



DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.18 @ 10:55:15

End Date: 2015.11.18 @ 16:39:00

Job Ticket #: 64487 DST #: 1

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

Printed: 2015.11.23 @ 10:56:41



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Larson Engineering
 562 W. State Rd 4
 Olmitz KS 67564
 ATTN: Vern Schrag

8-18s-28w Lane,KS

Ray #1-8

Job Ticket: 64487

DST#: 1

Test Start: 2015.11.18 @ 10:55:15

GENERAL INFORMATION:

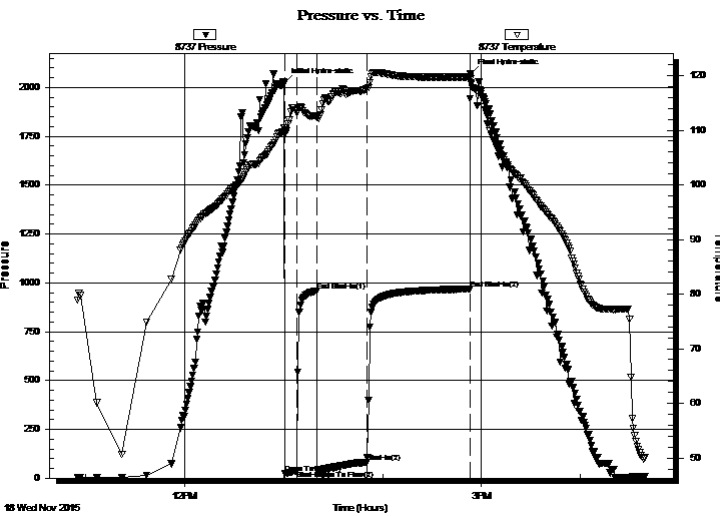
Formation: **LKC J**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 13:01:00
 Time Test Ended: 16:39:00
 Interval: **4186.00 ft (KB) To 4206.00 ft (KB) (TVD)**
 Total Depth: 4206.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Mike Roberts
 Unit No: 65
 Reference Elevations: 2761.00 ft (KB)
 2752.00 ft (CF)
 KB to GR/CF: 9.00 ft

Serial #: 8737

Outside

Press@RunDepth: 80.94 psig @ 4201.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2015.11.18 End Date: 2015.11.18 Last Calib.: 2015.11.18
 Start Time: 10:55:15 End Time: 16:39:00 Time On Btm: 2015.11.18 @ 13:00:45
 Time Off Btm: 2015.11.18 @ 14:53:30

TEST COMMENT: IF:Built to 1" blow
 IS:No return blow
 FF:Built to 3" blow
 FS:No return blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2024.84	110.48	Initial Hydro-static
1	23.51	109.36	Open To Flow (1)
8	39.24	113.14	Shut-In(1)
20	958.90	112.69	End Shut-In(1)
50	41.36	112.31	Open To Flow (2)
112	80.94	117.62	Shut-In(2)
113	968.43	119.76	End Shut-In(2)
113	2073.16	119.43	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
124.00	mcw 50% m 50% w	0.61
7.00	mud w with a trace of oil	0.10

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64487

DST#: 1

ATTN: Vern Schrag

Test Start: 2015.11.18 @ 10:55:15

Tool Information

Drill Pipe:	Length: 4048.00 ft	Diameter: 3.80 inches	Volume: 56.78 bbl	Tool Weight: 1500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 124.00 ft	Diameter: 2.25 inches	Volume: 0.61 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 57.39 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	14.00 ft			String Weight: Initial 55000.00 lb
Depth to Top Packer:	4186.00 ft			Final 55000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	20.00 ft			
Tool Length:	48.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4159.00	
Shut In Tool	5.00			4164.00	
Hydraulic tool	5.00			4169.00	
Jars	5.00			4174.00	
Safety Joint	3.00			4177.00	
Packer	5.00			4182.00	28.00 Bottom Of Top Packer
Packer	4.00			4186.00	
Stubb	1.00			4187.00	
Perforations	14.00			4201.00	
Recorder	0.00	8846	Inside	4201.00	
Recorder	0.00	8737	Outside	4201.00	
Bullnose	5.00			4206.00	20.00 Bottom Packers & Anchor

Total Tool Length: 48.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64487

DST#: 1

ATTN: Vern Schrag

Test Start: 2015.11.18 @ 10:55:15

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: 50.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.73 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
124.00	mcw 50%m 50%w	0.610
7.00	mud with a trace of oil	0.098

Total Length: 131.00 ft

Total Volume: 0.708 bbl

Num Fluid Samples: 0

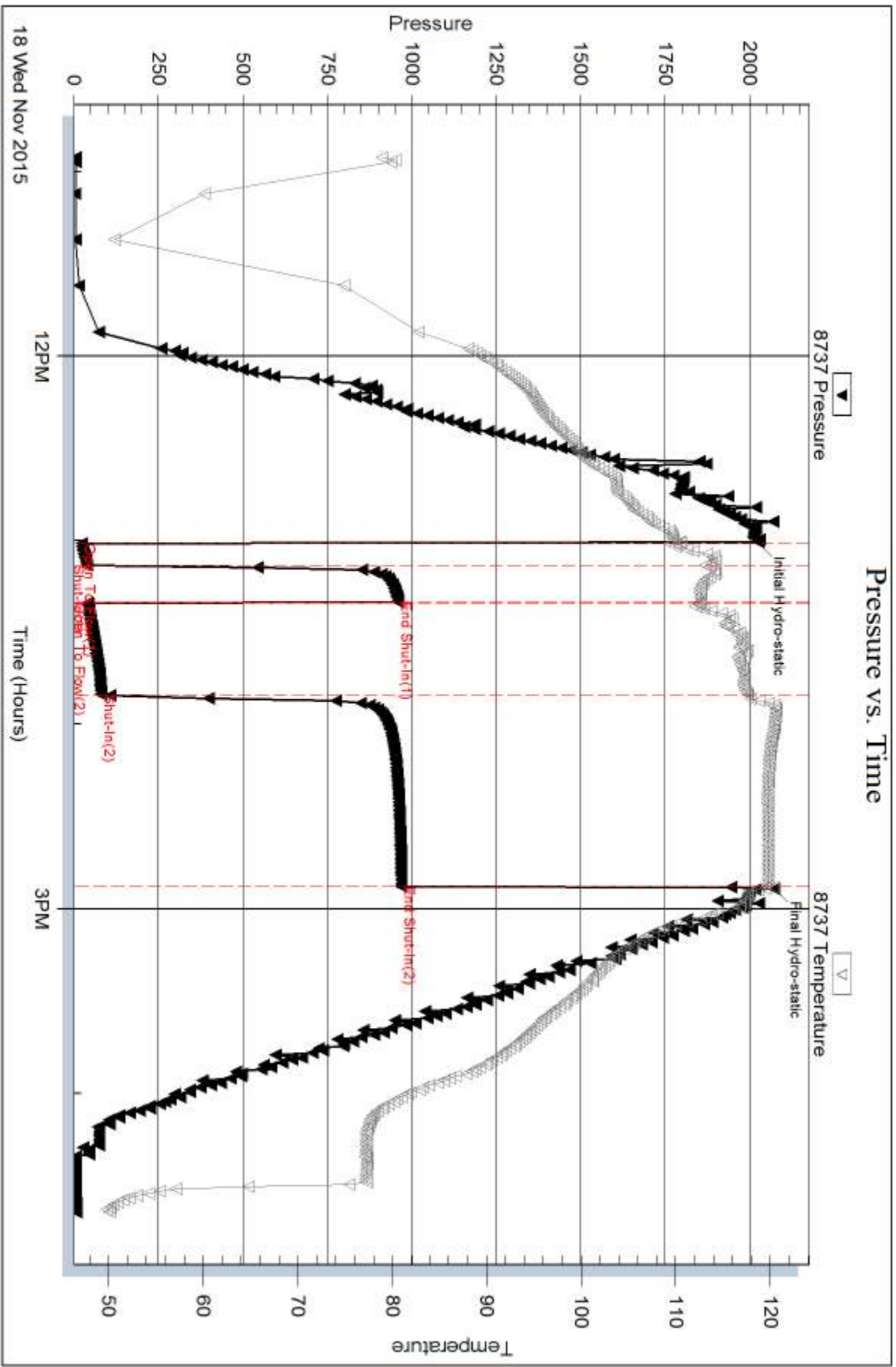
Num Gas Bombs: 0

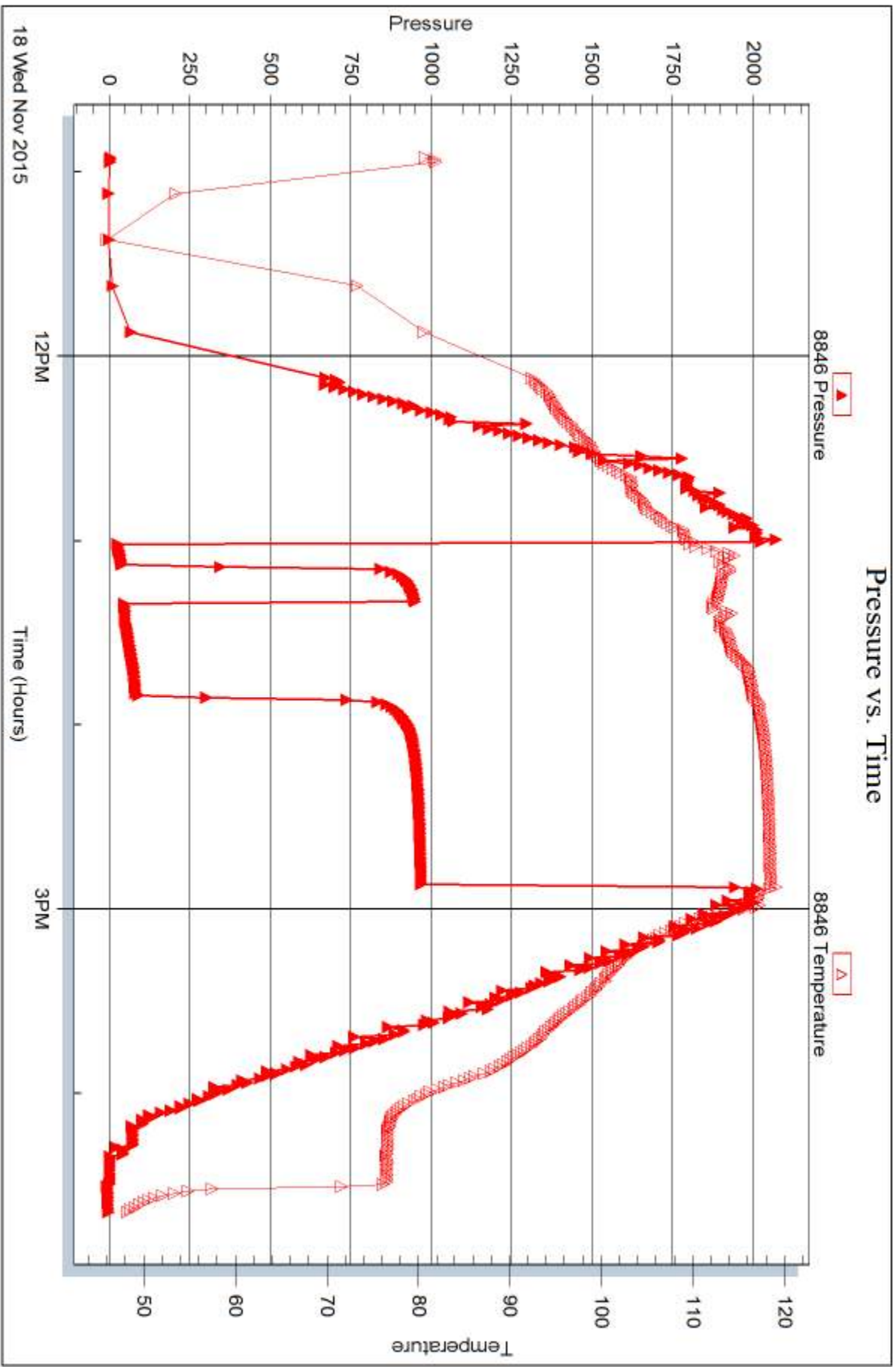
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.19 @ 05:38:15

End Date: 2015.11.19 @ 10:30:15

Job Ticket #: 64488 DST #: 2

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

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TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Larson Engineering
 562 W. State Rd 4
 Olmitz KS 67564
 ATTN: Vern Schrag

8-18s-28w Lane, KS

Ray #1-8

Job Ticket: 64488

DST#: 2

Test Start: 2015.11.19 @ 05:38:15

GENERAL INFORMATION:

Formation: **LKC K**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 07:43:30
 Time Test Ended: 10:30:15
 Interval: **4222.00 ft (KB) To 4242.00 ft (KB) (TVD)**
 Total Depth: 4222.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Mike Roberts
 Unit No: 65
 Reference Elevations: 2761.00 ft (KB)
 2752.00 ft (CF)
 KB to GR/CF: 9.00 ft

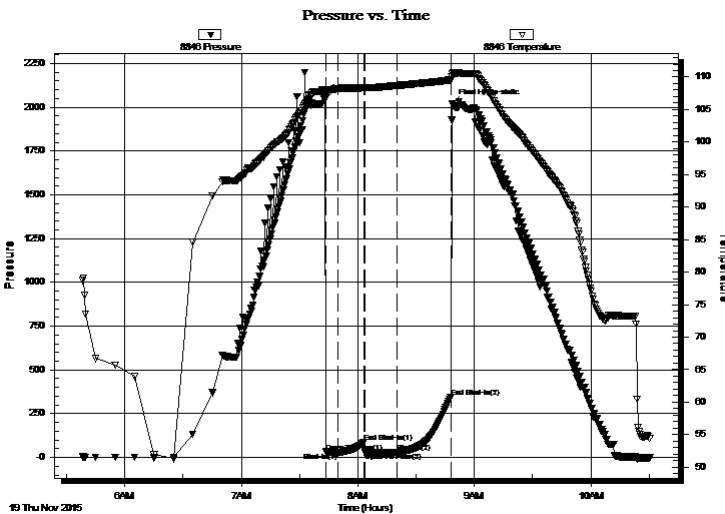
Serial #: 8846

Inside

Press@RunDepth: 28.92 psig @ 4237.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2015.11.19 End Date: 2015.11.19 Last Calib.: 2015.11.19
 Start Time: 05:38:15 End Time: 10:30:15 Time On Btm: 2015.11.19 @ 07:43:15
 Time Off Btm: 2015.11.19 @ 08:48:30

TEST COMMENT: IF: Built to weak surface blow
 IS: No return blow
 FF: No blow
 FS: No return blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2047.55	107.94	Initial Hydro-static
1	32.29	106.81	Open To Flow (1)
7	26.57	108.18	Shut-In(1)
20	88.13	108.33	End Shut-In(1)
21	27.29	108.31	Open To Flow (2)
37	28.92	108.67	Shut-In(2)
65	344.71	109.54	End Shut-In(2)
66	2022.08	110.49	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
2.00	mud with oil spots	0.01

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64488

DST#: 2

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 05:38:15

Tool Information

Drill Pipe:	Length: 4078.00 ft	Diameter: 3.80 inches	Volume: 57.20 bbl	Tool Weight:	1500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 124.00 ft	Diameter: 2.25 inches	Volume: 0.61 bbl	Weight to Pull Loose:	70000.00 lb
			<u>Total Volume: 57.81 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	8.00 ft			String Weight: Initial	55000.00 lb
Depth to Top Packer:	4222.00 ft			Final	55000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	20.00 ft				
Tool Length:	48.00 ft				
Number of Packers:	2	Diameter: 6.75 inches			

Tool Comments:

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4195.00	
Shut In Tool	5.00			4200.00	
Hydraulic tool	5.00			4205.00	
Jars	5.00			4210.00	
Safety Joint	3.00			4213.00	
Packer	5.00			4218.00	28.00 Bottom Of Top Packer
Packer	4.00			4222.00	
Stubb	1.00			4223.00	
Perforations	14.00			4237.00	
Recorder	0.00	8846	Inside	4237.00	
Recorder	0.00	8737	Outside	4237.00	
Bullnose	5.00			4242.00	20.00 Bottom Packers & Anchor

Total Tool Length: 48.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64488

DST#: 2

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 05:38:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 64.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.35 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
2.00	mud w ith oil spots	0.010

Total Length: 2.00 ft Total Volume: 0.010 bbl

Num Fluid Samples: 0

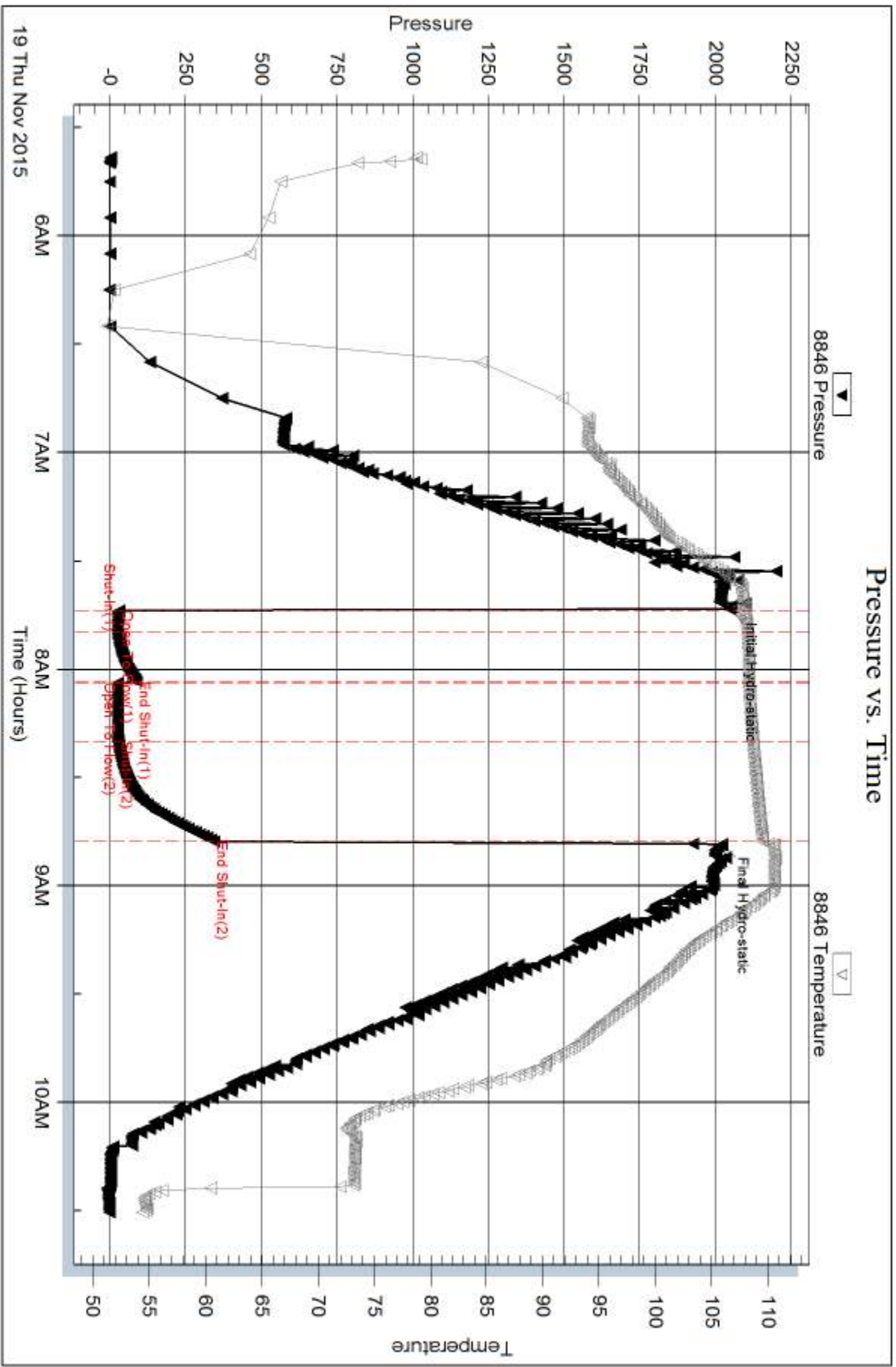
Num Gas Bombs: 0

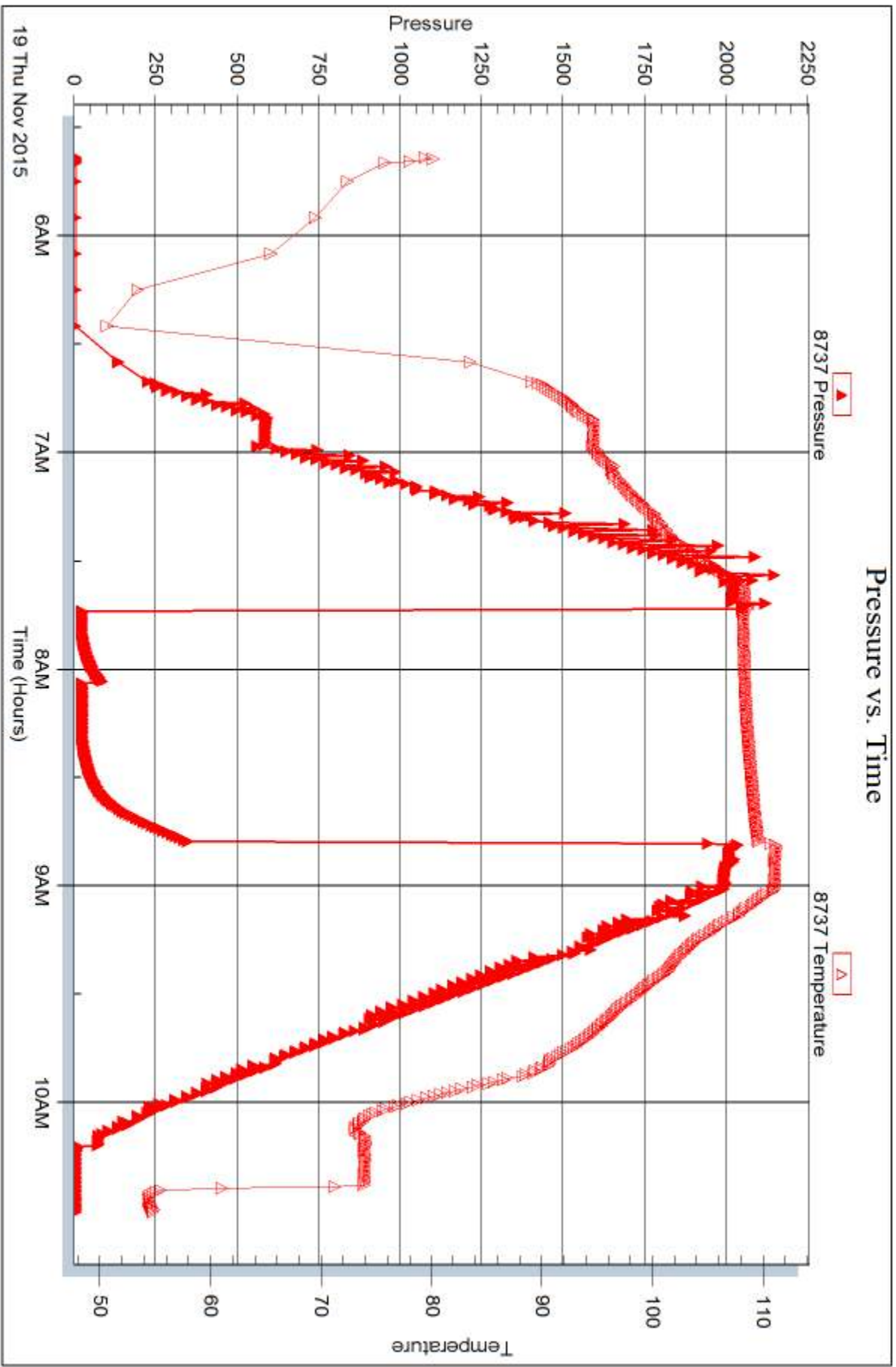
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.19 @ 20:08:15

End Date: 2015.11.20 @ 01:43:00

Job Ticket #: 64489 DST #: 3

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

Printed: 2015.11.23 @ 10:56:07



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Larson Engineering
 562 W. State Rd 4
 Olmitz KS 67564
 ATTN: Vern Schrag

8-18s-28w Lane, KS
Ray #1-8
 Job Ticket: 64489 **DST#: 3**
 Test Start: 2015.11.19 @ 20:08:15

GENERAL INFORMATION:

Formation: **LKC L**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 21:49:30
 Time Test Ended: 01:43:00
 Interval: **4260.00 ft (KB) To 4270.00 ft (KB) (TVD)**
 Total Depth: 4270.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Mike Roberts
 Unit No: 65
 Reference Elevations: 2761.00 ft (KB)
 2752.00 ft (CF)
 KB to GR/CF: 9.00 ft

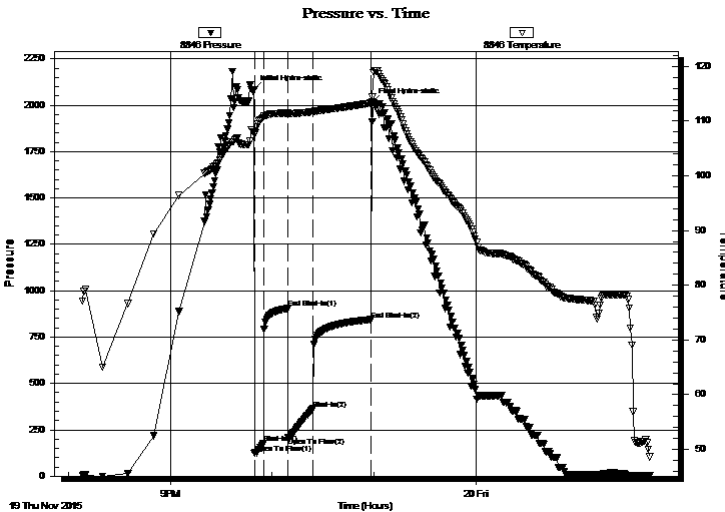
Serial #: 8846

Inside

Press@RunDepth: 362.63 psig @ 4265.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2015.11.19 End Date: 2015.11.20 Last Calib.: 2015.11.20
 Start Time: 20:08:15 End Time: 01:43:00 Time On Btm: 2015.11.19 @ 21:49:15
 Time Off Btm: 2015.11.19 @ 22:58:45

TEST COMMENT: IF:BOB in 3 min.
 IS:Return blow built to 6"
 FF:BOB in 1 min.
 FS:Return blow built to 4"

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2083.69	107.97	Initial Hydro-static
1	122.17	107.53	Open To Flow (1)
6	175.85	110.74	Shut-In(1)
20	904.54	111.49	End Shut-In(1)
21	207.60	111.24	Open To Flow (2)
35	362.63	111.72	Shut-In(2)
69	843.94	113.33	End Shut-In(2)
70	2011.88	113.53	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
62.00	ocm 20%o 80%m	0.30
62.00	ocgm 10%o 20%g 70%m	0.30
248.00	gcmo 10%g 15%m 75%o	3.48
439.00	gco 20%g 80%o	6.16
0.00	GIP = 806 feet	0.00

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64489

DST#: 3

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 20:08:15

Tool Information

Drill Pipe:	Length: 4138.00 ft	Diameter: 3.80 inches	Volume: 58.05 bbl	Tool Weight: 1500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 124.00 ft	Diameter: 2.25 inches	Volume: 0.61 bbl	Weight to Pull Loose: 80000.00 lb
			<u>Total Volume: 58.66 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	30.00 ft			String Weight: Initial 55000.00 lb
Depth to Top Packer:	4260.00 ft			Final 57000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	10.00 ft			
Tool Length:	38.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4233.00	
Shut In Tool	5.00			4238.00	
Hydraulic tool	5.00			4243.00	
Jars	5.00			4248.00	
Safety Joint	3.00			4251.00	
Packer	5.00			4256.00	28.00 Bottom Of Top Packer
Packer	4.00			4260.00	
Stubb	1.00			4261.00	
Perforations	4.00			4265.00	
Recorder	0.00	8846	Inside	4265.00	
Recorder	0.00	8737	Outside	4265.00	
Bullnose	5.00			4270.00	10.00 Bottom Packers & Anchor

Total Tool Length: 38.00



**TRILOBITE
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DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64489

DST#: 3

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 20:08:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

31 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbf

Water Loss: 6.37 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbf
62.00	ocm 20%o 80%m	0.305
62.00	ocgm 10%o 20%g 70%m	0.305
248.00	gcmo 10%g 15%m 75%o	3.479
439.00	gco 20%g 80%o	6.158
0.00	GIP = 806 feet	0.000

Total Length: 811.00 ft Total Volume: 10.247 bbl

Num Fluid Samples: 0

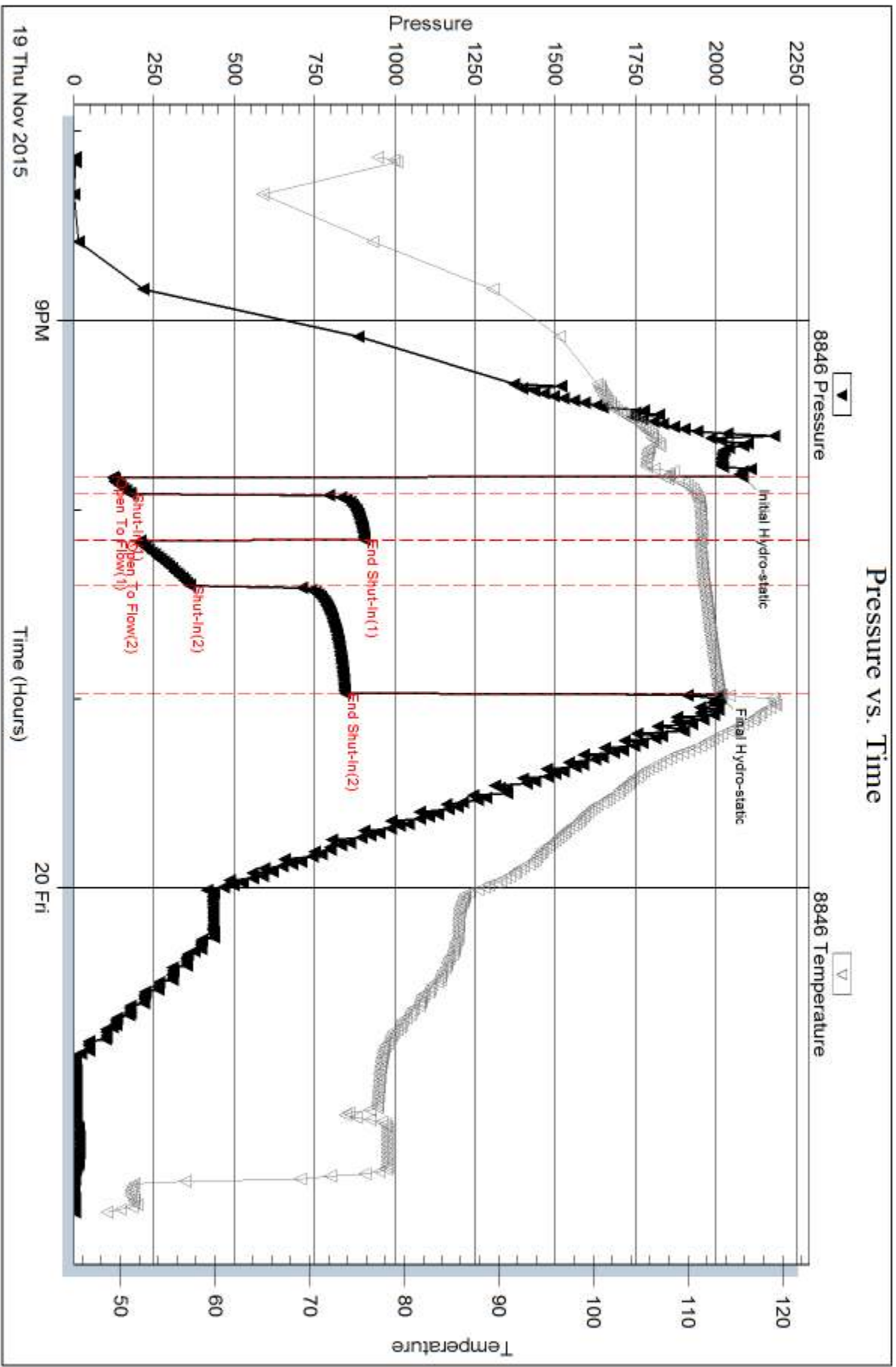
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: API= 33@ 40 corrected to 31 @ 60





DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.21 @ 02:28:15

End Date: 2015.11.21 @ 08:28:45

Job Ticket #: 64490 DST #: 4

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

Printed: 2015.11.23 @ 10:55:53



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Larson Engineering
 562 W. State Rd 4
 Olmitz KS 67564
 ATTN: Vern Schrag

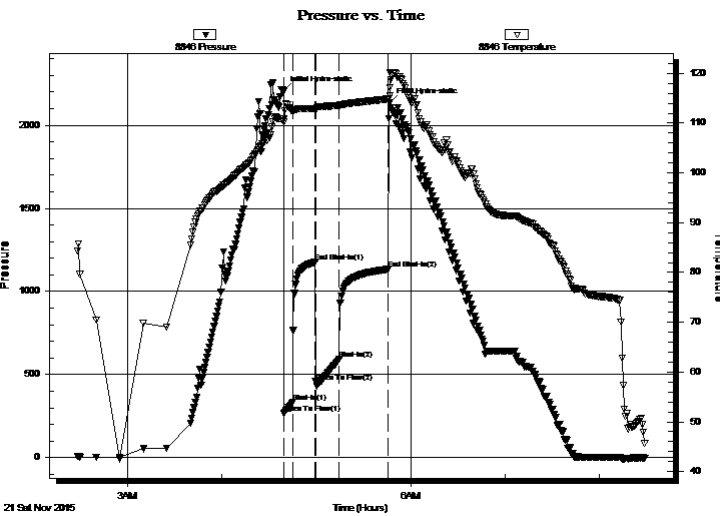
8-18s-28w Lane, KS
Ray #1-8
 Job Ticket: 64490 **DST#: 4**
 Test Start: 2015.11.21 @ 02:28:15

GENERAL INFORMATION:

Formation: **Marmaton**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 04:39:30
 Time Test Ended: 08:28:45
 Interval: **4292.00 ft (KB) To 4405.00 ft (KB) (TVD)**
 Total Depth: 4405.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Mike Roberts
 Unit No: 65
 Reference Elevations: 2761.00 ft (KB)
 2752.00 ft (CF)
 KB to GR/CF: 9.00 ft

Serial #: 8846 Inside
 Press@RunDepth: 590.90 psig @ 4294.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2015.11.21 End Date: 2015.11.21 Last Calib.: 2015.11.21
 Start Time: 02:28:15 End Time: 08:28:45 Time On Btm: 2015.11.21 @ 04:39:15
 Time Off Btm: 2015.11.21 @ 05:47:00

TEST COMMENT: IF:BOB in 1 min.
 IS:No return blow
 FF:BOB in 4 min. died back to 6" blow
 FS:o return blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2205.50	110.83	Initial Hydro-static
1	266.44	110.20	Open To Flow (1)
6	334.38	112.42	Shut-In(1)
20	1175.68	112.98	End Shut-In(1)
21	456.97	112.70	Open To Flow (2)
36	590.90	113.57	Shut-In(2)
67	1132.98	114.86	End Shut-In(2)
68	2134.30	117.10	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
124.00	gcmw 3%g 15% w 82%m (collars)	0.61
558.00	gcw om 3%g 17%o 30%m 50%w	7.83
186.00	gcw om 3%g 5%w 22%o 70%m	2.61
186.00	gcm 2%g 98%m	2.61

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64490

DST#: 4

ATTN: Vern Schrag

Test Start: 2015.11.21 @ 02:28:15

Tool Information

Drill Pipe:	Length: 4173.00 ft	Diameter: 3.80 inches	Volume: 58.54 bbl	Tool Weight:	1500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 124.00 ft	Diameter: 2.25 inches	Volume: 0.61 bbl	Weight to Pull Loose:	70000.00 lb
			<u>Total Volume: 59.15 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	33.00 ft			String Weight: Initial	55000.00 lb
Depth to Top Packer:	4292.00 ft			Final	60000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	113.00 ft				
Tool Length:	141.00 ft				
Number of Packers:	2	Diameter:	6.75 inches		
Tool Comments:					

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4265.00	
Shut In Tool	5.00			4270.00	
Hydraulic tool	5.00			4275.00	
Jars	5.00			4280.00	
Safety Joint	3.00			4283.00	
Packer	5.00			4288.00	28.00 Bottom Of Top Packer
Packer	4.00			4292.00	
Stubb	1.00			4293.00	
Perforations	1.00			4294.00	
Recorder	0.00	8846	Inside	4294.00	
Recorder	0.00	8737	Outside	4294.00	
Change Over Sub	1.00			4295.00	
Drill Pipe	94.00			4389.00	
Change Over Sub	1.00			4390.00	
Perforations	10.00			4400.00	
Bullnose	5.00			4405.00	113.00 Bottom Packers & