



DRILL STEM TEST REPORT

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

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206

ATTN: Phil Askey / Rusty M

Ruth #1-10

S10-16s-46w Cheyenne, CO

Start Date: 2015.09.13 @ 01:30:00

End Date: 2015.09.13 @ 10:00:20

Job Ticket #: 61714 DST #: 1

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

Printed: 2015.09.18 @ 09:06:51



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61714

DST#: 1

Test Start: 2015.09.13 @ 01:30:00

GENERAL INFORMATION:

Formation: **Marmaton**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 04:23:30

Time Test Ended: 10:00:20

Test Type: Conventional Bottom Hole (Initial)

Tester: Chuck Smith

Unit No: 61

Interval: 4488.00 ft (KB) To 4550.00 ft (KB) (TVD)

Total Depth: 4550.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 8357 Inside

Press@RunDepth: 795.17 psig @ 4489.00 ft (KB)

Start Date: 2015.09.13

End Date:

2015.09.13

Start Time: 01:30:02

End Time:

10:00:19

Capacity: 8000.00 psig

Last Calib.: 2015.09.13

Time On Btm: 2015.09.13 @ 04:21:10

Time Off Btm: 2015.09.13 @ 07:21:00

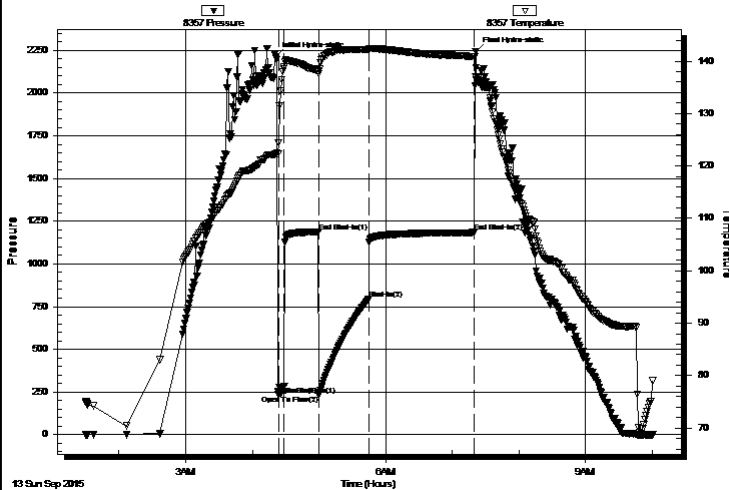
TEST COMMENT: 5- 1.33 psi build. (B.O.B. @ 3 min)

30- No return.

45- 5.95 psi build. (B.O.B. @ 3 min)

90- No return.

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2214.10	122.36	Initial Hydro-static
3	234.05	124.38	Open To Flow (1)
8	285.50	138.87	Shut-In (1)
39	1187.86	138.16	End Shut-In (1)
39	232.91	137.60	Open To Flow (2)
84	795.17	142.16	Shut-In (2)
179	1185.54	140.89	End Shut-In (2)
180	2244.66	136.93	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
1424.00	MW 10m 90w With emulsion	18.50
330.00	OSWM 10w 90m With emulsion	4.68

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61714

DST#: 1

Test Start: 2015.09.13 @ 01:30:00

GENERAL INFORMATION:

Formation: **Marmaton**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 04:23:30

Time Test Ended: 10:00:20

Test Type: Conventional Bottom Hole (Initial)

Tester: Chuck Smith

Unit No: 61

Interval: 4488.00 ft (KB) To 4550.00 ft (KB) (TVD)

Total Depth: 4550.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751 Outside

Press@RunDepth: psig @ 4489.00 ft (KB)

Start Date: 2015.09.13

End Date:

2015.09.13

Start Time: 01:30:02

End Time:

10:00:10

Capacity: 8000.00 psig

Last Calib.:

2015.09.13

Time On Btm:

Time Off Btm:

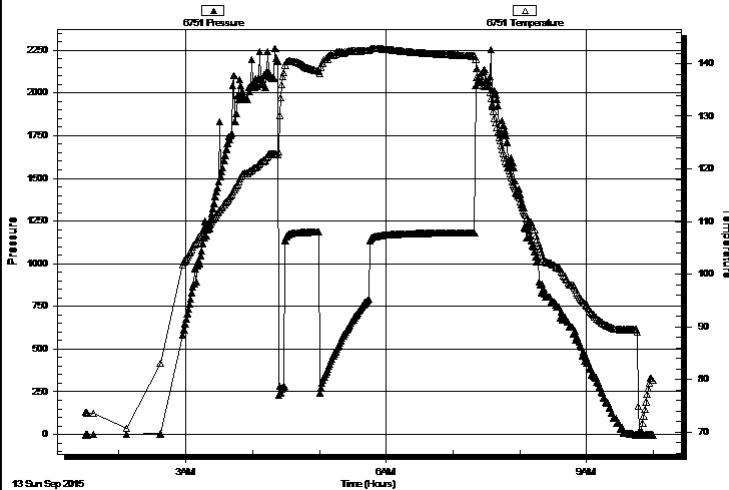
TEST COMMENT: 5- 1.33 psi build. (B.O.B. @ 3 min)

30- No return.

45- 5.95 psi build. (B.O.B. @ 3 min)

90- No return.

Pressure vs. Time



PRESSURE SUMMARY

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

Length (ft)	Description	Volume (bbl)
1424.00	MW 10m 90w With emulsion	18.50
330.00	OSWM 10w 90m With emulsion	4.68

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61714

DST#: 1

Test Start: 2015.09.13 @ 01:30:00

Tool Information

Drill Pipe:	Length:	4295.00 ft	Diameter:	3.82 inches	Volume:	60.88 bbl	Tool Weight:	2300.00 lb
Heavy Wt. Pipe:	Length:	0.00 ft	Diameter:	2.25 inches	Volume:	0.00 bbl	Weight set on Packer:	22000.00 lb
Drill Collar:	Length:	182.00 ft	Diameter:	2.25 inches	Volume:	0.90 bbl	Weight to Pull Loose:	85000.00 lb
					Total Volume:	61.78 bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:		16.50 ft					String Weight: Initial	68000.00 lb
Depth to Top Packer:		4488.00 ft					Final	74000.00 lb
Depth to Bottom Packer:		ft						
Interval between Packers:		62.00 ft						
Tool Length:		89.50 ft						
Number of Packers:		2	Diameter:	6.75 inches				
Tool Comments:								

Tool Description

Length (ft) Serial No. Position Depth (ft) Accum. Lengths

Change Over Sub	1.00			4461.50	
Shut In Tool	5.00			4466.50	
Hydraulic tool	5.00			4471.50	
Jars	5.00			4476.50	
Safety Joint	2.50			4479.00	
Packer	5.00			4484.00	27.50 Bottom Of Top Packer
Packer	4.00			4488.00	
Stubb	1.00			4489.00	
Recorder	0.00	8357	Inside	4489.00	
Recorder	0.00	6751	Outside	4489.00	
Perforations	25.00			4514.00	
Change Over Sub	1.00			4515.00	
Drill Pipe	31.00			4546.00	
Change Over Sub	1.00			4547.00	
Bullnose	3.00			4550.00	62.00 Bottom Packers & Anchor

Total Tool Length: 89.50



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy

Ruth #1-10

Bldg 12000

Job Ticket: 61714

DST#: 1

Wichita, KS 67206

Test Start: 2015.09.13 @ 01:30:00

ATTN: Phil Askey / Rusty M

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:

21000 ppm

Viscosity: 43.00 sec/qt

Cushion Volume:

bbl

Water Loss: 7.18 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2400.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
1424.00	MW 10m 90w With emulsion	18.501
330.00	OSWM 10w 90m With emulsion	4.678

Total Length: 1754.00 ft Total Volume: 23.179 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW: .345 @ 65 Degrees F = 21000 PPM

