>
	Sub Total <u>1757</u>	MP/DST Disc't

Approved By Jeff Christian Our Representative Matthew Adams

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# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63282

Well Name & No. Culwell 'J' #1-19 Test No. 4 Date 4-9-19  
 Company Martin Drilling Co Inc Elevation 3389 KB 3389 GL  
 Address 250 N Water STE 300 Wichita KS 67202  
 Co. Rep / Geo. Jeff Christian Rig Martin #3  
 Location: Sec. 19 Twp 25 Rge. 37W Co. Leyenne State KS

Interval Tested 4400-4452 Zone Tested LKC 6  
 Anchor Length 52 Drill Pipe Run 4229 Mud Wt. 9.0  
 Top Packer Depth 4395 Drill Collars Run 177 Vis 70  
 Bottom Packer Depth 4400 Wt. Pipe Run - WL 6.0  
 Total Depth 4452 Chlorides 600 ppm System LCM 4#

Blow Description IF - 3/4" blow built to B.O.B (11 inches) @ 12 mins (blow increased to 25 1/2")  
ISI - S. blow back @ 1 1/2 mins built to 2" @ 34 min + decreased to 1 1/2"  
FF - S. blow built to B.O.B (11 inches) @ 21 mins (blow increased to 32 1/2")  
FSI - S. blow back @ 1 min built to 4"

Rec	Feet of		%gas	%oil	%water	%mud
<u>501</u>	<u>GMCO</u>	<u>29</u>	<u>50</u>		<u>21</u>	
<u>.90</u>	<u>CGO</u>	<u>18</u>	<u>82</u>			
<u>0</u>	<u>280' GIP</u>	<u>100</u>				

Rec Total 591 BHT 143 Gravity 29 API RW - @ - °F Chlorides - ppm

- (A) Initial Hydrostatic 2252
- (B) First Initial Flow 36
- (C) First Final Flow 161
- (D) Initial Shut-In 923
- (E) Second Initial Flow 167
- (F) Second Final Flow 256
- (G) Final Shut-In 897
- (H) Final Hydrostatic 2216

- Test 1300
- Jars 250
- Safety Joint 75
- Circ Sub
- Hourly Standby
- Mileage 132 RT 132
- Sampler
- Straddle
- Shale Packer
- Extra Packer
- Extra Recorder
- Day Standby
- Accessibility
- Sub Total 1757

- T-On Location 03:15
- T-Started 03:45
- T-Open 05:42
- T-Pulled 09:42
- T-Out 12:30

Comments ISI - bled off manifold 2 mins  
FSI - bled off manifold 2 mins  
Pulled 35K over STWT off bottom.

- Ruined Shale Packer
- Ruined Packer
- Extra Copies
- Sub Total 0
- Total 1757
- MP/DST Disc't

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

Approved By [Signature] Our Representative [Signature]  
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# TRIOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 63283

Well Name & No. Culwell 'J' #1-19 Test No. 5 Date 04-09-19  
 Company Murfin Drilling Co Inc Elevation 3389 KB 3384 GL  
 Address 250 N Water STE 300 Wichita  
 Co. Rep / Geo. Jeff Christian Rig Murfin #3  
 Location: Sec. 19 Twp 25 Rge. 37 W Co. Cheyenne State KS

Interval Tested 4448-4540 Zone Tested LKC H-1  
 Anchor Length 92 Drill Pipe Run 4259 Mud Wt. 9.1  
 Top Packer Depth 4443 Drill Collars Run 177 Vis 70  
 Bottom Packer Depth 4448 Wt. Pipe Run - WL 5.6  
 Total Depth 4540 Chlorides 600 ppm System LCM 4  
 Blow Description IF Surface Blow built to 1' 1/4  
ISI No Blow back  
FF No Blow  
FBI No Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>5</u>	<u>OSM</u>	<u>5</u>	<u>1</u>	<u>9.5</u>	
<u>0</u>	<u>Heavy oil Spots in tool</u>				

Rec Total 5" BHT 135 Gravity - API RW - @ - °F Chlorides - ppm

(A) Initial Hydrostatic <u>2248</u>	<input checked="" type="checkbox"/> Test 1300	T-On Location <u>23:45</u>
(B) First Initial Flow <u>23</u>	<input checked="" type="checkbox"/> Jars 250	T-Started <u>00:12</u>
(C) First Final Flow <u>26</u>	<input checked="" type="checkbox"/> Safety Joint 75	T-Open <u>2:19</u>
(D) Initial Shut-In <u>156</u>	<input type="checkbox"/> Circ Sub	T-Pulled <u>5:19</u>
(E) Second Initial Flow <u>29</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>7:01</u>
(F) Second Final Flow <u>29</u>	<input checked="" type="checkbox"/> Mileage <u>132 RT X 2</u> 264	Comments <u>Released @ 16:00</u>
(G) Final Shut-In <u>60</u>	<input type="checkbox"/> Sampler	<u>4-10-19</u>
(H) Final Hydrostatic <u>2208</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>60 30</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>90 60</u>	<input type="checkbox"/> Day Standby	Total <u>1889</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>1889</u>	

Approved By [Signature]

Our Representative [Signature]

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