



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.09 @ 19:03:00

End Date: 2017.11.10 @ 03:08:30

Job Ticket #: 63166 DST #: 1

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:36:58



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co
 250 N Water, STE 300,
 Wichita, KS 67202
 ATTN: Rocky Milford

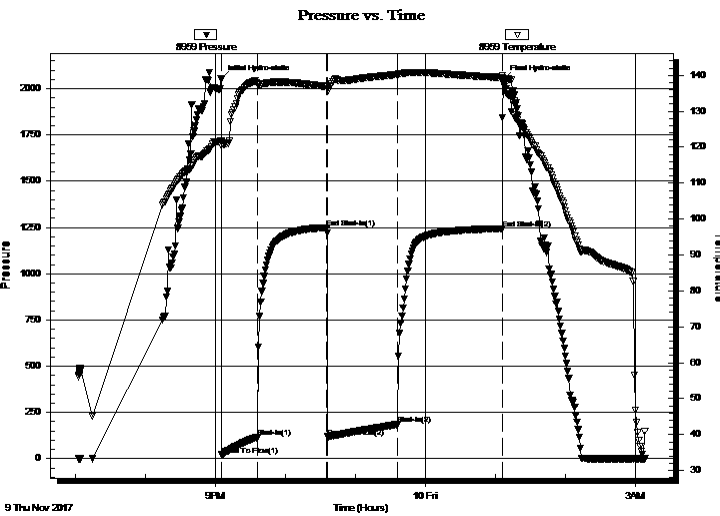
20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
 Job Ticket: 63166 **DST#: 1**
 Test Start: 2017.11.09 @ 19:03:00

GENERAL INFORMATION:

Formation: **Topeka**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 21:05:30
 Time Test Ended: 03:08:30
 Interval: **4074.00 ft (KB) To 4130.00 ft (KB) (TVD)**
 Total Depth: 4130.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Martine Salinas
 Unit No: 82
 Reference Elevations: 3418.00 ft (KB)
 3413.00 ft (CF)
 KB to GR/CF: 5.00 ft

Serial #: 8959 Inside
 Press@RunDepth: 184.25 psig @ 4075.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.11.09 End Date: 2017.11.10 Last Calib.: 2017.11.10
 Start Time: 19:03:01 End Time: 03:08:30 Time On Btm: 2017.11.09 @ 21:05:00
 Time Off Btm: 2017.11.10 @ 01:06:39

TEST COMMENT: 30-IF-Surface blow built to 9"
 60-ISI-No blow
 60-FF-BOB@ 53 mins
 90-FSI-No blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2051.84	121.61	Initial Hydro-static
1	20.42	120.38	Open To Flow (1)
32	113.93	137.53	Shut-In(1)
91	1249.27	136.91	End Shut-In(1)
92	117.88	136.39	Open To Flow (2)
152	184.25	140.24	Shut-In(2)
241	1243.58	139.38	End Shut-In(2)
242	2050.13	139.06	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
305.00	HMCW 29%M, 71% W	2.41

Gas Rates

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



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DRILL STEM TEST REPORT

Murfin Drilling Co
 250 N Water, STE 300,
 Wichita, KS 67202
 ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS

Culwell 'G' #1-20

Job Ticket: 63166

DST#: 1

Test Start: 2017.11.09 @ 19:03:00

GENERAL INFORMATION:

Formation: **Topeka**
 Deviated: No Whipstock: ft (KB)
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 Time Test Ended: 03:08:30
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 Total Depth: 4130.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Martine Salinas
 Unit No: 82
 Reference Elevations: 3418.00 ft (KB)
 3413.00 ft (CF)
 KB to GR/CF: 5.00 ft

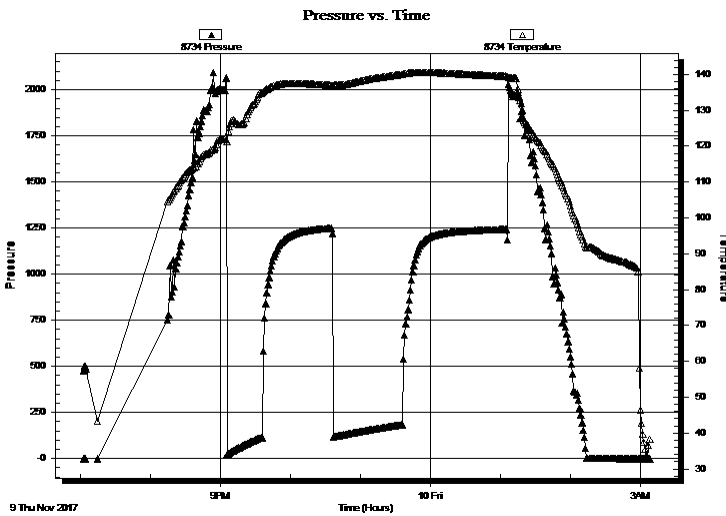
Serial #: 8734

Outside

Press@RunDepth: psig @ 4075.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.11.09 End Date: 2017.11.10 Last Calib.: 2017.11.10
 Start Time: 19:03:01 End Time: 03:08:40 Time On Btm:
 Time Off Btm:

TEST COMMENT: 30-IF-Surface blow built to 9"
 60-ISI-No blow
 60-FF-BOB@ 53 mins
 90-FSI-No blow

PRESSURE SUMMARY



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

Recovery

Length (ft)	Description	Volume (bbl)
305.00	HMCW 29%M, 71% W	2.41

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63166 **DST#: 1**
Test Start: 2017.11.09 @ 19:03:00

Tool Information

Drill Pipe:	Length: 3871.00 ft	Diameter: 3.80 inches	Volume: 54.30 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 60000.00 lb
			<u>Total Volume: 55.31 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	30.00 ft			String Weight: Initial 54000.00 lb
Depth to Top Packer:	4074.00 ft			Final 56000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	56.00 ft			
Tool Length:	84.00 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			4051.00	
Hydraulic tool	5.00			4056.00	
Jars	5.00			4061.00	
Safety Joint	3.00			4064.00	
Packer	5.00			4069.00	28.00 Bottom Of Top Packer
Packer	5.00			4074.00	
Packer - Shale	0.00			4074.00	
Stubb	1.00			4075.00	
Recorder	0.00	8959	Inside	4075.00	
Recorder	0.00	8734	Outside	4075.00	
Perforations	17.00			4092.00	
Change Over Sub	1.00			4093.00	
Drill Pipe	31.00			4124.00	
Change Over Sub	1.00			4125.00	
Bullnose	5.00			4130.00	56.00 Bottom Packers & Anchor

Total Tool Length: 84.00



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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63166 **DST#: 1**
Test Start: 2017.11.09 @ 19:03:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 71.00 sec/qt	Cushion Volume: bbl		
Water Loss: 6.35 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 700.00 ppm			
Filter Cake: 2.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
305.00	HMCW 29%M, 71% W	2.411

Total Length: 305.00 ft Total Volume: 2.411 bbl
Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
Laboratory Name: Laboratory Location:
Recovery Comments: RW= .342 @ 20.8 degs= 67,000ppm

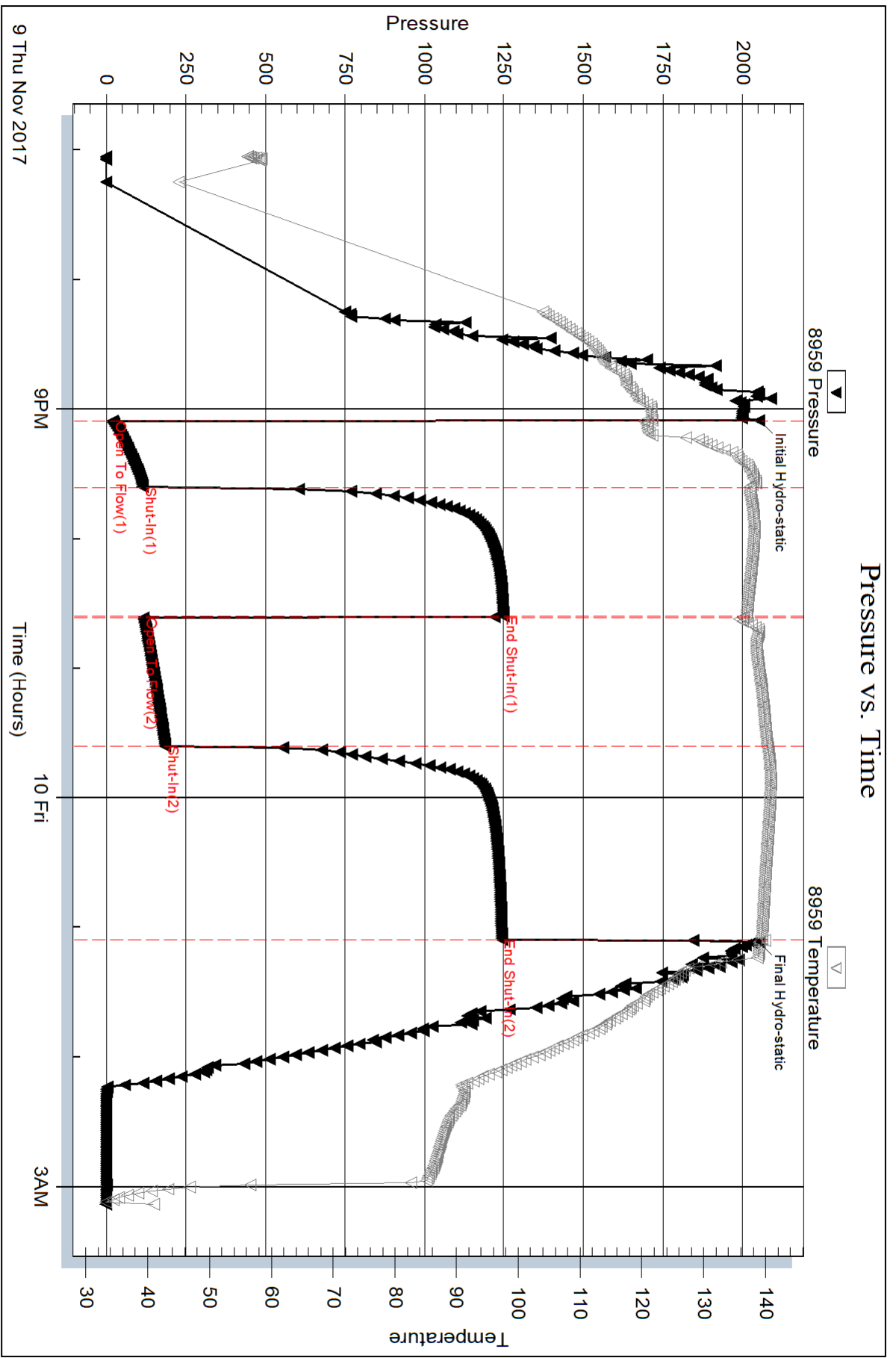
Serial #: 8959

Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 1

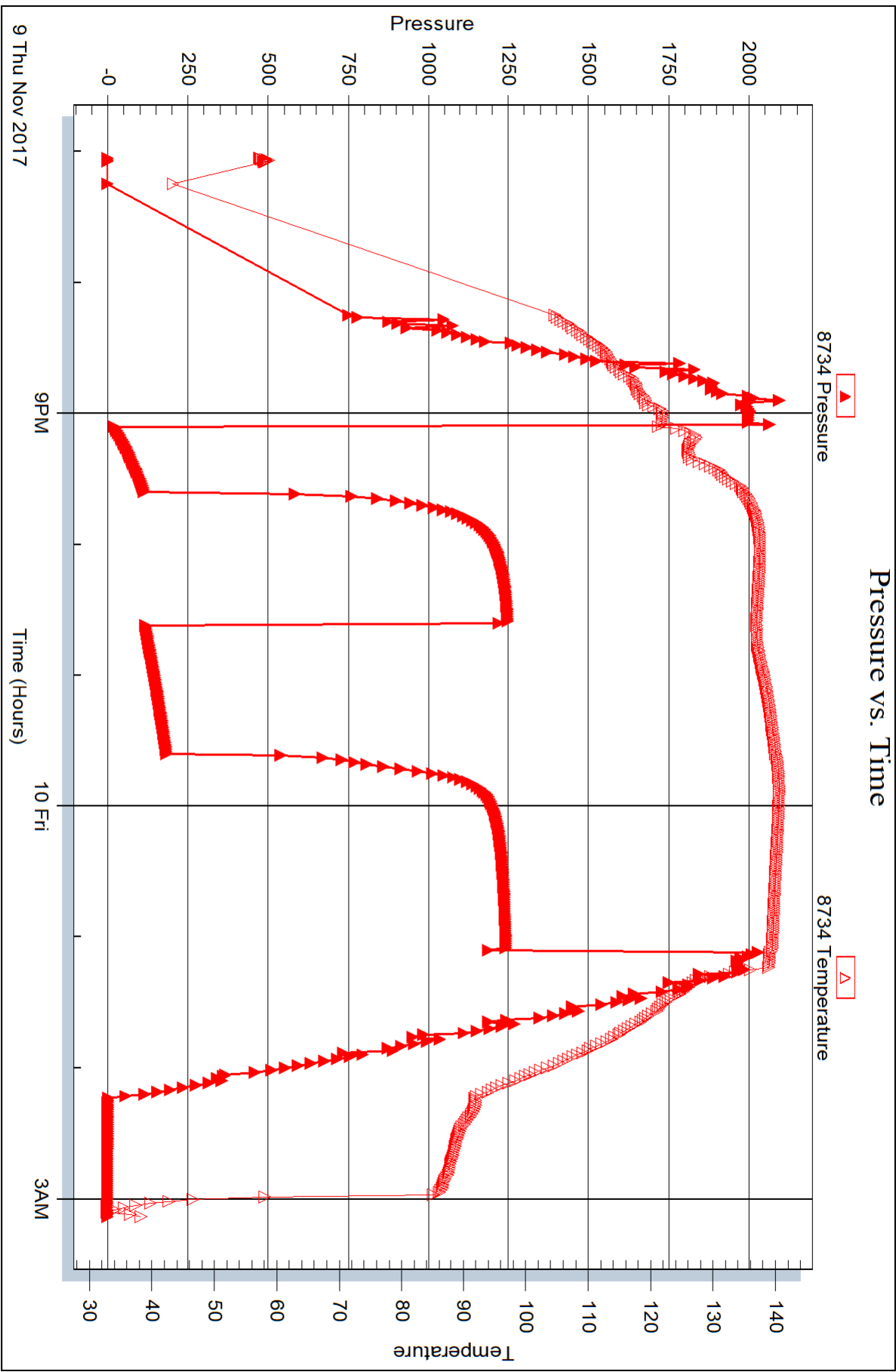


Serial #: 8734

Outside Murfin Drilling Co

Culw ell 'G' #1-20

DST Test Number: 1





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.10 @ 21:51:00

End Date: 2017.11.11 @ 04:55:09

Job Ticket #: 63167 DST #: 2

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:35:33



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co
 250 N Water, STE 300,
 Wichita, KS 67202
 ATTN: Rocky Milford

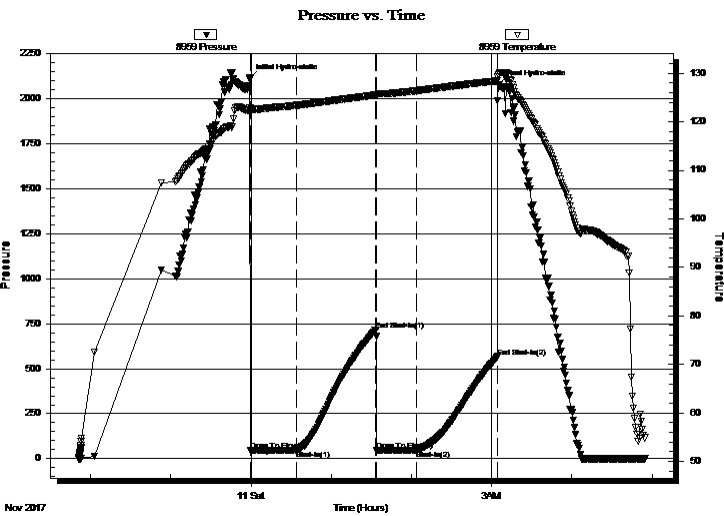
20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
 Job Ticket: 63167 **DST#: 2**
 Test Start: 2017.11.10 @ 21:51:00

GENERAL INFORMATION:

Formation: **Oread**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 23:59:30 Tester: Martine Salinas
 Time Test Ended: 04:55:09 Unit No: 82
 Interval: **4203.00 ft (KB) To 4286.00 ft (KB) (TVD)** Reference Elevations: 3418.00 ft (KB)
 Total Depth: 4286.00 ft (KB) (TVD) 3413.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 5.00 ft

Serial #: 8959 Inside
 Press@RunDepth: 47.71 psig @ 4204.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.11.10 End Date: 2017.11.11 Last Calib.: 2017.11.11
 Start Time: 21:51:01 End Time: 04:55:10 Time On Btm: 2017.11.10 @ 23:59:10
 Time Off Btm: 2017.11.11 @ 03:05:20

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



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2112.51	122.97	Initial Hydro-static
1	44.21	122.45	Open To Flow (1)
35	44.74	123.39	Shut-In(1)
95	715.26	125.53	End Shut-In(1)
95	47.01	125.36	Open To Flow (2)
125	47.71	126.42	Shut-In(2)
185	566.95	128.45	End Shut-In(2)
187	2076.86	129.64	Final Hydro-static

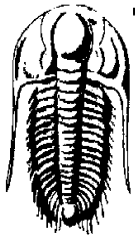
Recovery

Length (ft)	Description	Volume (bbl)
58.00	OSM 3%O, 97%M	0.29

Gas Rates

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

* Recovery from multiple tests



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Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S-.37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63167 **DST#: 2**
Test Start: 2017.11.10 @ 21:51:00

GENERAL INFORMATION:

Formation: Oread	Test Type: Conventional Bottom Hole (Reset)
Deviated: No Whipstock: ft (KB)	Tester: Martine Salinas
Time Tool Opened: 23:59:30	Unit No: 82
Time Test Ended: 04:55:09	Reference Elevations: 3418.00 ft (KB)
Interval: 4203.00 ft (KB) To 4286.00 ft (KB) (TVD)	3413.00 ft (CF)
Total Depth: 4286.00 ft (KB) (TVD)	KB to GR/CF: 5.00 ft
Hole Diameter: 7.88 inches Hole Condition: Good	

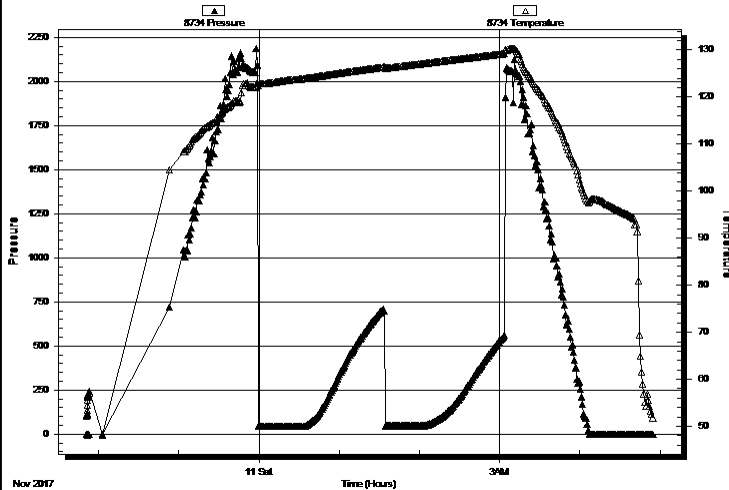
Serial #: 8734

Outside

Press@RunDepth: psig @ 4204.00 ft (KB)	Capacity: 8000.00 psig
Start Date: 2017.11.10 End Date: 2017.11.11	Last Calib.: 2017.11.11
Start Time: 21:51:01 End Time: 04:55:10	Time On Btm:
	Time Off Btm:

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

Pressure vs. Time



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
58.00	OSM 3%O, 97%M	0.29

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
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63167 **DST#: 2**
Test Start: 2017.11.10 @ 21:51:00

Tool Information

Drill Pipe:	Length: 3995.00 ft	Diameter: 3.80 inches	Volume: 56.04 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 74000.00 lb
			<u>Total Volume: 57.05 bbl</u>	Tool Chased 10.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 60000.00 lb
Depth to Top Packer:	4203.00 ft			Final 60000.00 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: Hit bridge @ approximately 4276, opened tool & slid to bottom 10'
Lost 6' of fluid in hole & bled off floor manifold, successful packer seat

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Shut In Tool	5.00			4180.00	
Hydraulic tool	5.00			4185.00	
Jars	5.00			4190.00	
Safety Joint	3.00			4193.00	
Packer	5.00			4198.00	28.00 Bottom Of Top Packer
Packer	5.00			4203.00	
Packer - Shale	0.00			4203.00	
Stubb	1.00			4204.00	
Recorder	0.00	8959	Inside	4204.00	
Recorder	0.00	8734	Outside	4204.00	
Perforations	12.00			4216.00	
Change Over Sub	1.00			4217.00	
Drill Pipe	63.00			4280.00	
Change Over Sub	1.00			4281.00	
Bullnose	5.00			4286.00	83.00 Bottom Packers & Anchor

Total Tool Length: 111.00



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DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63167 **DST#: 2**
Test Start: 2017.11.10 @ 21:51:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API:	deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity:	ppm
Viscosity: 72.00 sec/qt	Cushion Volume: bbl		
Water Loss: 6.35 in ³	Gas Cushion Type:		
Resistivity: ohm.m	Gas Cushion Pressure: psig		
Salinity: 800.00 ppm			
Filter Cake: 2.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
58.00	OSM 3%O, 97%M	0.285

Total Length: 58.00 ft Total Volume: 0.285 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments:

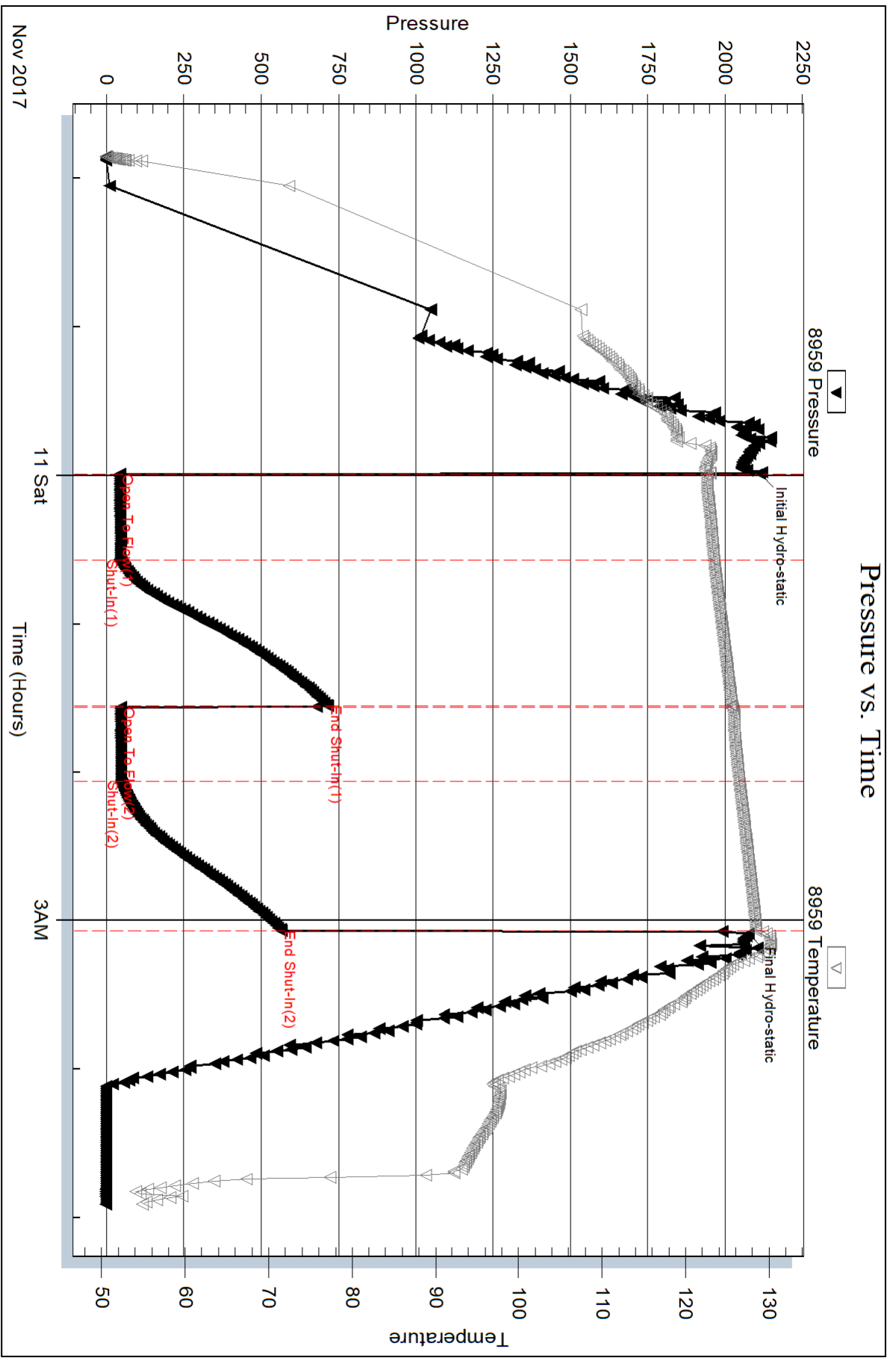
Serial #: 8959

Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 2

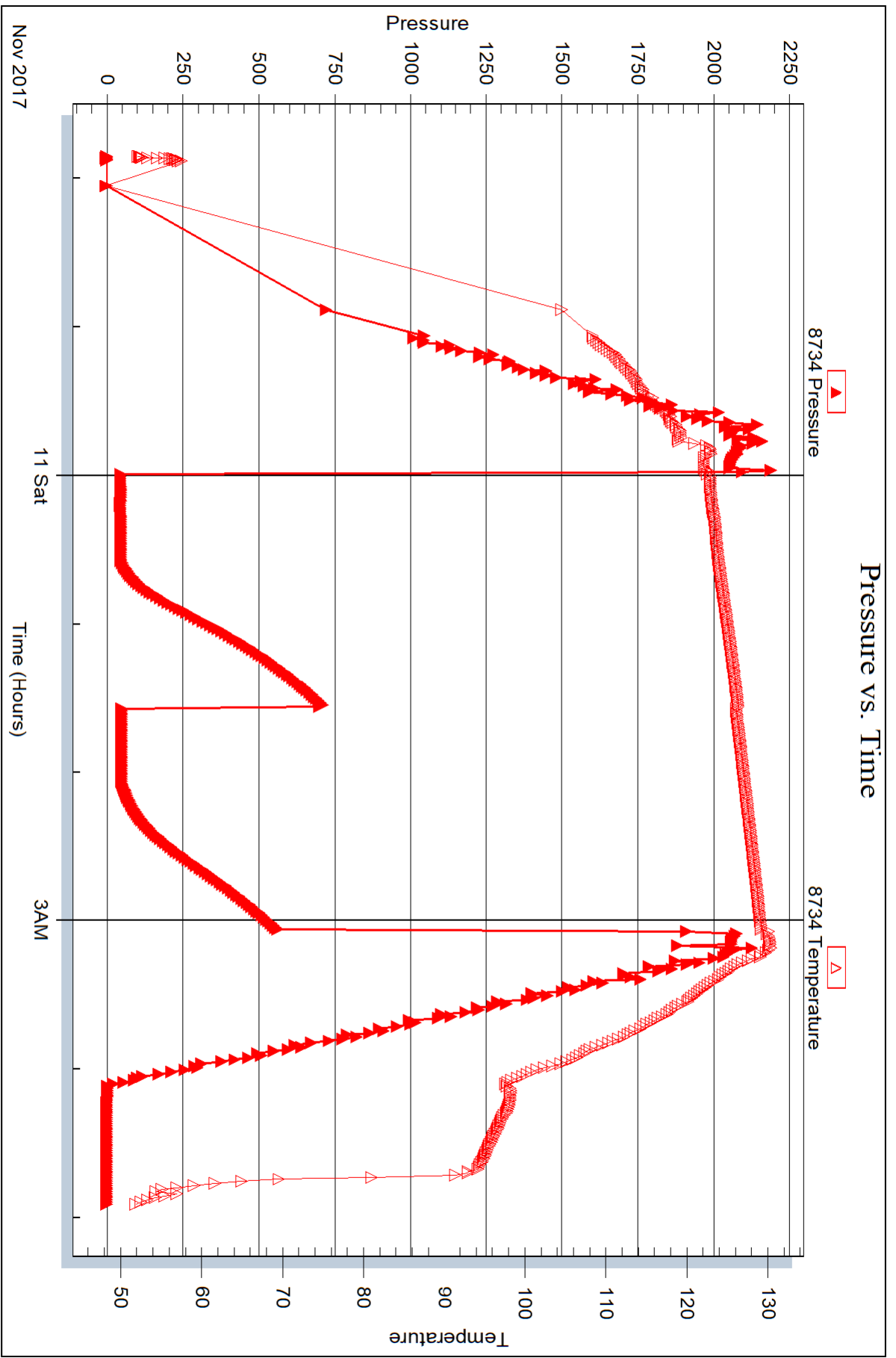


Serial #: 8734

Outside Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 2





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.11 @ 17:17:00

End Date: 2017.11.12 @ 01:14:50

Job Ticket #: 63168 DST #: 3

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:35:01

Murfin Drilling Co

20- 2S.-37W Cheyenne,KS

Culwell 'G' #1-20

DST # 3

Leavenworth - LKC "

2017.11.11



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS

Culwell 'G' #1-20

Job Ticket: 63168

DST#: 3

Test Start: 2017.11.11 @ 17:17:00

GENERAL INFORMATION:

Formation: **Leavenworth - LKC "**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:13:20

Time Test Ended: 01:14:50

Test Type: Conventional Bottom Hole (Reset)

Tester: Martine Salinas

Unit No: 82

Interval: 4284.00 ft (KB) To 4355.00 ft (KB) (TVD)

Reference Elevations: 3418.00 ft (KB)

Total Depth: 4355.00 ft (KB) (TVD)

3413.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 5.00 ft

Serial #: 8959

Inside

Press@RunDepth: 62.25 psig @ 4285.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.11.11

End Date:

2017.11.12

Last Calib.:

2017.11.12

Start Time: 17:17:01

End Time:

01:14:50

Time On Btm:

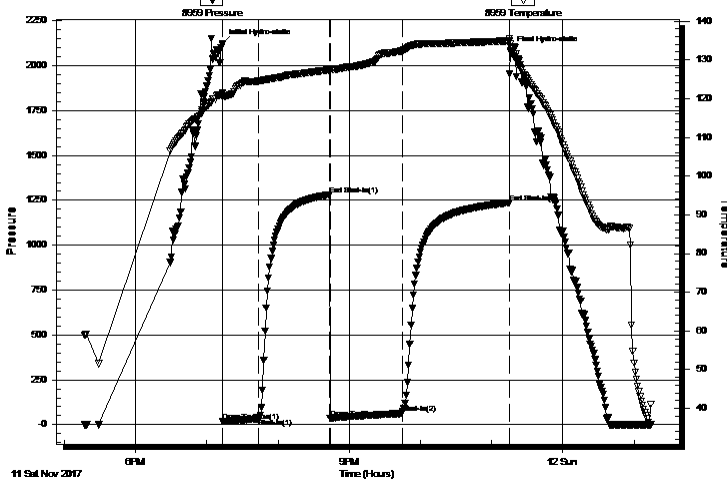
2017.11.11 @ 19:13:10

Time Off Btm:

2017.11.11 @ 23:15:50

TEST COMMENT: 30-IF-Surface blow built to 3"
60-ISI-No blow
60-FF-Surface blow @ 18 mins built to 3/4"
90-FSI-No blow

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2124.88	121.40	Initial Hydro-static
1	18.21	120.55	Open To Flow (1)
31	32.91	124.50	Shut-In(1)
91	1281.95	127.38	End Shut-In(1)
91	36.81	127.16	Open To Flow (2)
152	62.25	132.24	Shut-In(2)
242	1237.27	134.89	End Shut-In(2)
243	2083.16	134.07	Final Hydro-static

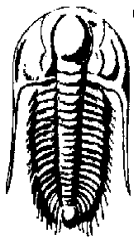
Recovery

Length (ft)	Description	Volume (bbl)
95.00	OSM 4%O, 96%M	0.47
2.00	CO 100% O	0.01

Gas Rates

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

* Recovery from multiple tests



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS

Culwell 'G' #1-20

Job Ticket: 63168 **DST#: 3**
Test Start: 2017.11.11 @ 17:17:00

GENERAL INFORMATION:

Formation: **Leavenworth - LKC "**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:13:20

Time Test Ended: 01:14:50

Interval: 4284.00 ft (KB) To 4355.00 ft (KB) (TVD)

Total Depth: 4355.00 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: 3418.00 ft (KB)

3413.00 ft (CF)

KB to GR/CF: 5.00 ft

Serial #: 8734 Outside

Press@RunDepth: psig @ 4285.00 ft (KB)

Start Date: 2017.11.11

End Date: 2017.11.12

Capacity: 8000.00 psig

Last Calib.: 2017.11.12

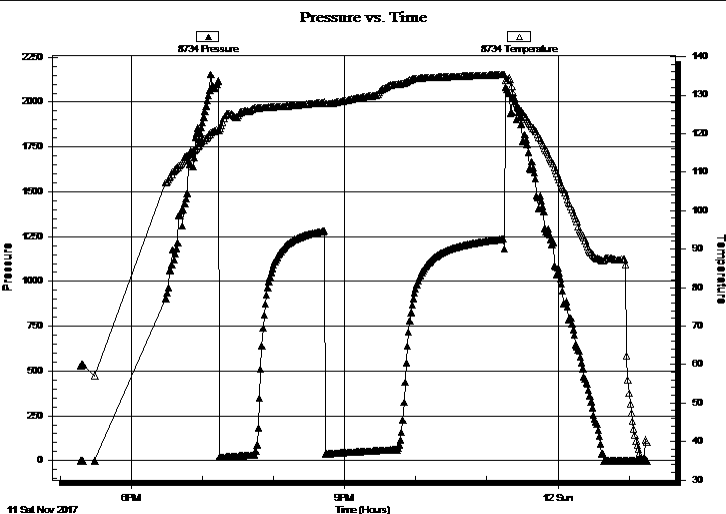
Start Time: 17:17:01

End Time: 01:15:00

Time On Btm:

Time Off Btm:

TEST COMMENT: 30-IF-Surface blow built to 3"
60-ISI-No blow
60-FF-Surface blow @ 18 mins built to 3/4"
90-FSI-No blow



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
95.00	OSM 4%O, 96%M	0.47
2.00	CO 100% O	0.01

Gas Rates

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

* Recovery from multiple tests



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TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63168 **DST#: 3**
Test Start: 2017.11.11 @ 17:17:00

Tool Information

Drill Pipe:	Length: 4058.00 ft	Diameter: 3.80 inches	Volume: 56.92 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 68000.00 lb
		Total Volume: 57.93 bbl		Tool Chased 0.00 ft
Drill Pipe Above KB:	7.00 ft			String Weight: Initial 60000.00 lb
Depth to Top Packer:	4284.00 ft			Final 60000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	71.00 ft			
Tool Length:	99.00 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			4261.00	
Hydraulic tool	5.00			4266.00	
Jars	5.00			4271.00	
Safety Joint	3.00			4274.00	
Packer	5.00			4279.00	28.00 Bottom Of Top Packer
Packer	5.00			4284.00	
Stubb	1.00			4285.00	
Recorder	0.00	8959	Inside	4285.00	
Recorder	0.00	8734	Outside	4285.00	
Perforations	32.00			4317.00	
Change Over Sub	1.00			4318.00	
Drill Pipe	31.00			4349.00	
Change Over Sub	1.00			4350.00	
Bullnose	5.00			4355.00	71.00 Bottom Packers & Anchor

Total Tool Length: 99.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63168 **DST#: 3**
Test Start: 2017.11.11 @ 17:17:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 21 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 70.00 sec/qt	Cushion Volume: bbl	
Water Loss: 6.36 in ³	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
95.00	OSM 4%O, 96%M	0.467
2.00	CO 100% O	0.010

Total Length: 97.00 ft Total Volume: 0.477 bbl
Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
Laboratory Name: Laboratory Location:
Recovery Comments: Gravity of oil = 19 @ 40 degs
Gravity corrected to 21 @ 60 degs

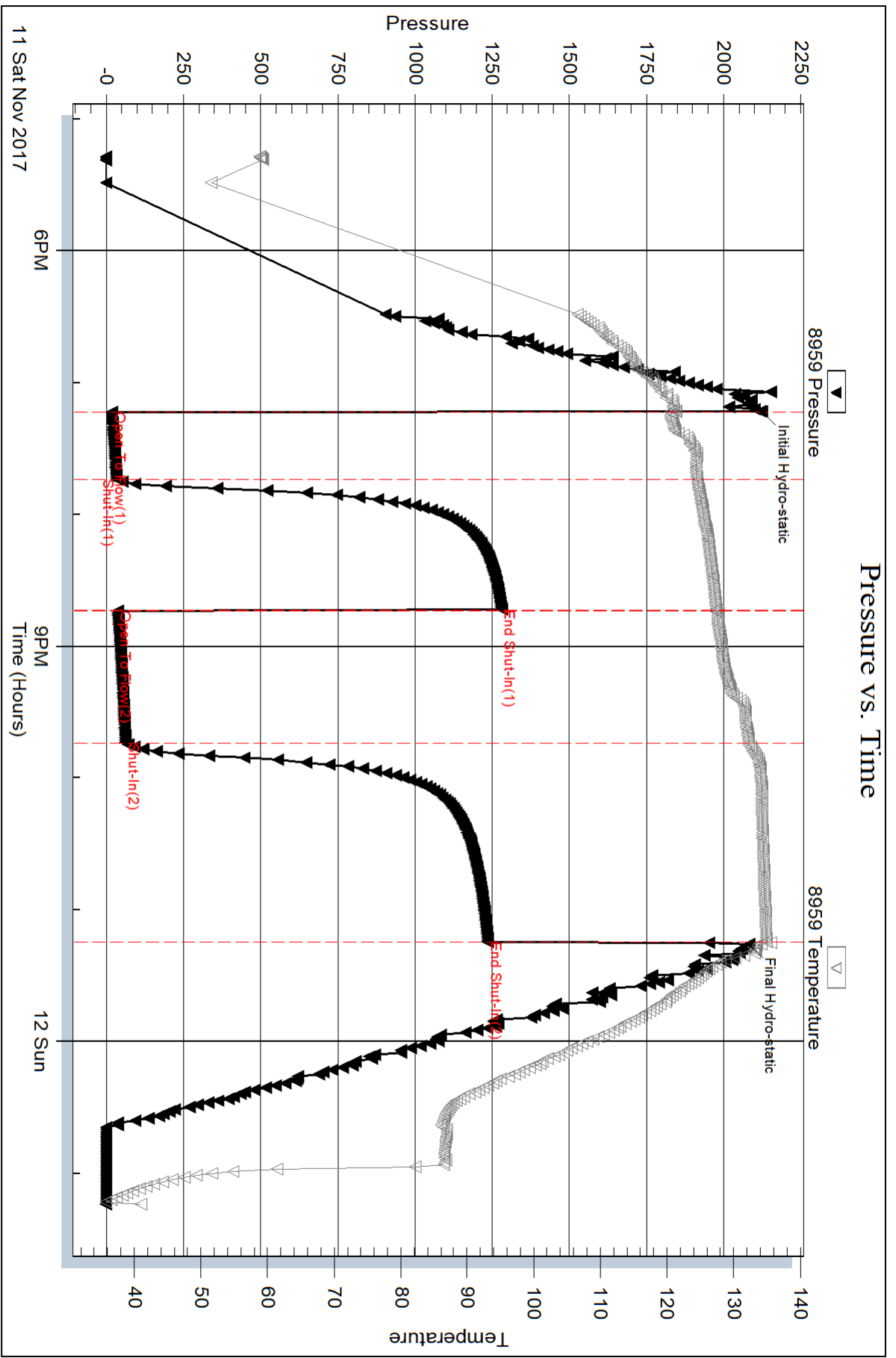
Serial #: 8959

Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 3



Triobite Testing, Inc

Ref. No: 63168

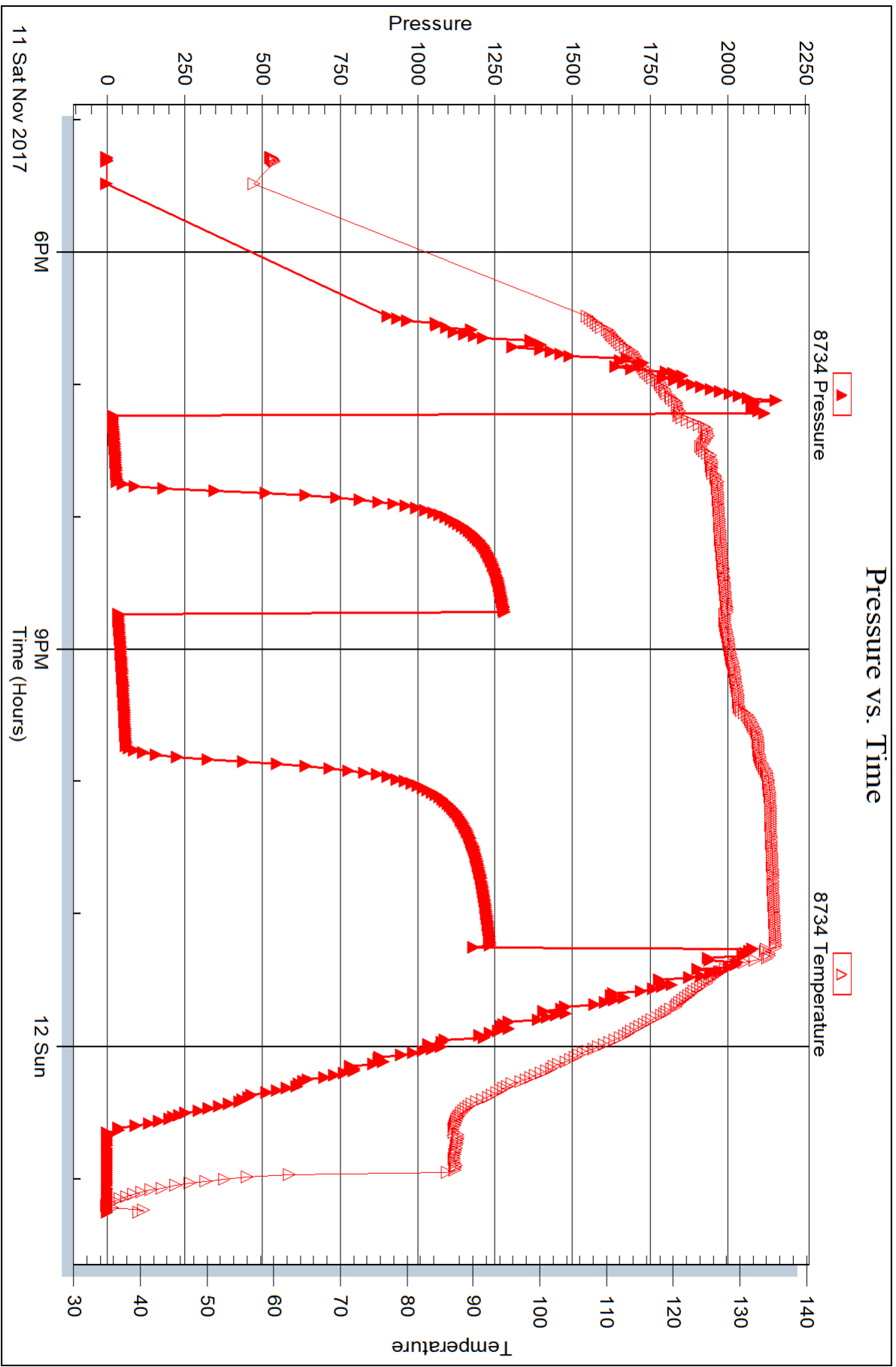
Printed: 2017.11.17 @ 10:35:01

Serial #: 8734

Outside Murfin Drilling Co

Culwell IG#1-20

DST Test Number: 3





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.12 @ 13:00:00

End Date: 2017.11.12 @ 21:51:30

Job Ticket #: 63169 DST #: 4

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:34:27



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

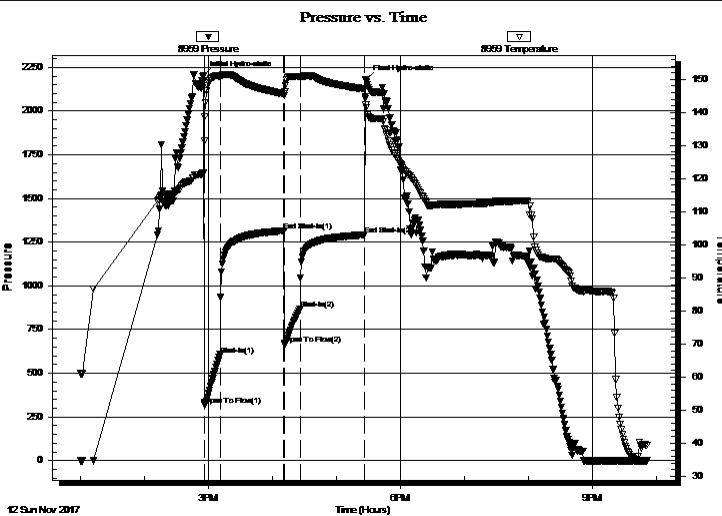
20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63169 **DST#: 4**
Test Start: 2017.11.12 @ 13:00:00

GENERAL INFORMATION:

Formation: **LKC A Prime - D Prim**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 14:56:30
Time Test Ended: 21:51:30
Interval: **4353.00 ft (KB) To 4425.00 ft (KB) (TVD)**
Total Depth: 4425.00 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: 3418.00 ft (KB)
3413.00 ft (CF)
KB to GR/CF: 5.00 ft

Serial #: 8959 **Inside**
Press@RunDepth: 866.73 psig @ 4354.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2017.11.12 End Date: 2017.11.12 Last Calib.: 2017.11.12
Start Time: 13:00:01 End Time: 21:51:30 Time On Btm: 2017.11.12 @ 14:55:10
Time Off Btm: 2017.11.12 @ 17:27:39

TEST COMMENT: 15-IF-BOB @ 45 secs
60-ISI- BOB @ 9 mins (attempt to bleed off 3 1/2 mins...12 1/2 mins total)
15-FF-BOB @ 45 secs & died back to 10 1/2 "
60-FSI-BOB @ 14 mins 45 secs



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2203.39	121.68	Initial Hydro-static
2	320.00	138.72	Open To Flow (1)
16	606.45	150.91	Shut-In(1)
76	1313.66	145.53	End Shut-In(1)
77	667.09	146.19	Open To Flow (2)
91	866.73	150.80	Shut-In(2)
151	1291.52	147.07	End Shut-In(2)
153	2180.85	142.32	Final Hydro-static

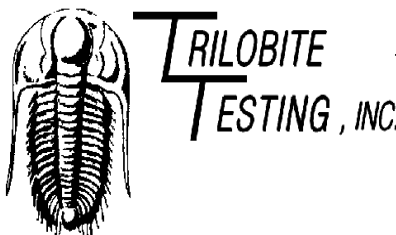
Recovery

Length (ft)	Description	Volume (bbl)
117.00	GHOCM 23%G, 30%O, 47%M	0.58
2181.00	CGO 21%G, 79%O (Reversed off)	29.79
5.00	CGO 19%G, 81%O	0.07
0.00	1134' GIP	0.00

Gas Rates

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

* Recovery from multiple tests



DRILL STEM TEST REPORT

Murfin Drilling Co
 250 N Water, STE 300,
 Wichita, KS 67202
 ATTN: Rocky Milford

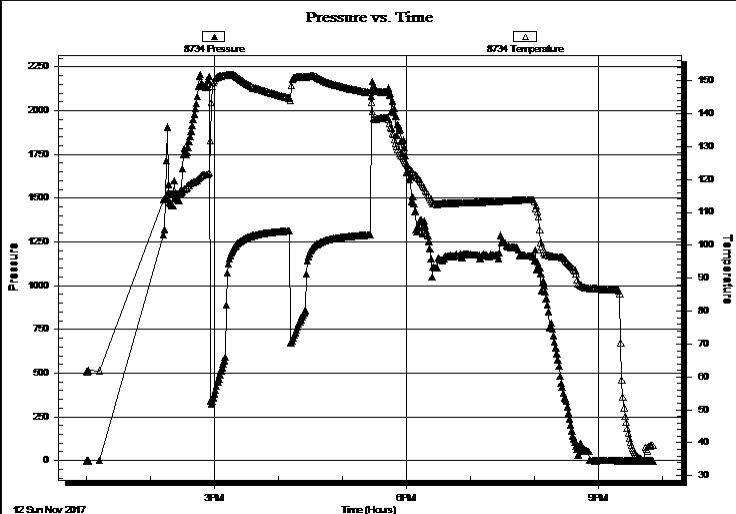
20- 2S-.37W Cheyenne,KS
Culwell 'G' #1-20
 Job Ticket: 63169 **DST#: 4**
 Test Start: 2017.11.12 @ 13:00:00

GENERAL INFORMATION:

Formation: **LKC A Prime - D Prim**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 14:56:30 Tester: Martine Salinas
 Time Test Ended: 21:51:30 Unit No: 82
 Interval: **4353.00 ft (KB) To 4425.00 ft (KB) (TVD)** Reference Elevations: 3418.00 ft (KB)
 Total Depth: 4425.00 ft (KB) (TVD) 3413.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 5.00 ft

Serial #: 8734 Outside
 Press@RunDepth: psig @ 4354.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.11.12 End Date: 2017.11.12 Last Calib.: 2017.11.12
 Start Time: 13:00:01 End Time: 21:51:19 Time On Btm:
 Time Off Btm:

TEST COMMENT: 15-IF-BOB @ 45 secs
 60-ISI- BOB @ 9 mins (attempt to bleed off 3 1/2 mins...12 1/2 mins total)
 15-FF-BOB @ 45 secs & died back to 10 1/2 "
 60-FSI-BOB @ 14 mins 45 secs



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
117.00	GHOCM 23%G, 30%O, 47%M	0.58
2181.00	CGO 21%G, 79%O (Reversed off)	29.79
5.00	CGO 19%G, 81%O	0.07
0.00	1134' GIP	0.00

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63169 **DST#: 4**
Test Start: 2017.11.12 @ 13:00:00

Tool Information

Drill Pipe:	Length: 4151.00 ft	Diameter: 3.80 inches	Volume: 58.23 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 75000.00 lb
			<u>Total Volume: 59.24 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	31.00 ft			String Weight: Initial 60000.00 lb
Depth to Top Packer:	4353.00 ft			Final 70000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	72.00 ft			
Tool Length:	100.00 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			4330.00	
Hydraulic tool	5.00			4335.00	
Jars	5.00			4340.00	
Safety Joint	3.00			4343.00	
Packer	5.00			4348.00	28.00 Bottom Of Top Packer
Packer	5.00			4353.00	
Stubb	1.00			4354.00	
Recorder	0.00	8959	Inside	4354.00	
Recorder	0.00	8734	Outside	4354.00	
Perforations	33.00			4387.00	
Change Over Sub	1.00			4388.00	
Drill Pipe	31.00			4419.00	
Change Over Sub	1.00			4420.00	
Bullnose	5.00			4425.00	72.00 Bottom Packers & Anchor

Total Tool Length: 100.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63169 **DST#: 4**
Test Start: 2017.11.12 @ 13:00:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 33.6 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 71.00 sec/qt	Cushion Volume: bbl	
Water Loss: 5.97 in ³	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 700.00 ppm		
Filter Cake: 2.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
117.00	GHOCM 23%G, 30%O, 47%M	0.575
2181.00	CGO 21%G, 79%O (Reversed off)	29.792
5.00	CGO 19%G, 81%O	0.070
0.00	1134' GIP	0.000

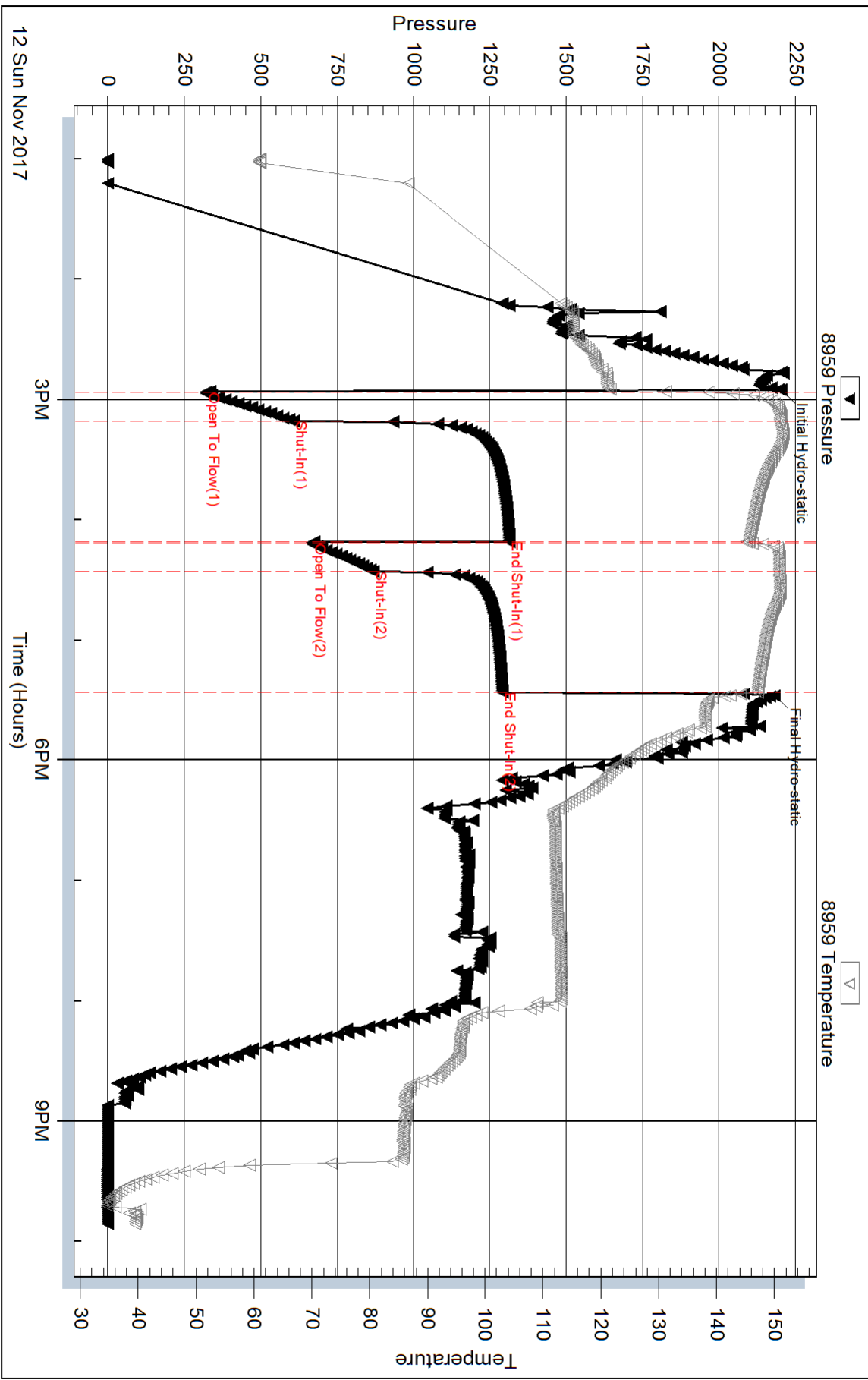
Total Length: 2303.00 ft Total Volume: 30.437 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: Gravity of oil = 31.2 @ 36 degs
Gravity corrected to 33.6 @ 60 degs

Pressure vs. Time

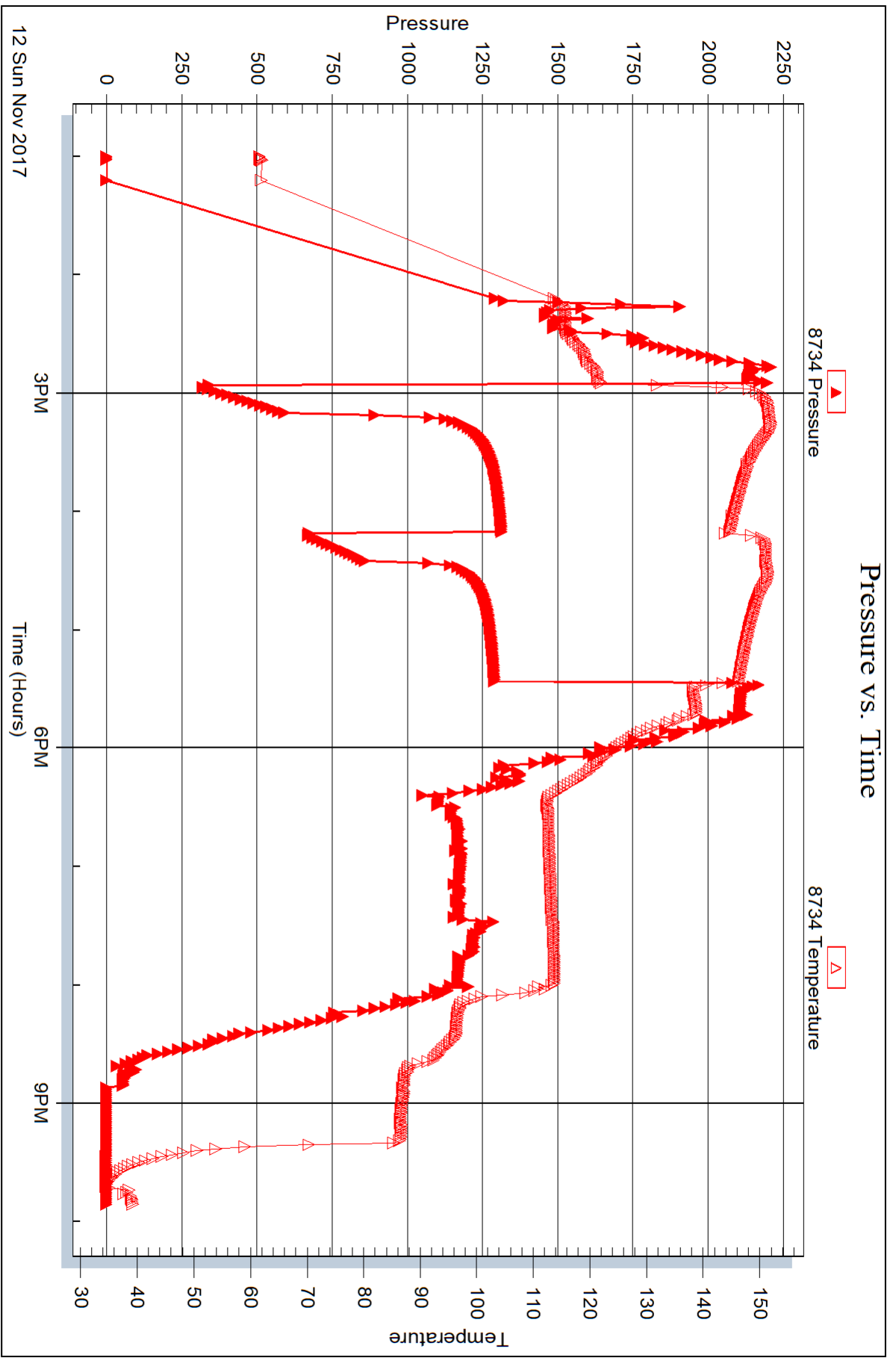


Serial #: 8734

Outside Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 4





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.13 @ 08:23:00

End Date: 2017.11.13 @ 16:57:40

Job Ticket #: 63170 DST #: 5

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

Printed: 2017.11.17 @ 10:33:59



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS

Culwell 'G' #1-20

Job Ticket: 63170

DST#: 5

Test Start: 2017.11.13 @ 08:23:00

GENERAL INFORMATION:

Formation: **LKC "G"**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 10:26:00
 Tester: Martine Salinas
 Time Test Ended: 16:57:40
 Unit No: 82
 Interval: **4422.00 ft (KB) To 4473.00 ft (KB) (TVD)**
 Reference Elevations: 3418.00 ft (KB)
 Total Depth: 4473.00 ft (KB) (TVD)
 3413.00 ft (CF)
 Hole Diameter: 7.88 inches
 Hole Condition: Good
 KB to GR/CF: 5.00 ft

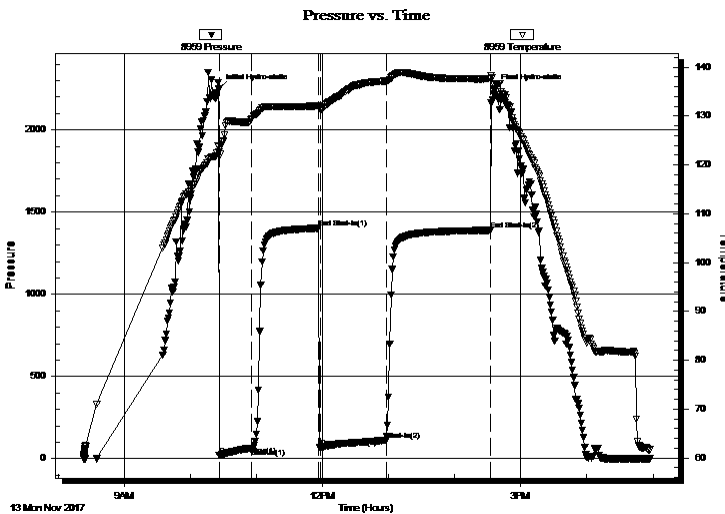
Serial #: 8959

Inside

Press@RunDepth: 111.49 psig @ 4423.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2017.11.13 End Date: 2017.11.13 Last Calib.: 2017.11.13
 Start Time: 08:23:01 End Time: 16:57:40 Time On Btm: 2017.11.13 @ 10:25:50
 Time Off Btm: 2017.11.13 @ 14:35:39

TEST COMMENT: 30-IF-Surface.blow built to 8"
 60-ISI-Surface blow back @ 2 mins built to 1/2"
 60-FF-BOB @ 35 mins
 90-FSI-Surface blow back @ 1 mins built to 1 1/2" & died back to 1"

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2251.00	123.71	Initial Hydro-static
1	18.78	122.75	Open To Flow (1)
30	65.09	129.50	Shut-In(1)
91	1402.47	132.12	End Shut-In(1)
93	68.74	131.21	Open To Flow (2)
152	111.49	137.18	Shut-In(2)
247	1389.73	137.62	End Shut-In(2)
250	2250.71	136.47	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
165.00	GHMCO 18%G, 29%M, 53%O	0.81
92.00	CGO 12%G, 88%O	0.93
0.00	295' GIP	0.00

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63170 **DST#: 5**
Test Start: 2017.11.13 @ 08:23:00

Tool Information

Drill Pipe:	Length: 4214.00 ft	Diameter: 3.80 inches	Volume: 59.11 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 78000.00 lb
			<u>Total Volume: 60.12 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	25.00 ft			String Weight: Initial 64000.00 lb
Depth to Top Packer:	4422.00 ft			Final 66000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	51.00 ft			
Tool Length:	79.00 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			4399.00	
Hydraulic tool	5.00			4404.00	
Jars	5.00			4409.00	
Safety Joint	3.00			4412.00	
Packer	5.00			4417.00	28.00 Bottom Of Top Packer
Packer	5.00			4422.00	
Stubb	1.00			4423.00	
Recorder	0.00	8959	Inside	4423.00	
Recorder	0.00	8734	Outside	4423.00	
Perforations	12.00			4435.00	
Change Over Sub	1.00			4436.00	
Drill Pipe	31.00			4467.00	
Change Over Sub	1.00			4468.00	
Bullnose	5.00			4473.00	51.00 Bottom Packers & Anchor

Total Tool Length: 79.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63170 **DST#: 5**
Test Start: 2017.11.13 @ 08:23:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 32.2 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 71.00 sec/qt	Cushion Volume: bbl	
Water Loss: 5.98 in ³	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 700.00 ppm		
Filter Cake: 2.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
165.00	GHMCO 18%G, 29%M, 53%O	0.811
92.00	CGO 12%G, 88%O	0.926
0.00	295' GIP	0.000

Total Length: 257.00 ft Total Volume: 1.737 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: Gravity of oil =32.8 @ 66 degs
Gravity corrected to 32.2 @ 60 degs

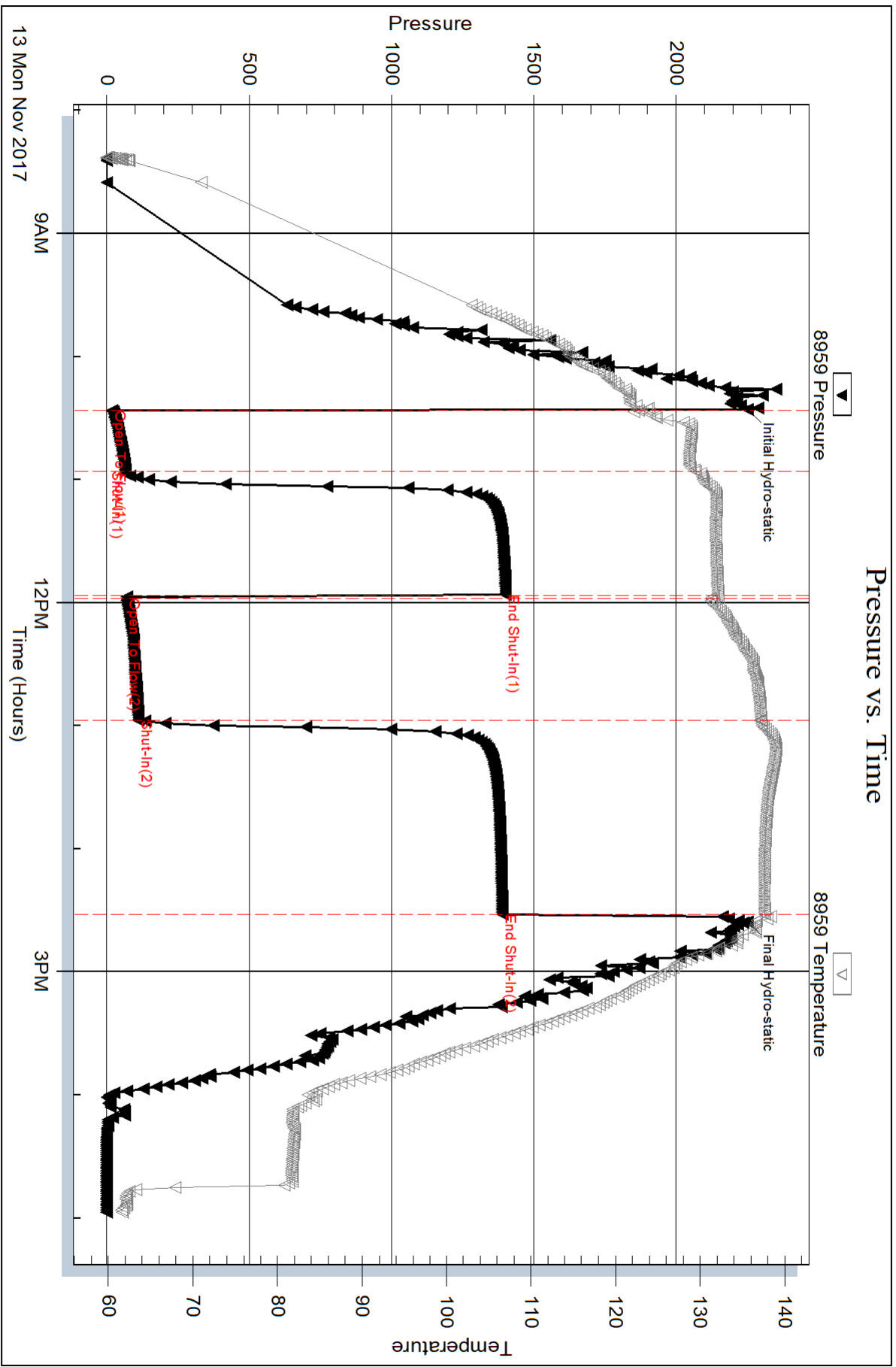
Serial #: 8959

Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 5

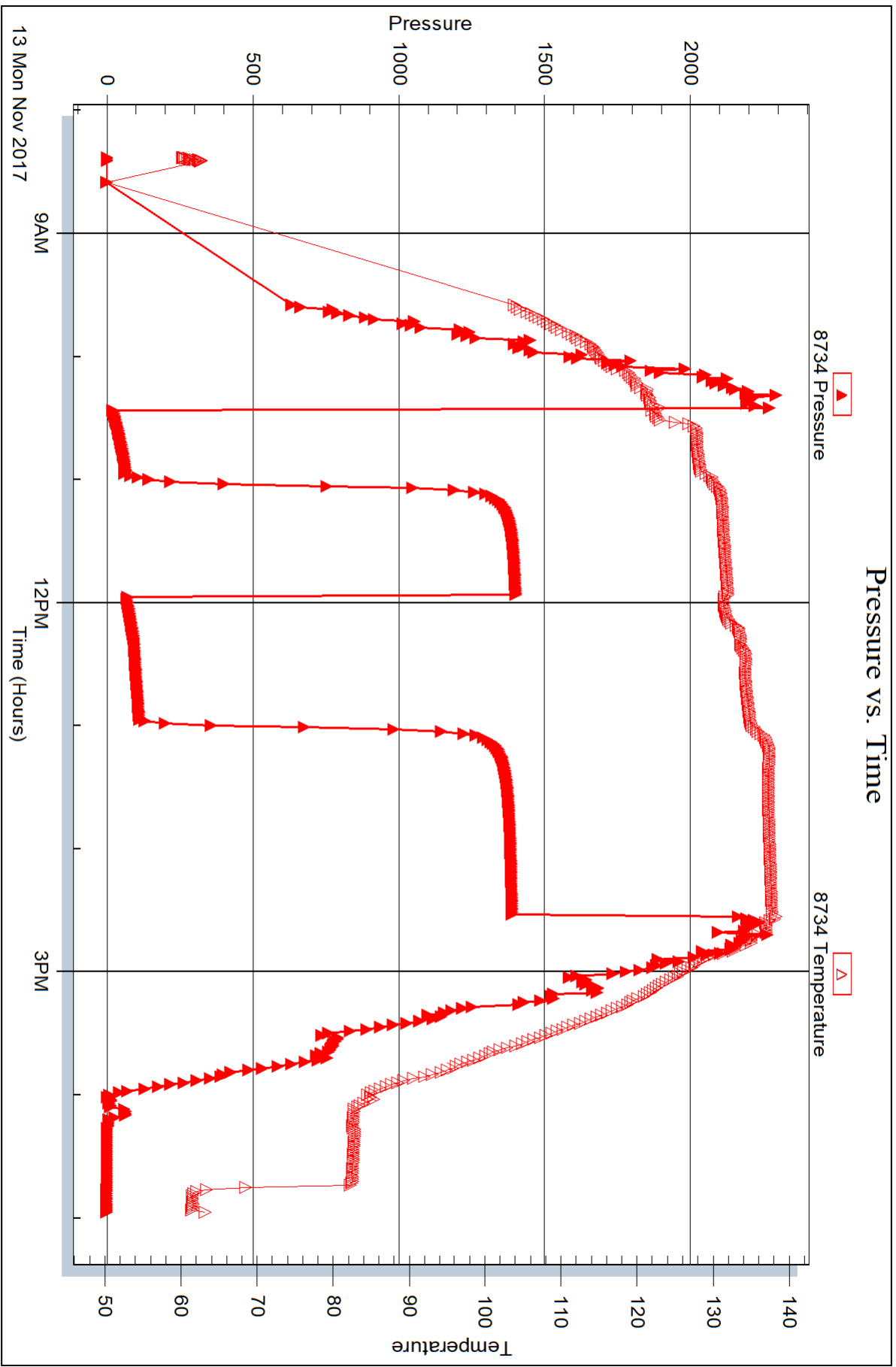


Serial #: 8734

Outside Murfin Drilling Co

Culw ell IG #1-20

DST Test Number: 5





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.14 @ 07:56:00

End Date: 2017.11.14 @ 17:16:00

Job Ticket #: 63171 DST #: 6

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:33:07

Murfin Drilling Co
20-2S.-37W Cheyenne,KS
Culwell 'G' #1-20
DST # 6
LKC "H - J"
2017.11.14



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63171 **DST#: 6**
Test Start: 2017.11.14 @ 07:56:00

Tool Information

Drill Pipe:	Length: 4245.00 ft	Diameter: 3.80 inches	Volume: 59.55 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 75000.00 lb
			<u>Total Volume: 60.56 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	8.00 ft			String Weight: Initial 60000.00 lb
Depth to Top Packer:	4470.00 ft			Final 66000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	90.00 ft			
Tool Length:	118.00 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			4447.00	
Hydraulic tool	5.00			4452.00	
Jars	5.00			4457.00	
Safety Joint	3.00			4460.00	
Packer	5.00			4465.00	28.00 Bottom Of Top Packer
Packer	5.00			4470.00	
Stubb	1.00			4471.00	
Recorder	0.00	8959	Inside	4471.00	
Recorder	0.00	8734	Outside	4471.00	
Perforations	19.00			4490.00	
Change Over Sub	1.00			4491.00	
Drill Pipe	63.00			4554.00	
Change Over Sub	1.00			4555.00	
Bullnose	5.00			4560.00	90.00 Bottom Packers & Anchor

Total Tool Length: 118.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63171 **DST#: 6**
Test Start: 2017.11.14 @ 07:56:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 34.4 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 71.00 sec/qt	Cushion Volume: bbl	
Water Loss: 6.35 in ³	Gas Cushion Type:	
Resistivity: ohm.m	Gas Cushion Pressure: psig	
Salinity: 700.00 ppm		
Filter Cake: 2.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
117.00	GOCM 33%G, 22%O, 45%M	0.575
1307.00	CGO 15%G, 85%O (Reversed out)	17.532
0.00	1023' GIP	0.000

Total Length: 1424.00 ft Total Volume: 18.107 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: Gravity of oil = 35 @ 66 degs
Gravity corrected to 34.4 @ 60 degs

Serial #: 8959

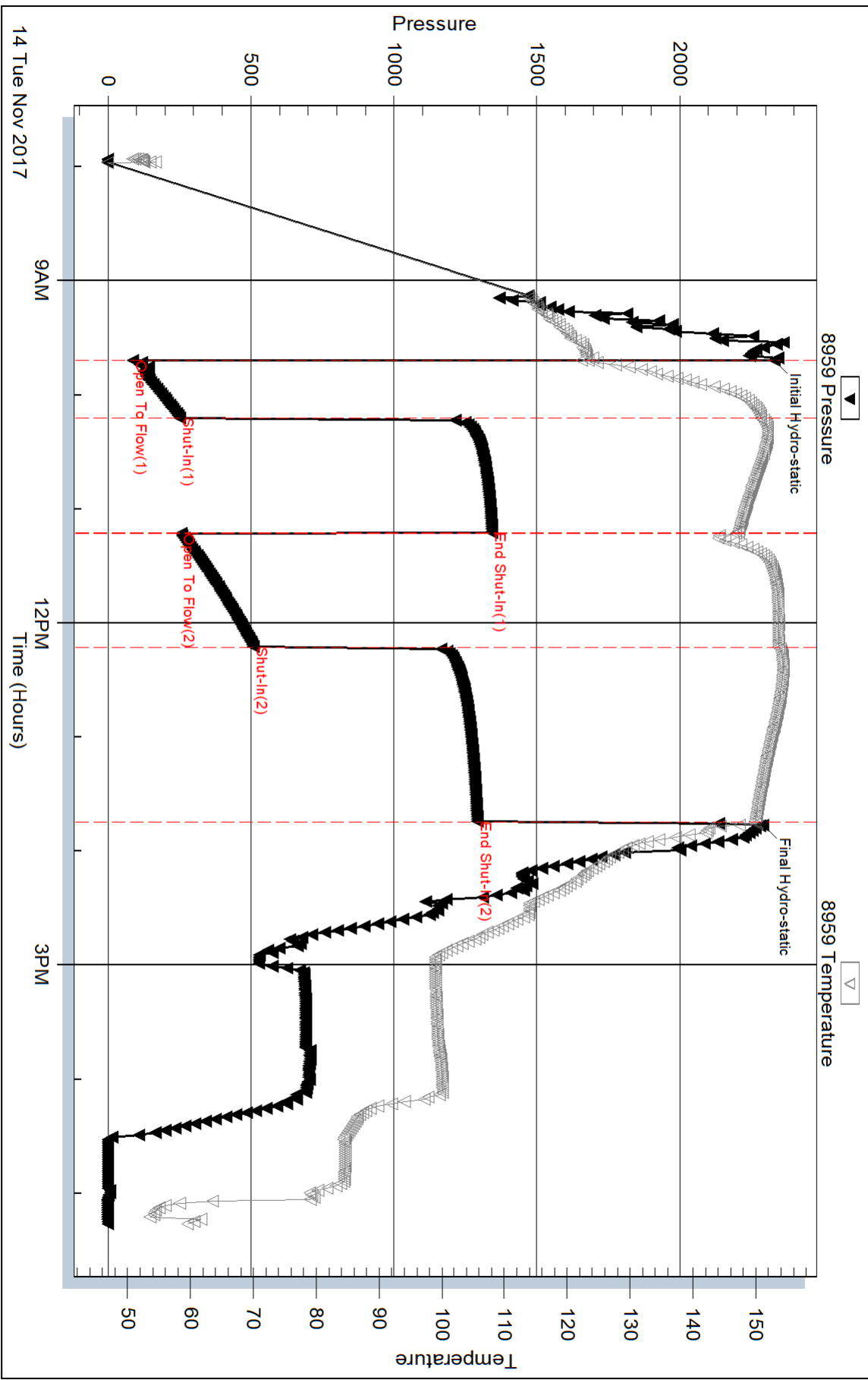
Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 6

Pressure vs. Time

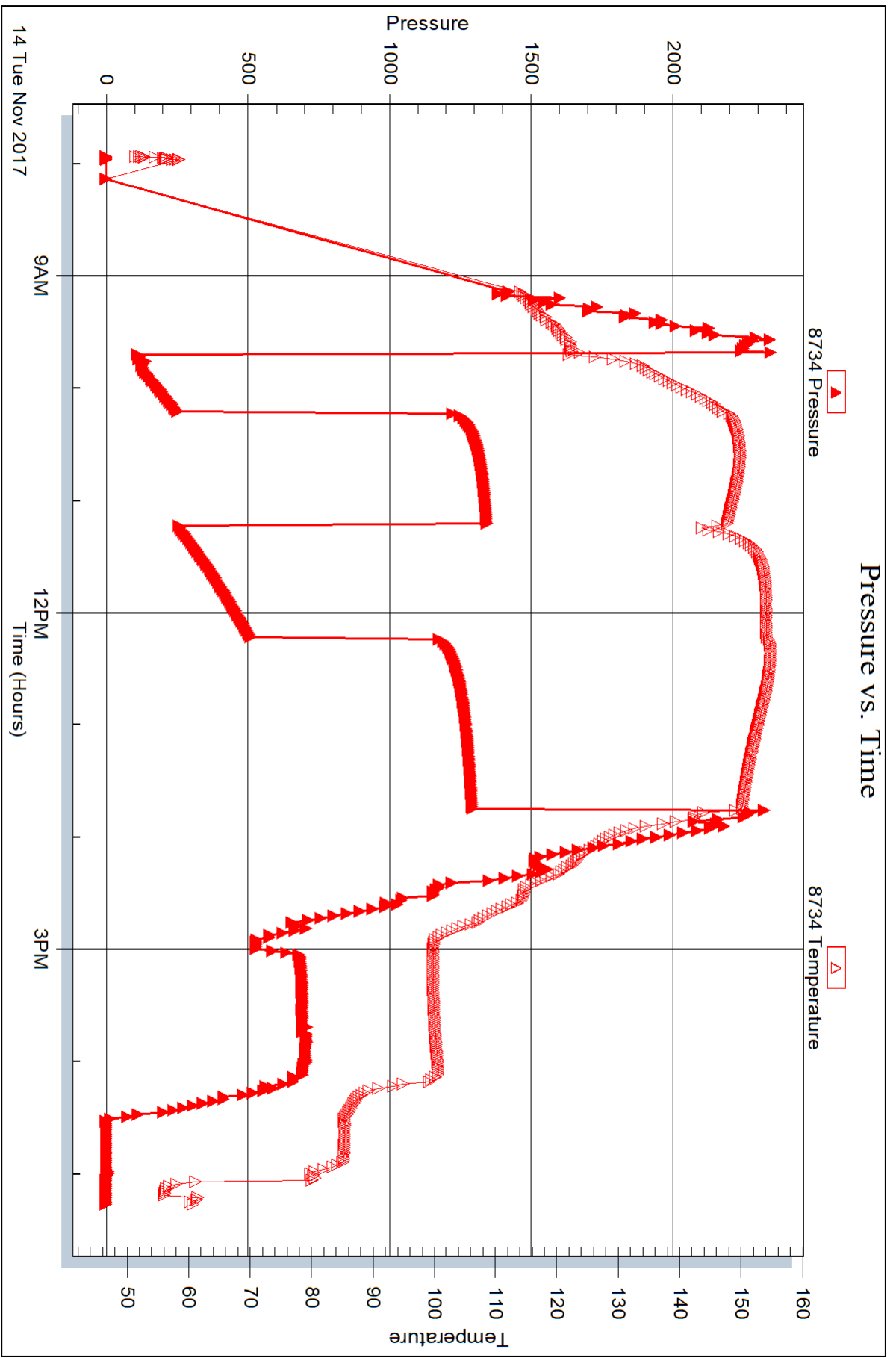


Serial #: 8734

Outside Murfin Drilling Co

Culwell IG#1-20

DST Test Number: 6



Trilobite Testing, Inc

Ref. No: 63171

Printed: 2017.11.17 @ 10:33:08



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co**

250 N Water, STE 300,
Wichita, KS 67202

ATTN: Rocky Milford

Culwell 'G' #1-20

20- 2S.-37W Cheyenne,KS

Start Date: 2017.11.16 @ 00:49:00

End Date: 2017.11.16 @ 10:46:19

Job Ticket #: 63172 DST #: 7

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2017.11.17 @ 10:32:32



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

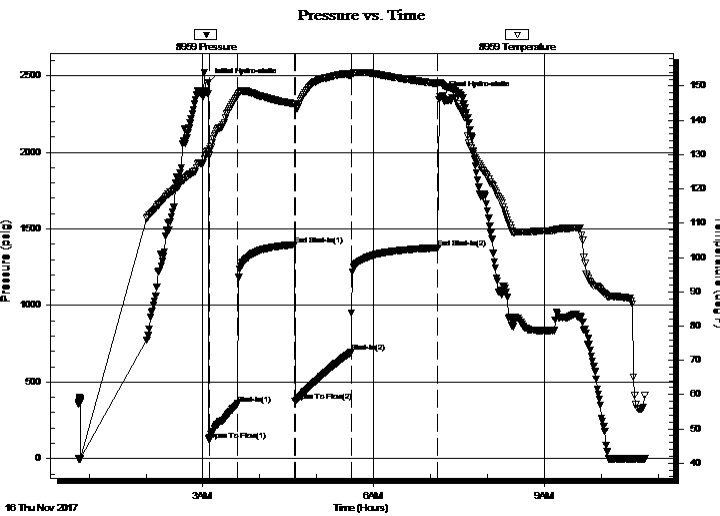
20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63172 **DST#: 7**
Test Start: 2017.11.16 @ 00:49:00

GENERAL INFORMATION:

Formation: **Ft. Scott- Celia**
Deviated: No Whipstock: ft (KB) Test Type: Conventional Bottom Hole (Reset)
Time Tool Opened: 03:06:40 Tester: Martine Salinas
Time Test Ended: 10:46:19 Unit No: 82
Interval: 4714.00 ft (KB) To 4846.00 ft (KB) (TVD) Reference Elevations: 3418.00 ft (KB)
Total Depth: 4846.00 ft (KB) (TVD) 3413.00 ft (CF)
Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 5.00 ft

Serial #: 8959 Inside
Press@RunDepth: 695.57 psig @ 4715.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2017.11.16 End Date: 2017.11.16 Last Calib.: 2017.11.16
Start Time: 00:49:01 End Time: 10:46:19 Time On Btm: 2017.11.16 @ 03:06:00
Time Off Btm: 2017.11.16 @ 07:13:00

TEST COMMENT: 30-IF-BOB @ 4 mins 10 secs
60-ISI-BOB @ 12 mins 50 secs
60-FF-BOB @ 5 1/2 mins
90-FSI-BOB @ 42 1/2 mins & died back to 11"



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2453.89	130.94	Initial Hydro-static
1	119.30	129.65	Open To Flow (1)
31	357.89	147.12	Shut-In(1)
91	1396.90	144.87	End Shut-In(1)
92	377.07	144.57	Open To Flow (2)
151	695.57	153.30	Shut-In(2)
242	1376.70	150.71	End Shut-In(2)
247	2368.68	150.24	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
58.00	GMCO 48%G, 20%M, 32%O	0.29
59.00	GOSM 28%G, 2%O, 70%M	0.29
1744.00	CGO 14%G, 86%O, (Reversed out)	23.66
0.00	1134' GIP	0.00

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63172 **DST#: 7**
Test Start: 2017.11.16 @ 00:49:00

Tool Information

Drill Pipe:	Length: 4495.00 ft	Diameter: 3.80 inches	Volume: 63.05 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: 205.00 ft	Diameter: 2.25 inches	Volume: 1.01 bbl	Weight to Pull Loose: 90000.00 lb
			Total Volume: 64.06 bbl	Tool Chased 0.00 ft
Drill Pipe Above KB:	14.00 ft			String Weight: Initial 61000.00 lb
Depth to Top Packer:	4714.00 ft			Final 70000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	132.00 ft			
Tool Length:	160.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments: Pulled tight coming off bottom, Ruined shale packer

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

Shut In Tool	5.00			4691.00	
Hydraulic tool	5.00			4696.00	
Jars	5.00			4701.00	
Safety Joint	3.00			4704.00	
Packer	5.00			4709.00	28.00 Bottom Of Top Packer
Packer	5.00			4714.00	
Packer - Shale	0.00			4714.00	
Stubb	1.00			4715.00	
Recorder	0.00	8959	Inside	4715.00	
Recorder	0.00	8734	Outside	4715.00	
Perforations	30.00			4745.00	
Change Over Sub	1.00			4746.00	
Drill Pipe	94.00			4840.00	
Change Over Sub	1.00			4841.00	
Bullnose	5.00			4846.00	132.00 Bottom Packers & Anchor

Total Tool Length: 160.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co
250 N Water, STE 300,
Wichita, KS 67202
ATTN: Rocky Milford

20- 2S.-37W Cheyenne,KS
Culwell 'G' #1-20
Job Ticket: 63172 **DST#: 7**
Test Start: 2017.11.16 @ 00:49:00

Mud and Cushion Information

Mud Type: Gel Chem	Cushion Type:	Oil API: 31.4 deg API
Mud Weight: 9.00 lb/gal	Cushion Length: ft	Water Salinity: ppm
Viscosity: 75.00 sec/qt	Cushion Volume: bbl	
Water Loss: 5.99 in ³	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
58.00	GMCO 48%G, 20%M, 32%O	0.285
59.00	GOSM 28%G, 2%O, 70%M	0.290
1744.00	CGO 14%G, 86%O, (Reversed out)	23.662
0.00	1134' GIP	0.000

Total Length: 1861.00 ft Total Volume: 24.237 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: Gravity of oil = 31.4 @ 60 degs

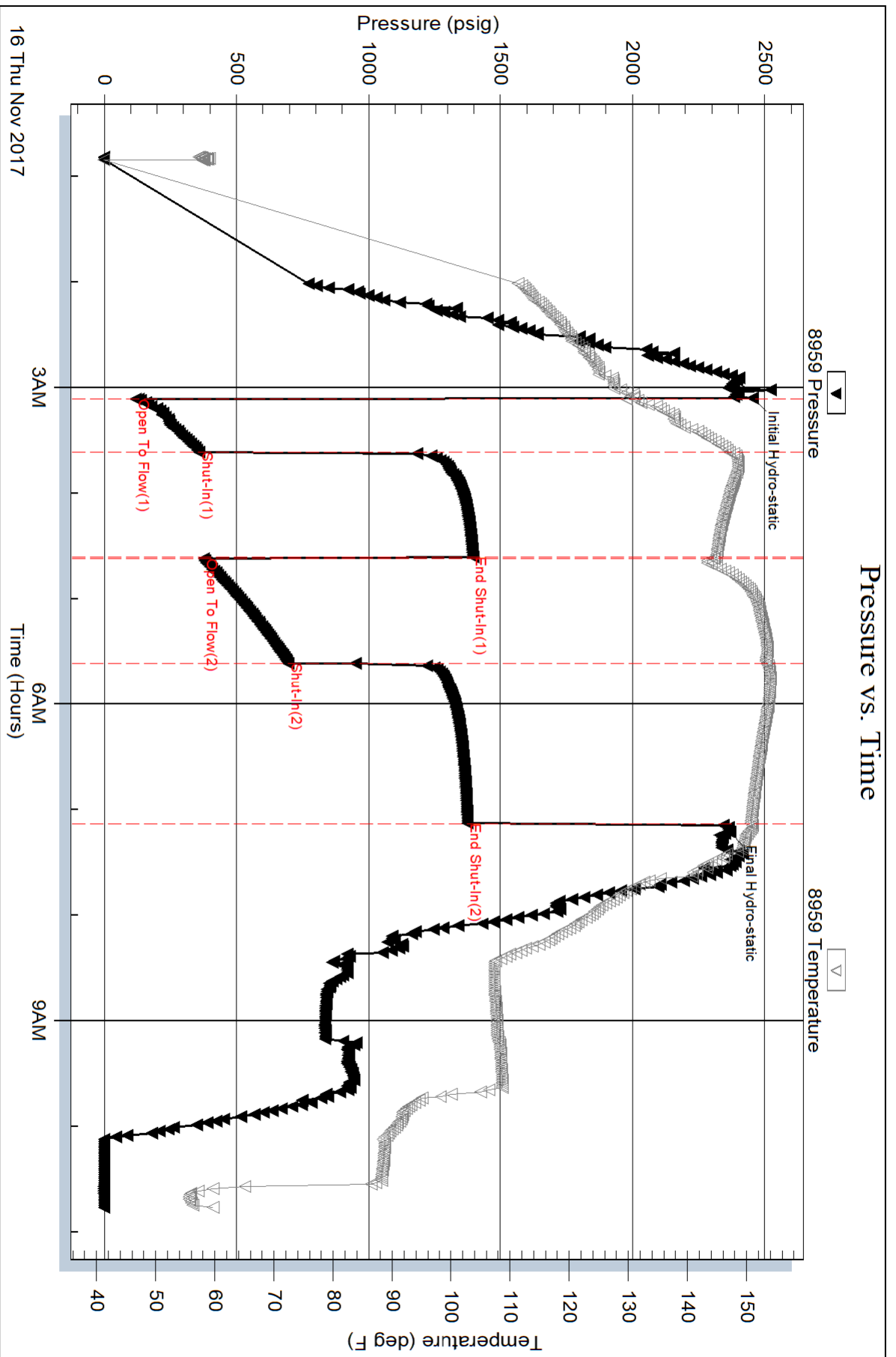
Serial #: 8959

Inside

Murfin Drilling Co

Culwell IG #1-20

DST Test Number: 7

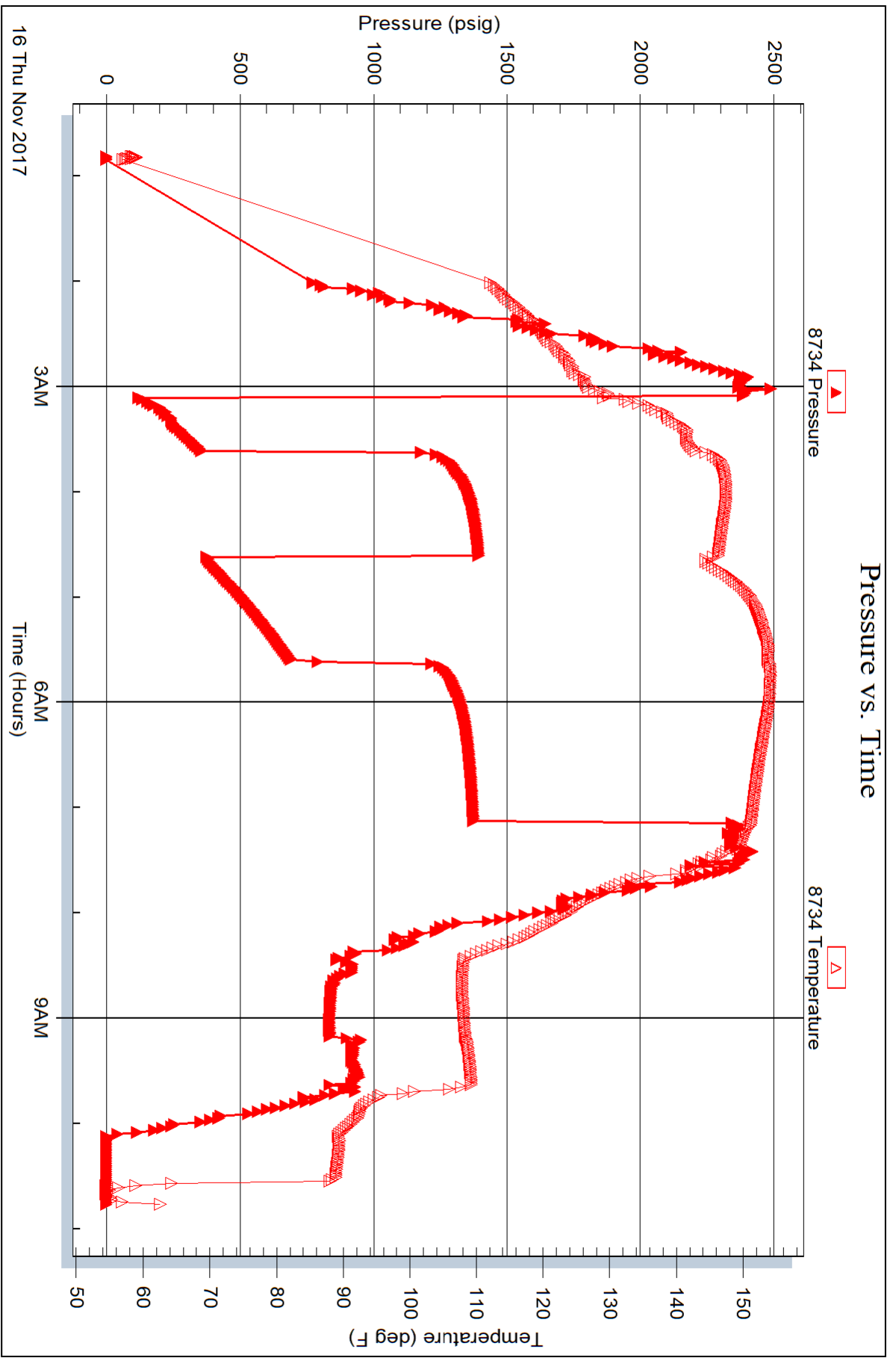


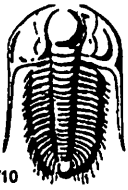
Serial #: 8734

Outside Murfin Drilling Co

Culw ell 'G' #1-20

DST Test Number: 7





TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63166

Well Name & No. Culwell 'G' # 1-20 Test No. 1 Date 11-9-17
 Company Murfin Drilling Co Inc. Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS. 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin # 24
 Location: Sec. 20 Twp. 25 Rge. 37w Co. Cheyenne State KS.

Interval Tested 4074-4130 Zone Tested Topeka
 Anchor Length 56' Drill Pipe Run 3871 Mud Wt. 8.9
 Top Packer Depth 4069 Drill Collars Run 265 Vis 71
 Bottom Packer Depth 4074 Wt. Pipe Run — WL 6.4
 Total Depth 4130 Chlorides 700 ppm System LCM 4#

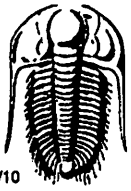
Blow Description IF. S. blow built to 9"
ISI - No blow
FF. S. blow built to B.O.B (11 inches) @ 53 mins.
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>305</u>	<u>HMCW</u>		<u>71</u>	<u>29</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 305 BHT 139 Gravity _____ API RW 342 @ 20.8° F Chlorides 67,000 ppm

(A) Initial Hydrostatic <u>2052</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>17:52</u>
(B) First Initial Flow <u>20</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>19:03</u>
(C) First Final Flow <u>114</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>21:06</u>
(D) Initial Shut-In <u>1249</u>	<input type="checkbox"/> Circ Sub _____	T-Pulled <u>01:06</u>
(E) Second Initial Flow <u>118</u>	<input type="checkbox"/> Hourly Standby _____	T-Out <u>03:09</u>
(F) Second Final Flow <u>184</u>	<input checked="" type="checkbox"/> Mileage <u>133 R.T</u> ^{99.75}	Comments _____
(G) Final Shut-In <u>1244</u>	<input type="checkbox"/> Sampler _____	_____
(H) Final Hydrostatic <u>2050</u>	<input type="checkbox"/> Straddle _____	<input type="checkbox"/> Ruined Shale Packer _____
	<input checked="" type="checkbox"/> Shale Packer <u>250</u>	<input type="checkbox"/> Ruined Packer _____
Initial Open <u>30</u>	<input type="checkbox"/> Extra Packer _____	<input type="checkbox"/> Extra Copies _____
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Recorder _____	Sub Total <u>0</u>
Final Flow <u>60</u>	<input type="checkbox"/> Day Standby _____	Total <u>1824.75</u>
Final Shut-In <u>90</u>	<input type="checkbox"/> Accessibility _____	MP/DST Disc't _____
	Sub Total <u>1824.75</u>	

Approved By Rocky Milford Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63167

Well Name & No. Culwell 'G' #1-20 Test No. 2 Date 11-10-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin #24
 Location: Sec. 20 Twp. 2S Rge. 37W Co. Cheyenne State KS

Interval Tested 4203-4286 Zone Tested Oscad
 Anchor Length 83' Drill Pipe Run 3995 Mud Wt. 9.0
 Top Packer Depth 4198 Drill Collars Run 205 Vis 72
 Bottom Packer Depth 4203 Wt. Pipe Run — WL 6.4
 Total Depth 4286 Chlorides 800 ppm System LCM 4#

Blow Description IF - 5. blow built to 1/4"
IST - No blow
FF - No blow
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>58</u>	<u>GSM</u>	<u>3</u>		<u>97</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 58 BHT 130 Gravity _____ API RW _____ @ _____ °F Chlorides _____ ppm

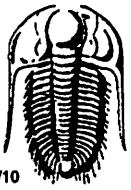
(A) Initial Hydrostatic 2113
 (B) First Initial Flow 44
 (C) First Final Flow 45
 (D) Initial Shut-In 715
 (E) Second Initial Flow 47
 (F) Second Final Flow 48
 (G) Final Shut-In 567
 (H) Final Hydrostatic 2077

Test 1150
 Jars 250
 Safety Joint 75
 Circ Sub _____
 Hourly Standby _____
 Mileage 133 RT 99.75
 Sampler _____
 Straddle _____
 Shale Packer 250
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1824.75

T-On Location 21:15 11-10-17
 T-Started 21:51
 T-Open 00:00
 T-Pulled 03:04
 T-Out 04:56 11-11-17
 Comments Hit bridge, opened tool & slid to bottom 10' lost 6' fluid in hole, bled off floor
 Ruined Shale Packer manifold
 Ruined Packer _____
 Extra Copies _____
 Sub Total 0
 Total 1824.75
 MP/DST Disc't _____

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

Approved By Rocky Milford Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63168

Well Name & No. Culwell 'G' #1-20 Test No. 3 Date 11-11-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin #24
 Location: Sec. 20 Twp. 2S. Rge. 37W. Co. Cheyenne State K5

Interval Tested 4284-4355 Zone Tested Leavenworth - LKC "A"
 Anchor Length 71 Drill Pipe Run 4058 Mud Wt. 8.9
 Top Packer Depth 4279 Drill Collars Run 205 Vis 70
 Bottom Packer Depth 4284 Wt. Pipe Run - WL 6.4
 Total Depth 4355 Chlorides 1100 ppm System LCM 4#

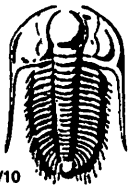
Blow Description IF - S. blow built to 3"
ISI - No blow
FF - S. blow @ 18mins built to 3/4"
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>95</u>	<u>65M</u>	<u>4</u>		<u>96</u>	
<u>2</u>	<u>0</u>	<u>100</u>			

Rec Total 97 BHT 134 Gravity 21 API RW @ °F Chlorides ppm

(A) Initial Hydrostatic 2125 Test 1150 T-On Location 16:20
 (B) First Initial Flow 18 Jars 250 T-Started 17:17
 (C) First Final Flow 32 Safety Joint 75 T-Open 19:14
 (D) Initial Shut-In 1282 Circ Sub _____ T-Pulled 23:14
 (E) Second Initial Flow 37 Hourly Standby _____ T-Out 01:15
 (F) Second Final Flow 62 Mileage 133 RT. 99.75 Comments _____
 (G) Final Shut-In 1237 Sampler _____
 (H) Final Hydrostatic 2083 Straddle _____ Ruined Shale Packer _____
 Shale Packer _____ Ruined Packer _____
 Extra Packer _____ Extra Copies _____
 Initial Open 30 Extra Recorder _____ Sub Total 0
 Initial Shut-In 60 Day Standby _____ Total 1574.75
 Final Flow 60 Accessibility _____ MP/DST Disc't _____
 Final Shut-In 90 Sub Total 1574.75

Approved By Rocky Milford Our Representative Robert Palmer
 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. 63169

Well Name & No. Culwell 'G' #1-20 Test No. 4 Date 11-12-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin #24
 Location: Sec. 20 Twp. 2s. Rge. 37W Co. Cheyenne State KS

Interval Tested 4353-4425 Zone Tested LKC A Prime - D Prime
 Anchor Length 72' Drill Pipe Run 4151 Mud Wt. 9.0
 Top Packer Depth 4348 Drill Collars Run 205 Vis 65
 Bottom Packer Depth 4353 Wt. Pipe Run — WL 6.0
 Total Depth 4425 Chlorides 1000 ppm System LCM 3H

Blow Description IF - S. blow built to B.O.B (12 inches) @ 45 secs
ISI - S. blow built to ~~B.O.B~~ B.O.B (12 inches) @ 9 mins. (Attempt to bleed off 3 1/2 min (12 1/2 total))
FF - S. blow built to B.O.B (12 inches) @ 45 secs & died back to 10 1/2"
FST - S. blow built to B.O.B (12 inches) @ 14 mins 45 secs

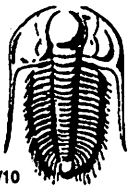
Rec	Feet of	%gas	%oil	%water	%mud
<u>117</u>	<u>GHO CM</u>	<u>23</u>	<u>30</u>	<u>47</u>	
<u>Rev 2181</u>	<u>CGO</u>	<u>21</u>	<u>79</u>		
<u>5'</u>	<u>CGO</u>	<u>19</u>	<u>81</u>		
<u>0</u>	<u>1134 GIP</u>				

Rec Total 2303 BHT 142 Gravity 33.6 API RW @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2203 Test 1150 T-On Location 12:30
 (B) First Initial Flow 320 Jars 250 T-Started 13:00
 (C) First Final Flow 606 Safety Joint 75 T-Open 14:56
 (D) Initial Shut-In 1314 Circ Sub Drop Bar 50 T-Pulled 17:26
 (E) Second Initial Flow 667 Hourly Standby _____ T-Out 21:52
 (F) Second Final Flow 867 Mileage 133RT 99.75 Comments _____
 (G) Final Shut-In 1292 Sampler _____
 (H) Final Hydrostatic 2181 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1624.75

MP/DST Disc't _____

Approved By Rocky Milford Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63170

Well Name & No. Culwell 'G' #1-20 Test No. 5 Date 11-13-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, Ks 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin #24
 Location: Sec. 20 Twp. 25 Rge. 37w. Co. Cheyenne State KS

Interval Tested 4422-4473 Zone Tested LKC "G"
 Anchor Length 51' Drill Pipe Run 4214 Mud Wt. 8.9
 Top Packer Depth 4417 Drill Collars Run 205 Vis 64
 Bottom Packer Depth 4422 Wt. Pipe Run — WL 6.0
 Total Depth 4473 Chlorides 1000 ppm System LCM 4#

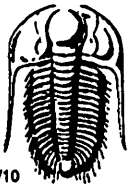
Blow Description IF-S blow built to 8"
ISI-S blowback @ 2mins built to 1/2"
FF-S blow built to B.O.B (12 inches) @ 35mins
ESI-S blow back @ 1min built to 1/2" + died back to 1"

Rec	Feet of		%gas	%oil	%water	%mud
<u>165</u>	<u>GHMCO</u>	<u>18</u>	<u>53</u>		<u>29</u>	
<u>92</u>	<u>CGO</u>	<u>12</u>	<u>88</u>			
<u>0</u>	<u>295' GIP</u>	<u>100</u>				

Rec Total 257 BHT 137 Gravity 32.2 API RW @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2251 Test 1150 T-On Location 07:25
 (B) First Initial Flow 19 Jars 250 T-Started 08:23
 (C) First Final Flow 65 Safety Joint 75 T-Open 10:27
 (D) Initial Shut-In 1402 Circ Sub — T-Pulled 14:27
 (E) Second Initial Flow 69 Hourly Standby — T-Out 16:58
 (F) Second Final Flow 111 Mileage 133 RT ^{99.25} Comments —
 (G) Final Shut-In 1390 Sampler —
 (H) Final Hydrostatic 2251 Straddle — Ruined Shale Packer —
 Shale Packer — Ruined Packer —
 Extra Packer — Extra Copies —
 Extra Recorder — Sub Total 0
 Day Standby — Total 1574.75
 Accessibility — MP/DST Disc't —
 Sub Total 1574.75

Approved By Rocky Milford Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63171

Well Name & No. Culwell 'G' #1-20 Test No. 6 Date 11-14-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS 67202
 Co. Rep / Geo. Bucky Milford Rig MURFIN #24
 Location: Sec. 20 Twp. 2s. Rge. 37w. Co. Cheyenne State KS

Interval Tested 4470-4560 Zone Tested LKC "H-J"
 Anchor Length 90 Drill Pipe Run 4245 Mud Wt. 9.0
 Top Packer Depth 4465 Drill Collars Run 265 Vis 61
 Bottom Packer Depth 4470 Wt. Pipe Run — WL 6.0
 Total Depth 4560 Chlorides 1200 ppm System LCM 4#

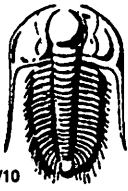
Blow Description IF - S. blow built to B.O.B (12 inches) @ 5 mins 40 secs
ISI - S. blow back built to B.O.B (12 inches) @ 8 mins 40 secs (Attempted to bleed off 2 mins, 10 mins total)
FF - S. blow built to B.O.B (12 inches) @ 9 mins.
FSI - No blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>117</u>	<u>GOCM</u>	<u>33</u>	<u>22</u>	<u>45</u>	
<u>Rev 1307</u>	<u>CGO</u>	<u>15</u>	<u>85</u>		
<u>0</u>	<u>1023' GIP</u>	<u>100</u>			

Rec Total 1424 BHT 147 Gravity 34.4 API RW @ °F Chlorides _____ ppm

(A) Initial Hydrostatic <u>2330</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>07:30</u>
(B) First Initial Flow <u>88</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>07:56</u>
(C) First Final Flow <u>252</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>09:43</u>
(D) Initial Shut-In <u>1345</u>	<input checked="" type="checkbox"/> Circ Sub <u>Drop Bar</u> <u>50</u>	T-Pulled <u>13:43</u>
(E) Second Initial Flow <u>256</u>	<input type="checkbox"/> Hourly Standby _____	T-Out <u>17:17</u>
(F) Second Final Flow <u>509</u>	<input checked="" type="checkbox"/> Mileage <u>133RT</u> <u>99.75</u>	Comments _____
(G) Final Shut-In <u>1293</u>	<input type="checkbox"/> Sampler _____	
(H) Final Hydrostatic <u>2291</u>	<input type="checkbox"/> Straddle _____	<input type="checkbox"/> Ruined Shale Packer _____
	<input type="checkbox"/> Shale Packer _____	<input type="checkbox"/> Ruined Packer _____
Initial Open <u>30</u>	<input type="checkbox"/> Extra Packer _____	<input type="checkbox"/> Extra Copies _____
Initial Shut-In <u>60</u>	<input type="checkbox"/> Extra Recorder _____	Sub Total <u>0</u>
Final Flow <u>60</u>	<input type="checkbox"/> Day Standby _____	Total <u>1624.75</u>
Final Shut-In <u>90</u>	<input type="checkbox"/> Accessibility _____	MP/DST Disc't _____
	Sub Total <u>1624.75</u>	

Approved By Bucky Milford Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 63172

Well Name & No. Culwell 'G' # 1-20 Test No. 7 Date 11-16-17
 Company Murfin Drilling Co Inc Elevation 3418 KB 3413 GL
 Address 250 N. Water, STE 300, Wichita, KS 67202
 Co. Rep / Geo. Rocky Milford Rig Murfin #24
 Location: Sec. 20 Twp. 2s Rge. 37w. Co. Cheyenne State KS

Interval Tested 4714-4846 Zone Tested Ft. Scott - Celia.
 Anchor Length 132 Drill Pipe Run 4495 Mud Wt. 9.2
 Top Packer Depth 4709 Drill Collars Run 265 Vis 75
 Bottom Packer Depth 4714 (shale) Wt. Pipe Run — WL 6.0
 Total Depth 4846 Chlorides 1000 ppm System LCM 4#

Blow Description IF · S. blow built to B.O.B (12 inches) @ 4 mins 10 secs
ISI · S. blow back built to B.O.B (12 inches) @ 12 mins 50 secs
FF · S. blow built to B.O.B (12 inches) @ 5 1/2 mins
FSE · S. blow back built to B.O.B (12 inches) @ 42 1/2 mins & dived back to 11"

Rec	Feet of		%gas	%oil	%water	%mud
<u>58</u>	<u>GMCO</u>	<u>48</u>	<u>32</u>		<u>20</u>	
<u>59</u>	<u>GOSM</u>	<u>28</u>	<u>2</u>		<u>70</u>	
<u>Rec 1744</u>	<u>CGO</u>	<u>14</u>	<u>86</u>			
<u>0</u>	<u>1134' GTP</u>	<u>100</u>				

Rec Total 1861 BHT 150 Gravity 31.4 API RW @ ° F Chlorides ppm

(A) Initial Hydrostatic 2454 Test 1150 T-On Location 00:10
 (B) First Initial Flow 119 Jars 250 T-Started 00:49
 (C) First Final Flow 358 Safety Joint 75 T-Open 03:07
 (D) Initial Shut-In 1397 Circ Sub Drop Bar ⁵⁰ T-Pulled 07:07
 (E) Second Initial Flow 377 Hourly Standby _____ T-Out 10:46
 (F) Second Final Flow 696 Mileage 133RT ^{99.75} Comments Pulled tight coming off bottom
 (G) Final Shut-In 1377 Sampler _____ Tools loaded @ 11:59
 (H) Final Hydrostatic 2369 Straddle _____ Ruined Shale Packer 350
 Ruined Packer _____
 Extra Packer _____
 Extra Recorder _____ Sub Total 350
 Day Standby _____ Total 1874.75+350
 Accessibility _____ MP/DST Disc't _____
 Sub Total 1874.75

Approved By Rocky Milford Our Representative Mark Johnson
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