Serial #: 8357

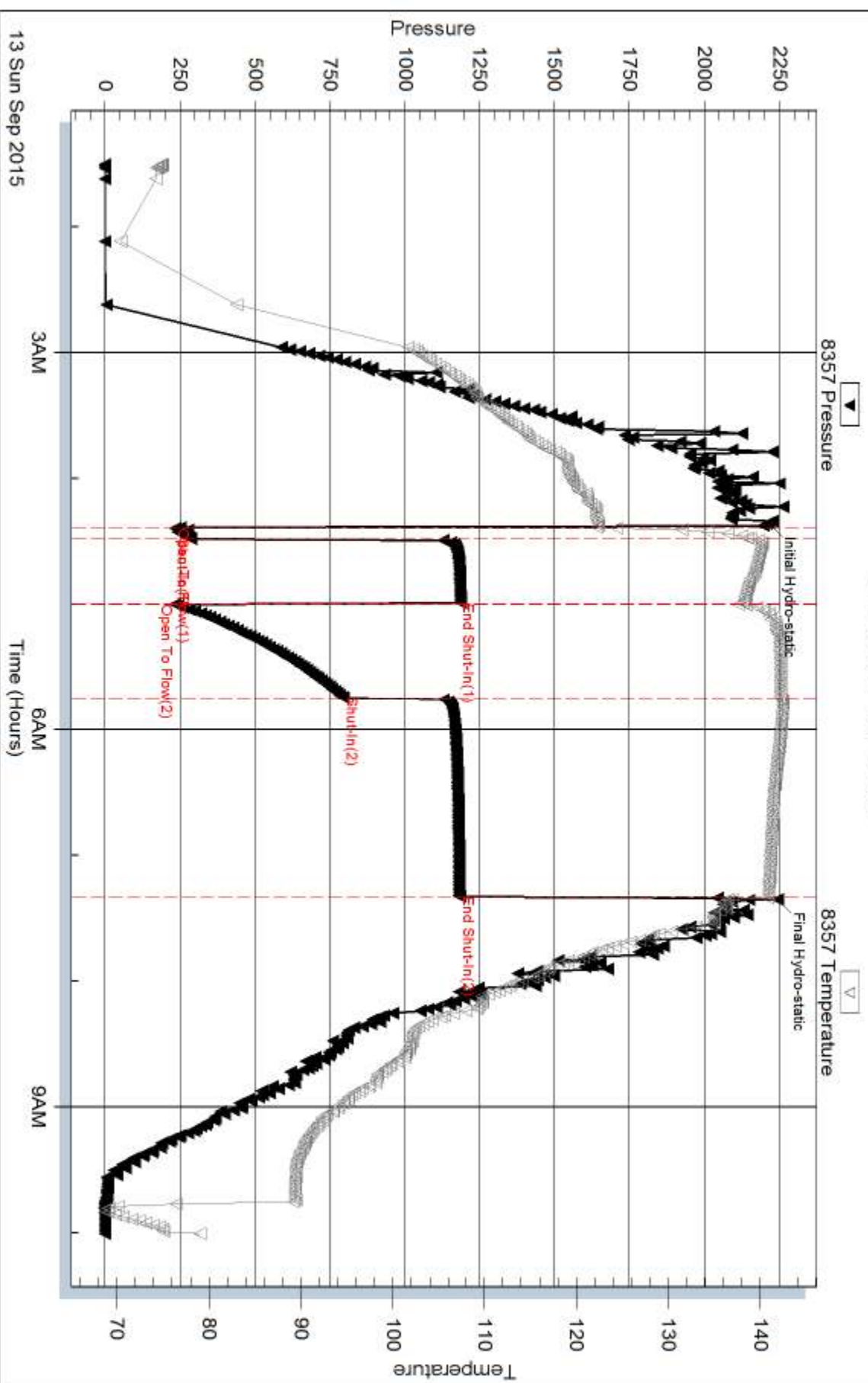
Inside

Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 1

Pressure vs. Time

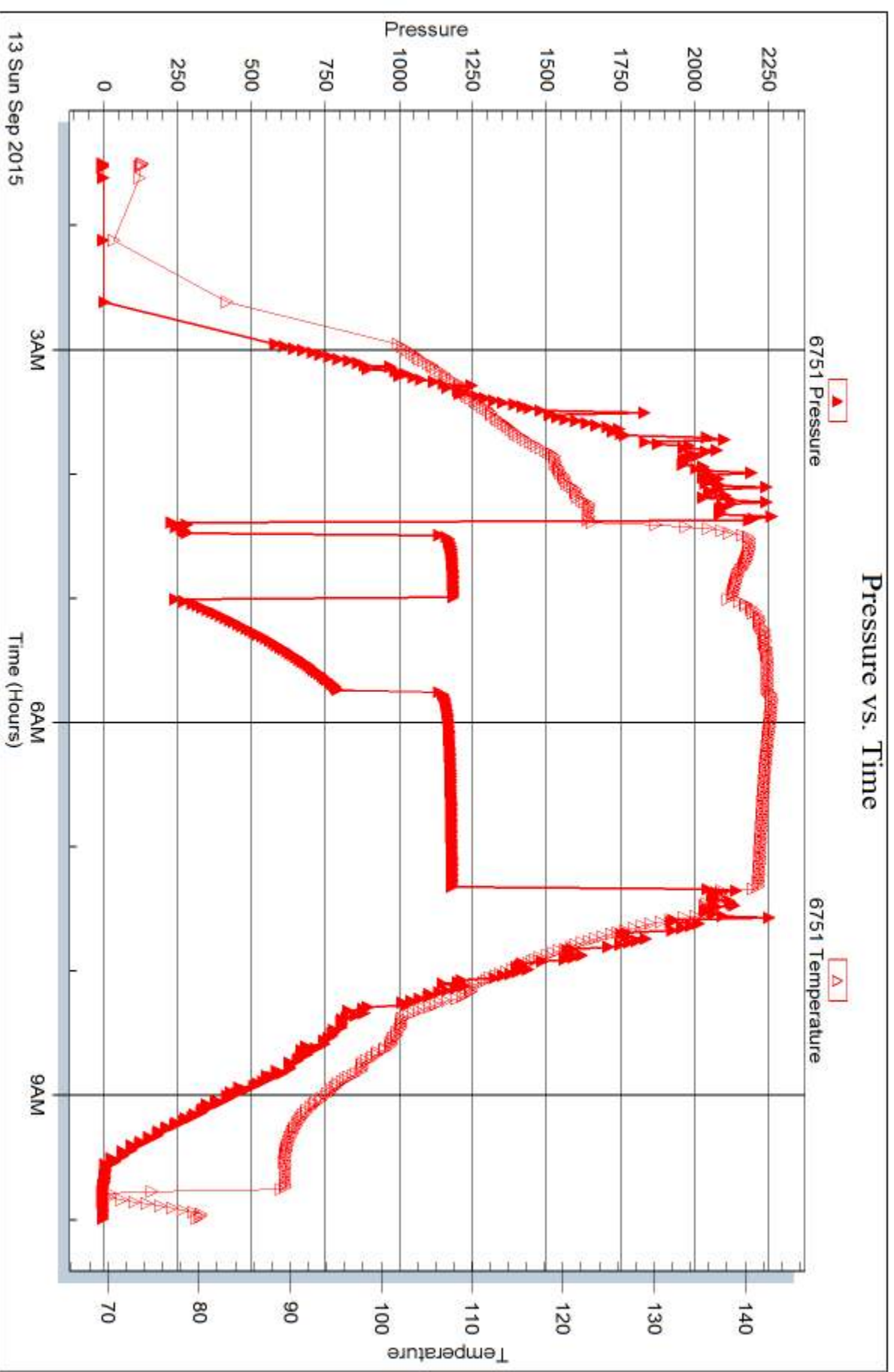


Serial #: 6751

Outside Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 1





DRILL STEM TEST REPORT

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

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206

ATTN: Phil Askey / Rusty M

Ruth #1-10

S10-16s-46w Cheyenne, CO

Start Date: 2015.09.13 @ 17:46:00

End Date: 2015.09.14 @ 01:35:09

Job Ticket #: 61715 DST #: 2

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

Printed: 2015.09.18 @ 09:06:28



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TESTING, INC.**

DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61715

DST#: 2

Test Start: 2015.09.13 @ 17:46:00

GENERAL INFORMATION:

Formation: **Ft. Scott**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:55:40

Time Test Ended: 01:35:09

Test Type: Conventional Bottom Hole (Reset)

Tester: Chuck Smith

Unit No: 61

Interval: 4570.00 ft (KB) To 4590.00 ft (KB) (TVD)

Total Depth: 4590.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 8357 Inside

Press@RunDepth: 215.90 psig @ 4571.00 ft (KB)

Start Date: 2015.09.13

End Date:

2015.09.14

Start Time: 17:46:02

End Time:

01:35:10

Capacity: 8000.00 psig

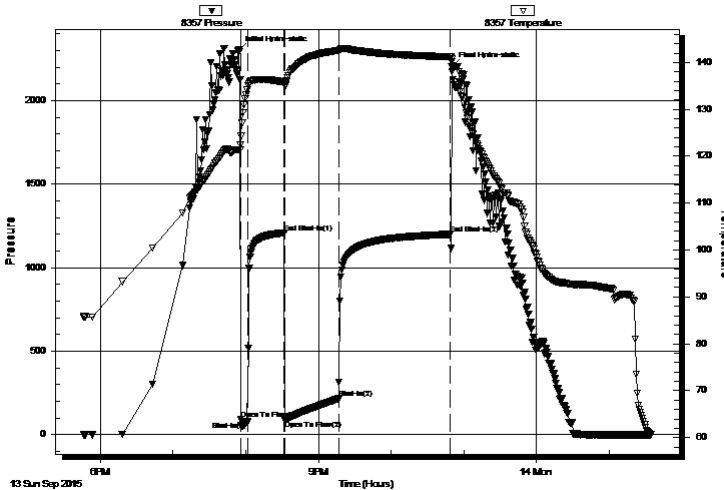
Last Calib.: 2015.09.14

Time On Btm: 2015.09.13 @ 19:54:10

Time Off Btm: 2015.09.13 @ 22:50:09

TEST COMMENT: 5- .27 psi build. (8" blow)
30- No return.
45- 1.13psi build. (B.O.B. @ 15 min)
90- No return.

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2301.86	121.43	Initial Hydro-static
2	93.84	122.43	Open To Flow (1)
7	78.01	134.13	Shut-In(1)
38	1208.09	135.79	End Shut-In(1)
38	88.26	134.98	Open To Flow (2)
83	215.90	142.49	Shut-In(2)
175	1200.10	141.21	End Shut-In(2)
176	2203.01	140.75	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
371.00	MW 10m 90w Popping gas	3.57
94.00	OSWM 10w 90m	1.33
0.00	160' GIP	0.00

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



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Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61715

DST#: 2

Test Start: 2015.09.13 @ 17:46:00

GENERAL INFORMATION:

Formation: **Ft. Scott**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:55:40

Time Test Ended: 01:35:09

Test Type: Conventional Bottom Hole (Reset)

Tester: Chuck Smith

Unit No: 61

Interval: 4570.00 ft (KB) To 4590.00 ft (KB) (TVD)

Total Depth: 4590.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751 Outside

Press@RunDepth: psig @ 4571.00 ft (KB)

Start Date: 2015.09.13

End Date:

2015.09.14

Start Time: 17:46:02

End Time:

01:35:10

Capacity: 8000.00 psig

Last Calib.:

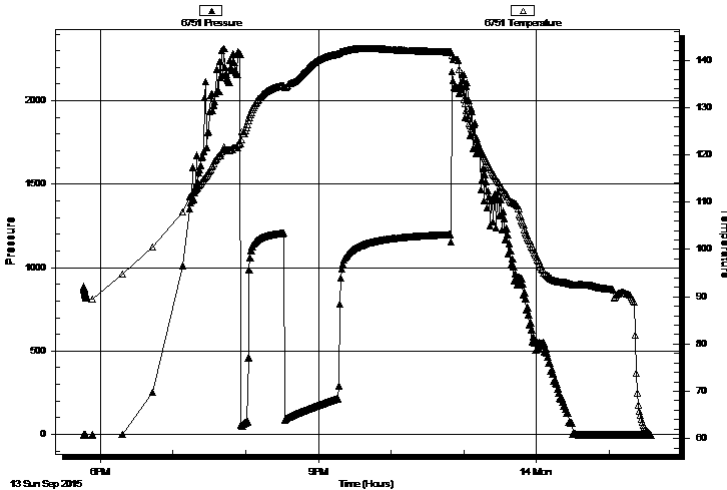
2015.09.14

Time On Btm:

Time Off Btm:

TEST COMMENT: 5- .27 psi build. (8" blow)
30- No return.
45- 1.13psi build. (B.O.B. @ 15 min)
90- No return.

Pressure vs. Time



PRESSURE SUMMARY

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

Length (ft)	Description	Volume (bbl)
371.00	MW 10m 90w Popping gas	3.57
94.00	OSWM 10w 90m	1.33
0.00	160' GIP	0.00

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61715

DST#: 2

Test Start: 2015.09.13 @ 17:46:00

Tool Information

Drill Pipe:	Length:	4381.00 ft	Diameter:	3.82 inches	Volume:	62.10 bbl	Tool Weight:	2300.00 lb
Heavy Wt. Pipe:	Length:	0.00 ft	Diameter:	2.25 inches	Volume:	0.00 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length:	182.00 ft	Diameter:	2.25 inches	Volume:	0.90 bbl	Weight to Pull Loose:	80000.00 lb
					Total Volume:	63.00 bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:		20.50 ft					String Weight: Initial	68000.00 lb
Depth to Top Packer:		4570.00 ft					Final	70000.00 lb
Depth to Bottom Packer:		ft						
Interval between Packers:		20.00 ft						
Tool Length:		47.50 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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Change Over Sub	1.00			4543.50	
Shut In Tool	5.00			4548.50	
Hydraulic tool	5.00			4553.50	
Jars	5.00			4558.50	
Safety Joint	2.50			4561.00	
Packer	5.00			4566.00	27.50 Bottom Of Top Packer
Packer	4.00			4570.00	
Stubb	1.00			4571.00	
Recorder	0.00	8357	Inside	4571.00	
Recorder	0.00	6751	Outside	4571.00	
Perforations	16.00			4587.00	
Bullnose	3.00			4590.00	20.00 Bottom Packers & Anchor

Total Tool Length: 47.50



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61715

DST#: 2

Test Start: 2015.09.13 @ 17:46:00

Mud and Cushion Information

Mud Type: Gel Chem

Mud Weight: 9.00 lb/gal

Viscosity: 62.00 sec/qt

Water Loss: 7.18 in³

Resistivity: ohm.m

Salinity: 2400.00 ppm

Filter Cake: 1.00 inches

Cushion Type:

Cushion Length:

Cushion Volume:

Gas Cushion Type:

Gas Cushion Pressure:

ft

bbl

psig

Oil API:

Water Salinity: 23000 ppm

deg API

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
371.00	MW 10m 90w Popping gas	3.574
94.00	OSWM 10w 90m	1.332
0.00	160' GIP	0.000

Total Length: 465.00 ft Total Volume: 4.906 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW: .335 @ 62 Degrees F = 23000 PPM

Serial #: 8357

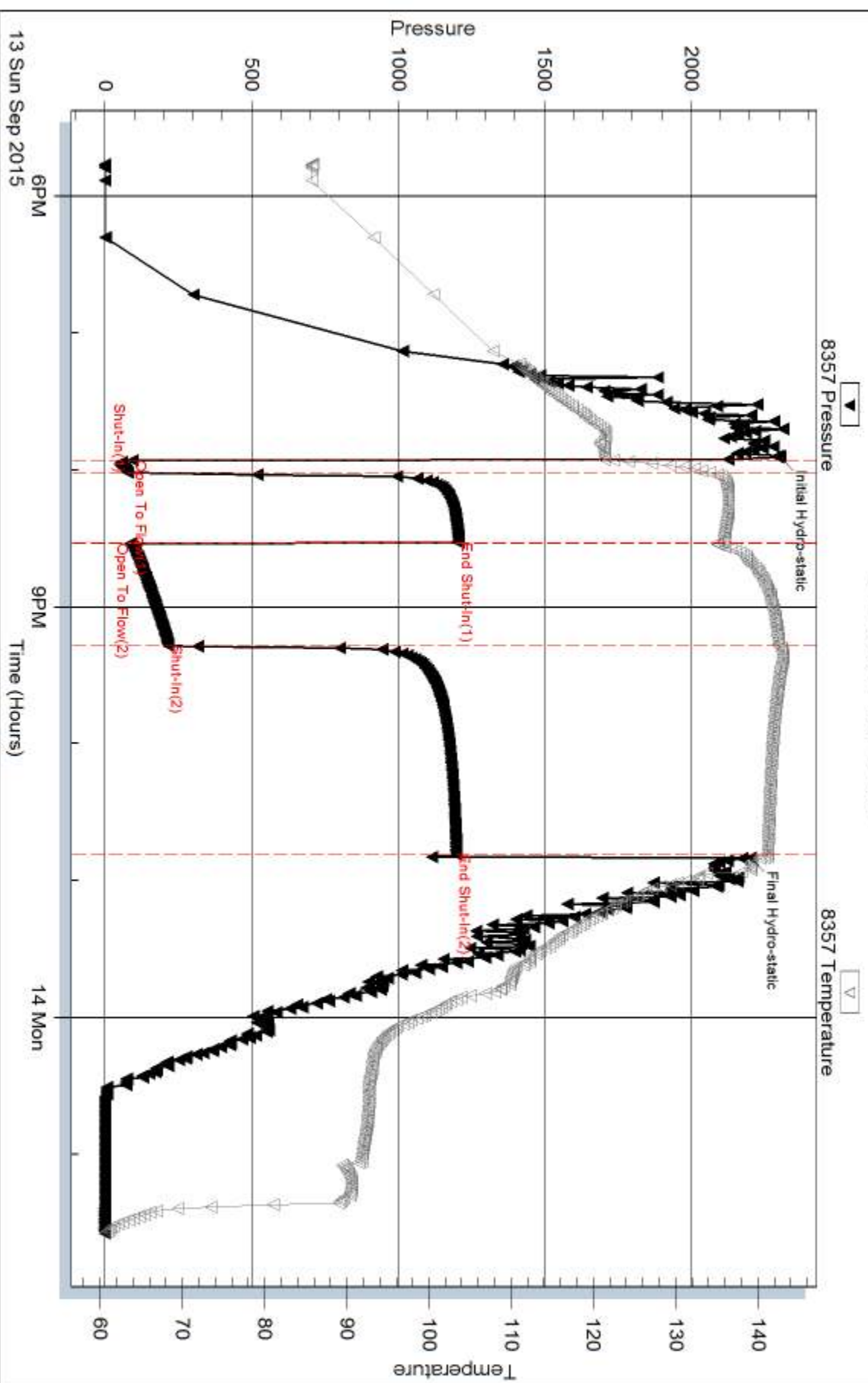
Inside

Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 2

Pressure vs. Time

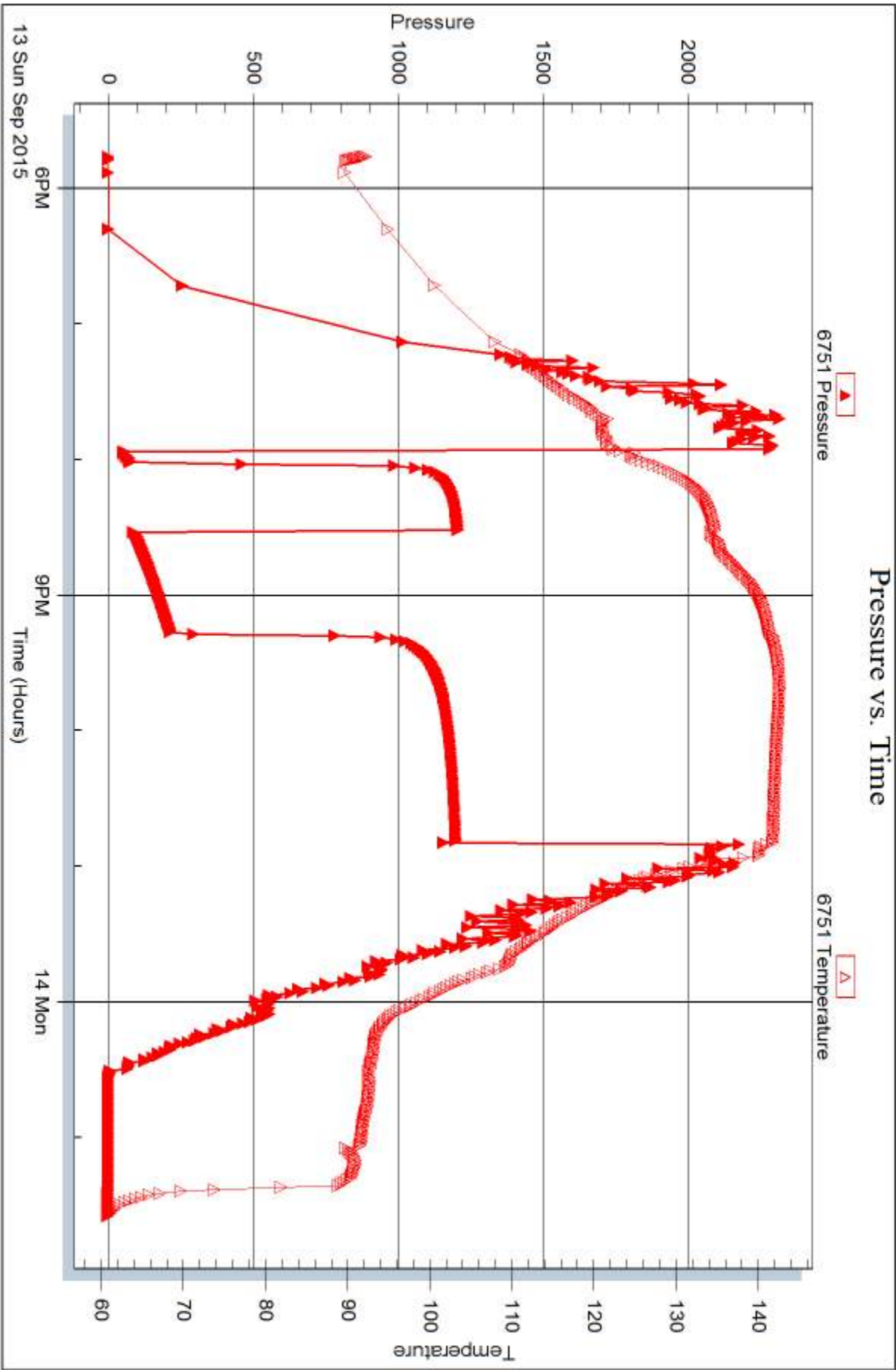


Serial #: 6751

Outside Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 2





DRILL STEM TEST REPORT

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

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206

ATTN: Phil Askey / Rusty M

Ruth #1-10

S10-16s-46w Cheyenne,CO

Start Date: 2015.09.16 @ 08:10:00

End Date: 2015.09.16 @ 16:48:10

Job Ticket #: 61716 DST #: 3

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

Printed: 2015.09.18 @ 09:06:05

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne,CO

Ruth #1-10

DST # 3

St. Louis - Spergen

2015.09.16



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61716

DST#: 3

Test Start: 2015.09.16 @ 08:10:00

GENERAL INFORMATION:

Formation: **St. Louis - Spergen**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 12:07:40

Time Test Ended: 16:48:10

Test Type: Conventional Bottom Hole (Reset)

Tester: Chuck Smith

Unit No: 61

Interval: 5232.00 ft (KB) To 5309.00 ft (KB) (TVD)

Total Depth: 5309.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751 Outside

Press@RunDepth: psig @ 5233.00 ft (KB)

Start Date: 2015.09.16

End Date:

2015.09.16

Start Time: 08:10:12

End Time:

16:48:10

Capacity: 8000.00 psig

Last Calib.: 2015.09.16

Time On Btm:

Time Off Btm:

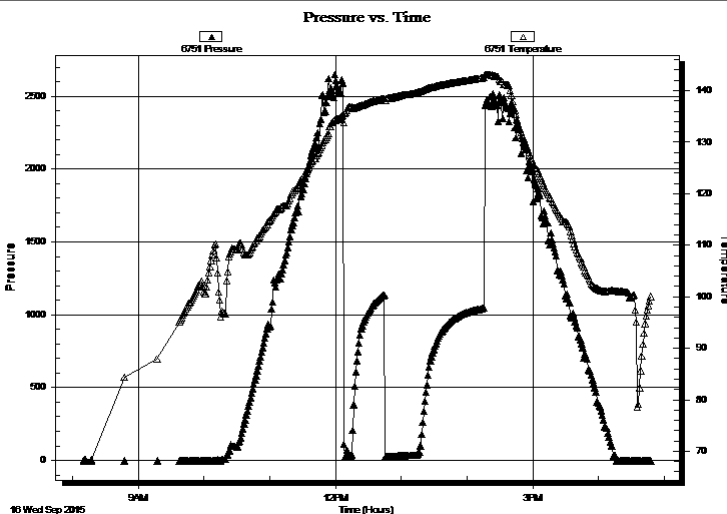
TEST COMMENT: 7- .05 psi Build (1/2" blow)

30- No return.

30- No blow.

60- No return.

PRESSURE SUMMARY



Time
(Min.)

Pressure
(psig)

Temp
(deg F)

Annotation

Recovery

Length (ft)	Description	Volume (bbl)
45.00	M 100m	0.22

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61716

DST#: 3

Test Start: 2015.09.16 @ 08:10:00

Tool Information

Drill Pipe:	Length:	5054.00 ft	Diameter:	3.82 inches	Volume:	71.64 bbl	Tool Weight:	2300.00 lb
Heavy Wt. Pipe:	Length:	0.00 ft	Diameter:	2.25 inches	Volume:	0.00 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length:	182.00 ft	Diameter:	2.25 inches	Volume:	0.90 bbl	Weight to Pull Loose:	85000.00 lb
					Total Volume:	72.54 bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:	31.50 ft					String Weight: Initial	76000.00 lb	
Depth to Top Packer:	5232.00 ft					Final	76000.00 lb	
Depth to Bottom Packer:	ft							
Interval between Packers:	77.00 ft							
Tool Length:	104.50 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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Change Over Sub	1.00		5205.50	
Shut In Tool	5.00		5210.50	
Hydraulic tool	5.00		5215.50	
Jars	5.00		5220.50	
Safety Joint	2.50		5223.00	
Packer	5.00		5228.00	27.50 Bottom Of Top Packer
Packer	4.00		5232.00	
Stubb	1.00		5233.00	
Recorder	0.00	8357 Inside	5233.00	
Recorder	0.00	6751 Outside	5233.00	
Perforations	40.00		5273.00	
Change Over Sub	1.00		5274.00	
Drill Pipe	31.00		5305.00	
Change Over Sub	1.00		5306.00	
Bullnose	3.00		5309.00	77.00 Bottom Packers & Anchor

Total Tool Length: 104.50



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

FLUID SUMMARY

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy

Ruth #1-10

Bldg 12000

Job Ticket: 61716

DST#: 3

Wichita, KS 67206

Test Start: 2015.09.16 @ 08:10:00

ATTN: Phil Askey / Rusty M

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbl

Water Loss: 7.99 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 3100.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
45.00	M 100m	0.221

Total Length: 45.00 ft

Total Volume: 0.221 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

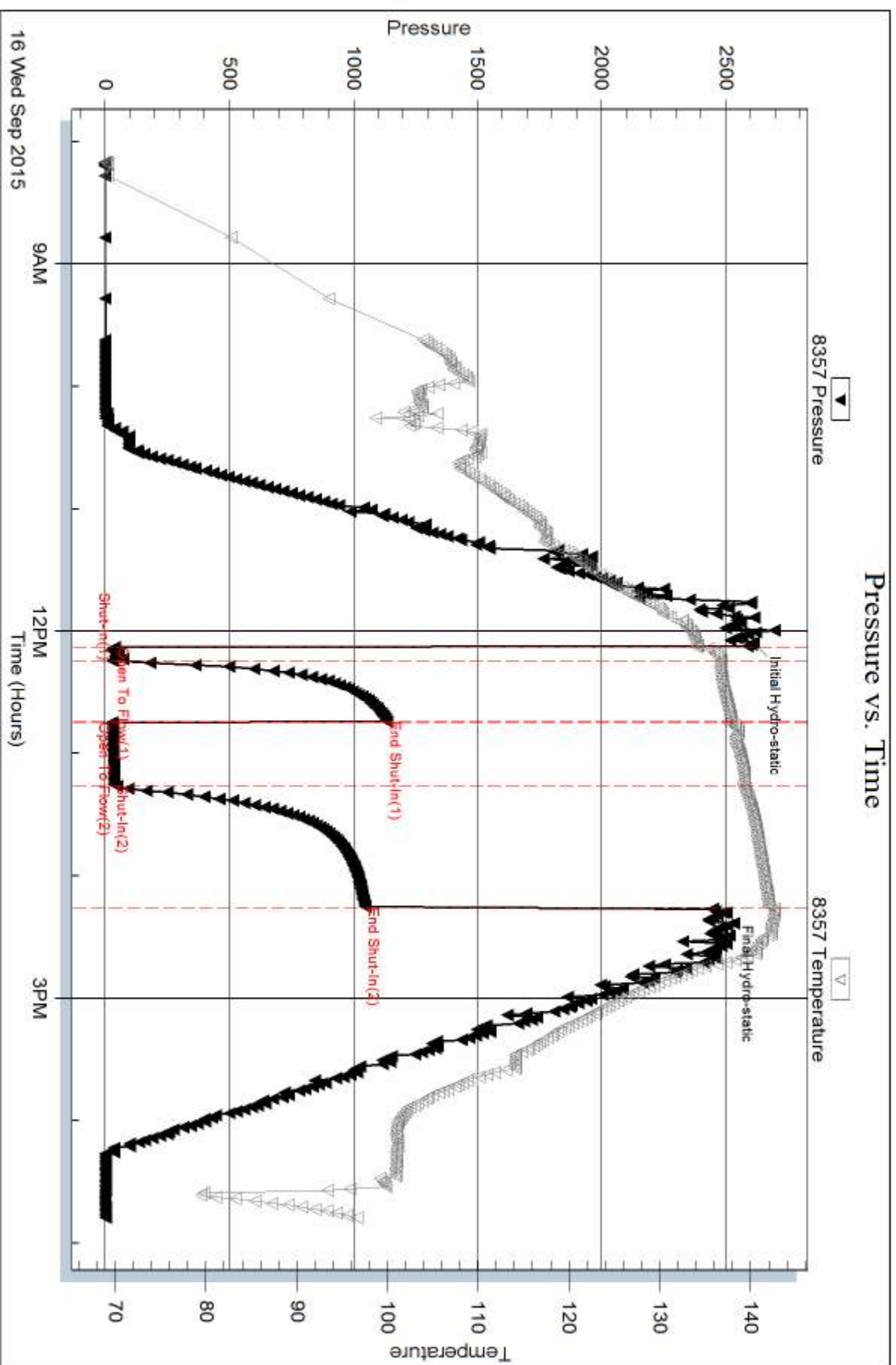
Serial #: 8357

Inside

Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 3

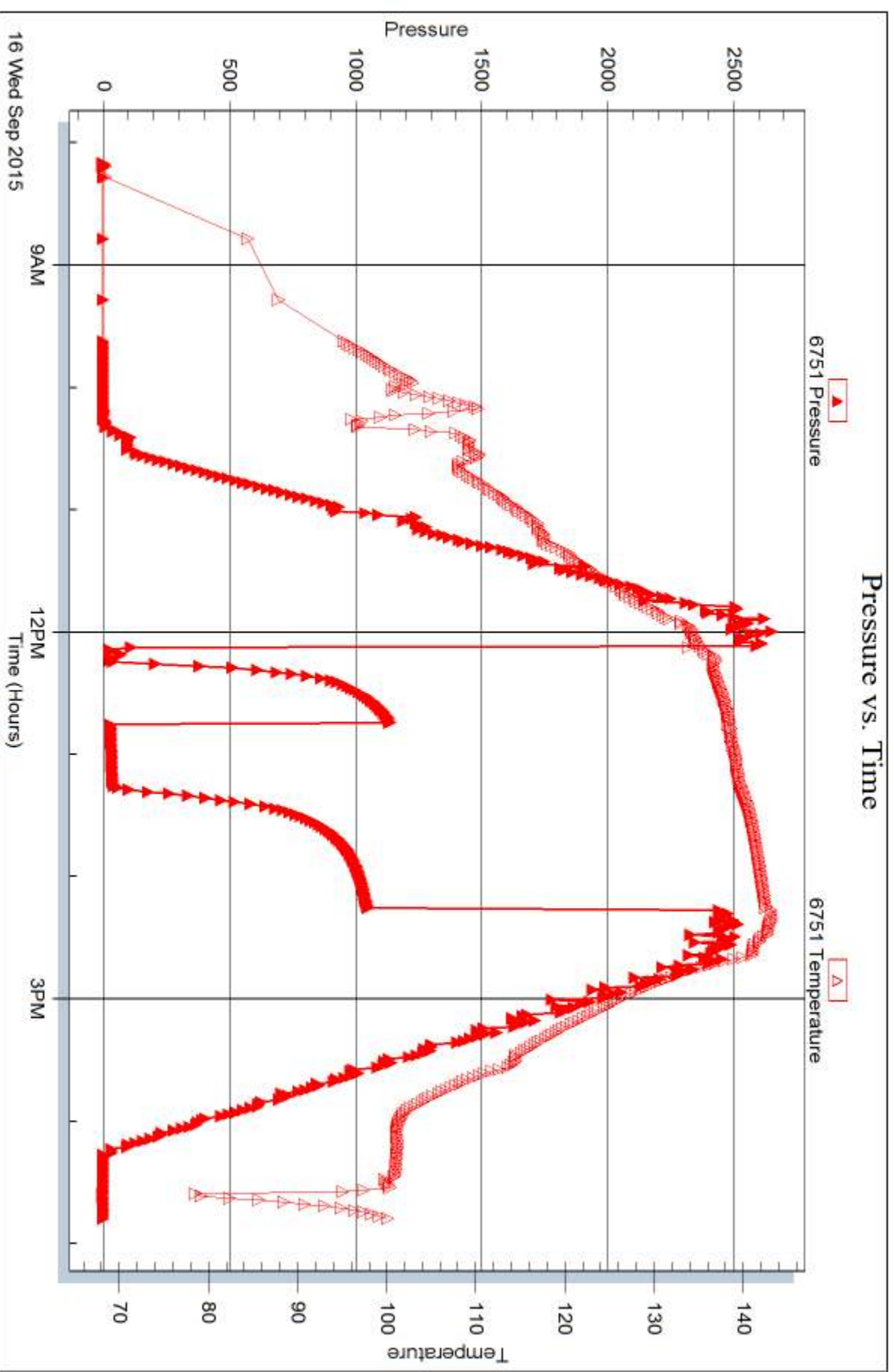


Serial #: 6751

Outside Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 3





DRILL STEM TEST REPORT

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

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206

ATTN: Phil Askey / Rusty M

Ruth #1-10

S10-16s-46w Cheyenne, CO

Start Date: 2015.09.17 @ 07:15:00

End Date: 2015.09.17 @ 15:44:39

Job Ticket #: 61717 DST #: 4

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

Printed: 2015.09.18 @ 09:05:33



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61717

DST#: 4

Test Start: 2015.09.17 @ 07:15:00

GENERAL INFORMATION:

Formation: **Spergen - Warsaw**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 10:11:50

Time Test Ended: 15:44:39

Test Type: Conventional Bottom Hole (Reset)

Tester: Chuck Smith

Unit No: 61

Interval: 5305.00 ft (KB) To 5400.00 ft (KB) (TVD)

Total Depth: 5400.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 8357 Inside

Press@RunDepth: 280.66 psig @ 5307.00 ft (KB)

Start Date: 2015.09.17

End Date:

2015.09.17

Start Time: 07:15:02

End Time:

15:44:40

Capacity: 8000.00 psig

Last Calib.: 2015.09.17

Time On Btm: 2015.09.17 @ 10:08:50

Time Off Btm: 2015.09.17 @ 13:04:50

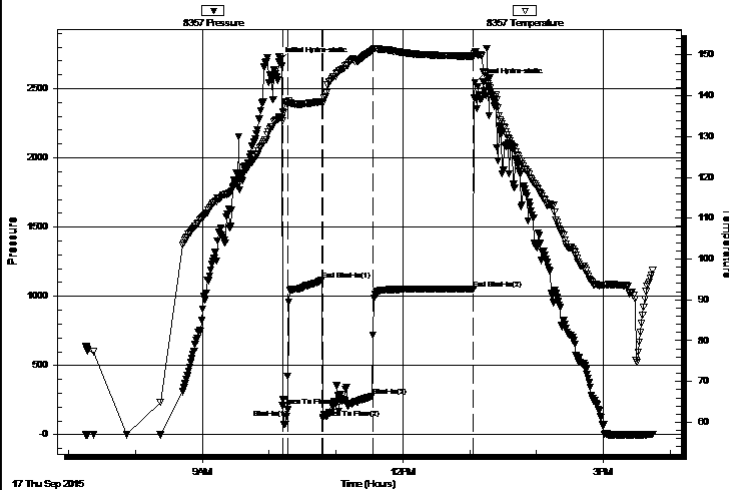
TEST COMMENT: 06- .14 psi build (3" Blow")

30- No return.

45- .80 psi build

90- No return.

Pressure vs. Time



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2696.83	134.74	Initial Hydro-static
3	208.81	133.86	Open To Flow (1)
8	181.74	138.36	Shut-In(1)
39	1120.04	138.61	End Shut-In(1)
40	119.25	138.20	Open To Flow (2)
84	280.66	151.11	Shut-In(2)
175	1053.27	149.73	End Shut-In(2)
177	2546.61	150.46	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
365.00	MW 30m 70w	3.49
160.00	WM 10w 90m With an oil spot	2.27

Gas Rates

	Choke (inches)	Pressure (psig)	Gas Rate (Mcf/d)
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* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61717

DST#: 4

Test Start: 2015.09.17 @ 07:15:00

GENERAL INFORMATION:

Formation: **Spergen - Warsaw**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 10:11:50

Time Test Ended: 15:44:39

Test Type: Conventional Bottom Hole (Reset)

Tester: Chuck Smith

Unit No: 61

Interval: 5305.00 ft (KB) To 5400.00 ft (KB) (TVD)

Total Depth: 5400.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 4230.00 ft (KB)

4218.00 ft (CF)

KB to GR/CF: 12.00 ft

Serial #: 6751 Outside

Press@RunDepth: psig @ 5307.00 ft (KB)

Start Date: 2015.09.17

End Date:

2015.09.17

Start Time: 07:14:52

End Time:

15:44:50

Capacity: 8000.00 psig

Last Calib.:

2015.09.17

Time On Btm:

Time Off Btm:

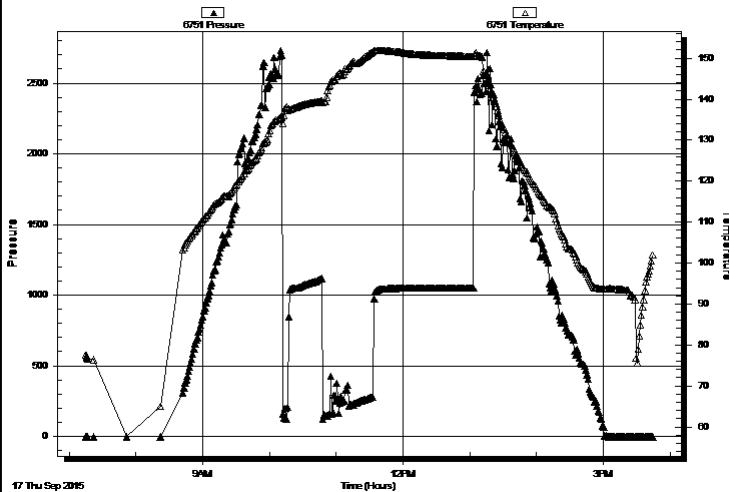
TEST COMMENT: 06- .14 psi build (3" Blow")

30- No return.

45- .80 psi build

90- No return.

Pressure vs. Time



PRESSURE SUMMARY

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

Length (ft)	Description	Volume (bbl)
365.00	MW 30m 70w	3.49
160.00	WM 10w 90m With an oil spot	2.27

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy
Bldg 12000
Wichita, KS 67206
ATTN: Phil Askey / Rusty M

Ruth #1-10

Job Ticket: 61717

DST#: 4

Test Start: 2015.09.17 @ 07:15:00

Tool Information

Drill Pipe:	Length:	5118.00 ft	Diameter:	3.82 inches	Volume:	72.55 bbl	Tool Weight:	2300.00 lb
Heavy Wt. Pipe:	Length:	0.00 ft	Diameter:	2.25 inches	Volume:	0.00 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length:	182.00 ft	Diameter:	2.25 inches	Volume:	0.90 bbl	Weight to Pull Loose:	85000.00 lb
					Total Volume:	73.45 bbl	Tool Chased	0.00 ft
Drill Pipe Above KB:		22.50 ft					String Weight: Initial	77000.00 lb
Depth to Top Packer:		5305.00 ft					Final	78000.00 lb
Depth to Bottom Packer:		ft						
Interval between Packers:		95.00 ft						
Tool Length:		122.50 ft						
Number of Packers:		2	Diameter:	6.75 inches				
Tool Comments:								

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			5278.50	
Shut In Tool	5.00			5283.50	
Hydraulic tool	5.00			5288.50	
Jars	5.00			5293.50	
Safety Joint	2.50			5296.00	
Packer	5.00			5301.00	27.50 Bottom Of Top Packer
Packer	4.00			5305.00	
Stubb	1.00			5306.00	
Perforations	1.00			5307.00	
Recorder	0.00	8357	Inside	5307.00	
Recorder	0.00	6751	Outside	5307.00	
Perforations	25.00			5332.00	
Change Over Sub	1.00			5333.00	
Drill Pipe	63.00			5396.00	
Change Over Sub	1.00			5397.00	
Bullnose	3.00			5400.00	95.00 Bottom Packers & Anchor
Total Tool Length:	122.50				



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Mull Drilling Co., Inc.

S10-16s-46w Cheyenne, CO

1700 N Waterfront Pkwy

Ruth #1-10

Bldg 12000

Job Ticket: 61717

DST#: 4

Wichita, KS 67206

Test Start: 2015.09.17 @ 07:15:00

ATTN: Phil Askey / Rusty M

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:

23000 ppm

Viscosity: 61.00 sec/qt

Cushion Volume:

bbl

Water Loss: 7.99 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 3000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
365.00	MW 30m 70w	3.489
160.00	WM 10w 90m With an oil spot	2.268

Total Length: 525.00 ft

Total Volume: 5.757 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW: .300 @ 77 Degrees F = 23000 PPM

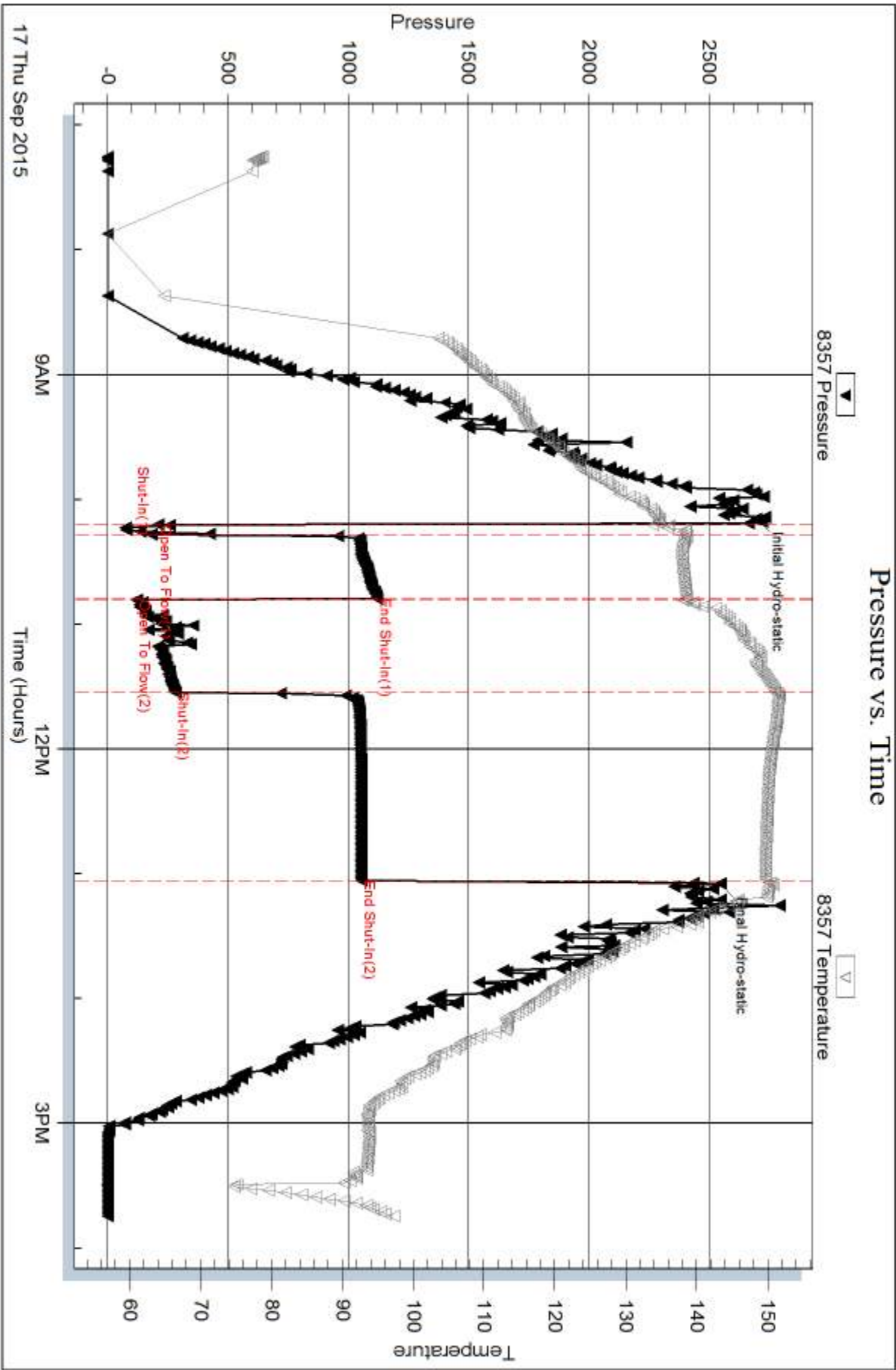
Serial #: 8357

Inside

Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 4

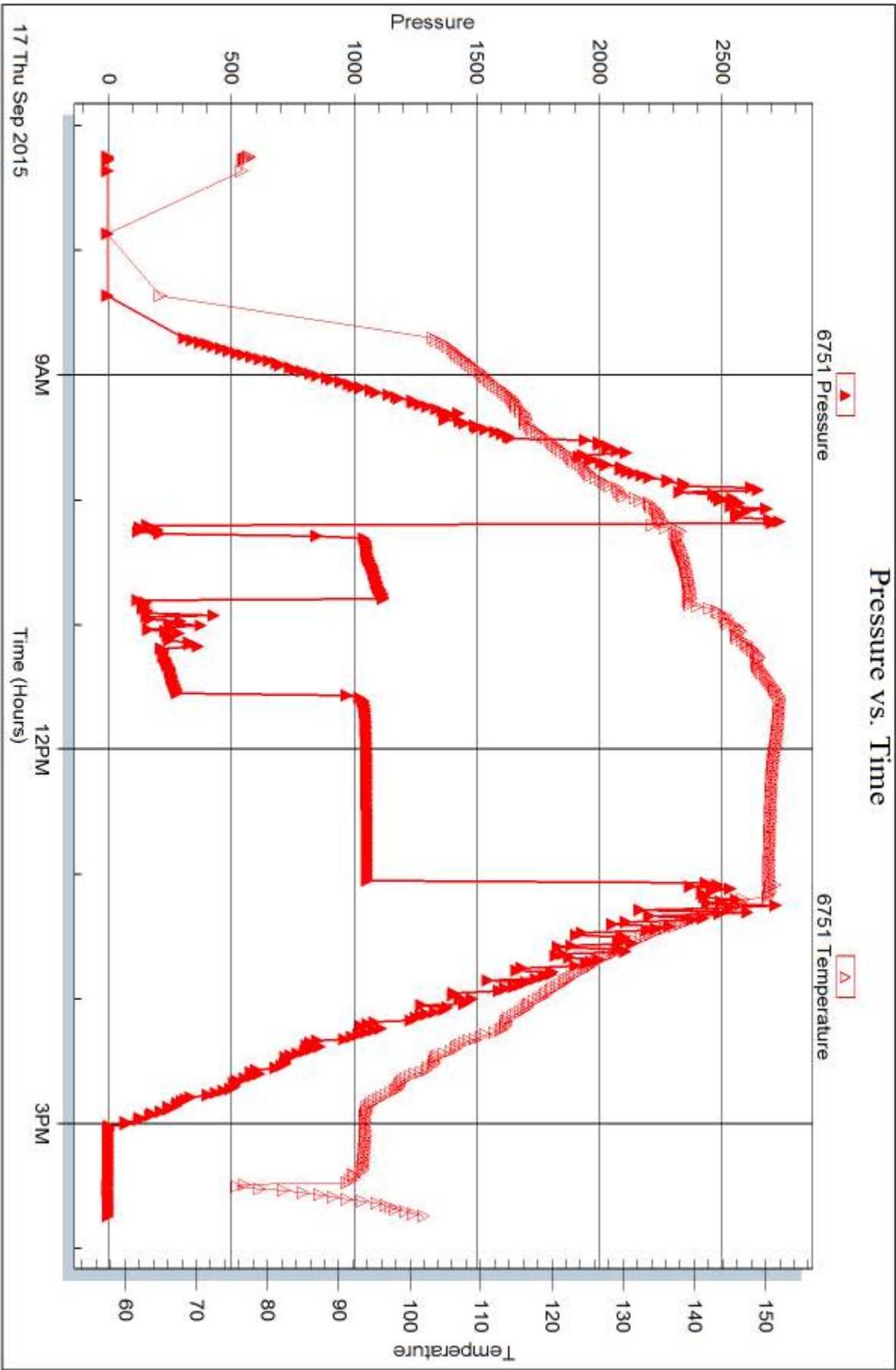


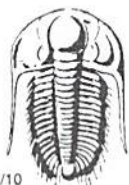
Serial #: 6751

Outside Mull Drilling Co., Inc.

Ruth #1-10

DST Test Number: 4





TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

61714

NO.

Well Name & No. Ruth #1-10 Test No. 1 Date 9-12-15
 Company Mull Drilling Co. Elevation 4230 KB 4200 GL
 Address 1700 N. Waterfront Pkwy Bldg. 12000 Wichita, KS 67206
 Co. Rep / Geo. Phil Askey Rig Duke #9
 Location: Sec. 10 Twp. 16s Rge. 46w Co. Cheyenne State CO

Interval Tested 4488-4550 Zone Tested Macmaton
 Anchor Length 62 Drill Pipe Run 4295 Mud Wt. 8.9
 Top Packer Depth 4484 Drill Collars Run 182 Vis 43
 Bottom Packer Depth 4488 Wt. Pipe Run 0 WL 7.2
 Total Depth 4550 Chlorides 2400 ppm System LCM 6"

Blow Description 1.33 psi build (B.O.B. @ 3 min.)
No return
5.95 psi build (B.O.B. @ 3 min.)
No return.

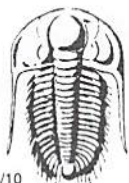
Rec	Feet of	%gas	%oil	%water	%mud
<u>330</u>	<u>OSWM with emulsion</u>			<u>10</u>	<u>90</u>
<u>#2/424</u>	<u>MW with emulsion</u>			<u>90</u>	<u>10</u>
	<u>H2S 75 PPM</u>				

Rec Total 1754 BHT 141 Gravity — API RW 345 @ 65 °F Chlorides 21000 ppm

(A) Initial Hydrostatic	<u>2214</u>	<input checked="" type="checkbox"/> Test	<u>1350</u>	T-On Location	<u>1:28</u>
(B) First Initial Flow	<u>234</u>	<input checked="" type="checkbox"/> Jars	<u>250</u>	T-Started	<u>1:30</u>
(C) First Final Flow	<u>286</u>	<input checked="" type="checkbox"/> Safety Joint	<u>75</u>	T-Open	<u>4:24</u>
(D) Initial Shut-In	<u>1188</u>	<input checked="" type="checkbox"/> Circ Sub	<u>50</u>	T-Pulled	<u>7:20</u>
(E) Second Initial Flow	<u>233</u>	<input type="checkbox"/> Hourly Standby		T-Out	<u>10:00</u>
(F) Second Final Flow	<u>795</u>	<input checked="" type="checkbox"/> Mileage	<u>226 RT</u> 211	Comments	
(G) Final Shut-In	<u>1186</u>	<input type="checkbox"/> Sampler			
(H) Final Hydrostatic	<u>2245</u>	<input type="checkbox"/> Straddle			

Initial Open	<u>5</u>	<input type="checkbox"/> Shale Packer		<input type="checkbox"/> Ruined Shale Packer	
Initial Shut-In	<u>30</u>	<input type="checkbox"/> Extra Packer		<input type="checkbox"/> Ruined Packer	
Final Flow	<u>45</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>1936</u>
		Sub Total	<u>1936</u>	MP/DST Disc't	

Approved By _____ Our Representative Chuck Smith
 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

61715

NO.

Well Name & No. Ruth #10 Test No. 2 Date 9-13-15
 Company Mull Drilling Co. Elevation 4230 KB 4218 GL
 Address 1700 N. Waterfront Pkwy Bldg. 12000 Wichita, KS 67206
 Co. Rep / Geo. Phil Askey Rig Duke #9
 Location: Sec. 10 Twp. 16s Rge. 46w Co. Cheyenne State CO

Interval Tested 4570-4590 Zone Tested FT. Scott
 Anchor Length 20 Drill Pipe Run 4381 Mud Wt. 9.1
 Top Packer Depth 4566 Drill Collars Run 182 Vis 6.2
 Bottom Packer Depth 4570 Wt. Pipe Run 0 WL 2.2
 Total Depth 4590 Chlorides 2400 ppm System LCM 6"

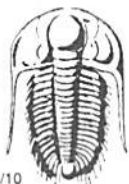
Blow Description • 27 psi build. (8" blow)
No return.
1.13 psi build. (had B.O.B. @ 15 min)
No return.

Rec	Feet of	%gas	%oil	%water	%mud
Rec <u>94</u>	Feet of <u>OSWM</u>	%gas	%oil	<u>10</u> %water	<u>90</u> %mud
Rec <u>371</u>	Feet of <u>MW Popping Gas</u>	%gas	%oil	<u>90</u> %water	<u>10</u> %mud
Rec	Feet of <u>160' GIP</u>	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 465 BHT 141 Gravity — API RW • 335 @ 62° F Chlorides 23000 ppm
 (A) Initial Hydrostatic 2302 ☒ Test 1350 T-On Location 17:43
 (B) First Initial Flow 94 ☒ Jars 250 T-Started 17:46
 (C) First Final Flow 78 ☒ Safety Joint 75 T-Open 19:56
 (D) Initial Shut-In 1208 ☒ Circ Sub NIC T-Pulled 22:49
 (E) Second Initial Flow 88 ☐ Hourly Standby 211 T-Out 1:35
 (F) Second Final Flow 216 ☒ Mileage 211 Comments
 (G) Final Shut-In 1200 ☐ Sampler
 (H) Final Hydrostatic 2203 ☐ Straddle
☐ Shale Packer
☐ Extra Packer
☐ Extra Recorder
☐ Day Standby
☐ Accessibility

Initial Open 5
 Initial Shut-In 30
 Final Flow 45
 Final Shut-In 90
 Sub Total 1886
 Total 1886
 MP/DST Disc't

Approved By [Signature] Our Representative Chuck Smith
 TriLOBITE TESTING INC. shall not be liable for damages 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

61716

NO.

Well Name & No. Ruth # 1-10 Test No. 3 Date 9-16-15
 Company Mull Drilling Co. Elevation 4230 KB 4218 GL
 Address 1700 N. Waterfront Pkwy Bldg. 12000 Wichita, KS 67206
 Co. Rep / Geo. Rusty Morning Rig Duke #9
 Location: Sec. 10 Twp. 16s Rge. 46w Co. Cheyenne State CO

Interval Tested 5232 - 5309 Zone Tested St. Louis - Spergen
 Anchor Length 77 Drill Pipe Run 5054 Mud Wt. 9.3
 Top Packer Depth 5228 Drill Collars Run 182 Vis 52
 Bottom Packer Depth 5232 Wt. Pipe Run 0 WL 8.0
 Total Depth 5309 Chlorides 3100 ppm System LCM 6" or 10"

Blow Description .05 psi build (1/2" Blow)

No return.

No blow.

No return.

Rec	Feet of	%gas	%oil	%water	%mud
Rec <u>45</u>	Feet of <u>M</u>			%water <u>100</u>	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 45 BHT 142 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2613

(B) First Initial Flow 40

(C) First Final Flow 29

(D) Initial Shut-In 11:36

(E) Second Initial Flow 28

(F) Second Final Flow 36

(G) Final Shut-In 1048

(H) Final Hydrostatic 2504

☒ Test 1450

☒ Jars 250

☒ Safety Joint 75

☒ Circ Sub N/C

☐ Hourly Standby

☒ Mileage 226 RT 211

☐ Sampler

☐ Straddle

☐ Shale Packer

☐ Extra Packer

☐ Extra Recorder

☒ Day Standby 1.5d 18.25h

☐ Accessibility

Sub Total 1986

T-On Location 7:55

T-Started 8:10

T-Open 12:08

T-Pulled 14:16

T-Out 16:48

Comments 2 motel rec'ts

☐ Ruined Shale Packer

☒ Ruined Packer 320

☐ Extra Copies

Sub Total 608.33+320

Total 2914.33

MP/DST Disc't

Initial Open 7

Initial Shut-In 30

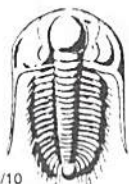
Final Flow 30

Final Shut-In 60

Approved By Rusty Morning

Our Representative Chuck Smith

Trilobite Testing Inc. shall not be held liable for damaged or 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

61717

NO.

Well Name & No. Ruth #1-10 Test No. 4 Date 9-17-15
 Company Mull Drilling Co. Elevation 4230 KB 4218 GL
 Address 1700 N. Waterfront Pkwy. Bldg. 12000 Wichita, KS 67206
 Co. Rep / Geo. Rusty Morning Rig Duke #9
 Location: Sec. 10 Twp. 16s Rge. 46w Co. Cheyenne State CO

Interval Tested 5305-5400 Zone Tested _____
 Anchor Length 95 Drill Pipe Run 5118 Mud Wt. 9.1
 Top Packer Depth 5301 Drill Collars Run 182 Vis 61
 Bottom Packer Depth 5305 Wt. Pipe Run 0 WL 8.0
 Total Depth 5400 Chlorides 3000 ppm System LCM 14[#]

Blow Description .14 psi Build (3" blow)
No return.
.80 psi Build
No return.

Rec	Feet of	%gas	%oil	%water	%mud
Rec <u>160</u>	Feet of <u>WM</u> <u>With an oil spot</u>	%gas	%oil	<u>10</u> %water	<u>90</u> %mud
Rec <u>365</u>	Feet of <u>MW</u>	%gas	%oil	<u>65</u> %water	<u>35</u> %mud
Rec _____	Feet of _____	%gas	%oil	%water	%mud
Rec _____	Feet of _____	%gas	%oil	%water	%mud

Rec Total 525 BHT 150 Gravity — API RW .300 @ 77 °F Chlorides 23000 ppm
 (A) Initial Hydrostatic 2697 ☒ Test 1450 T-On Location 7:05
 (B) First Initial Flow 209 ☒ Jars 250 T-Started 7:15
 (C) First Final Flow 182 ☒ Safety Joint 75 T-Open 10:12
 (D) Initial Shut-In 1120 ☒ Circ Sub N/C T-Pulled 13:03
 (E) Second Initial Flow 119 ☐ Hourly Standby _____ T-Out 15:45
 (F) Second Final Flow 281 ☒ Mileage 211 Comments Loaded tool afterwards
 (G) Final Shut-In 1053 ☐ Sampler _____
 (H) Final Hydrostatic 2547 ☐ Straddle _____

Initial Open 6 ☐ Shale Packer _____
 Initial Shut-In 30 ☐ Extra Packer _____
 Final Flow 45 ☐ Extra Recorder _____
 Final Shut-In 90 ☐ Day Standby _____
☐ Accessibility _____
 Sub Total 1986 Sub Total 1986

Approved By Rusty Morning Our Representative Chuck Smith
 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.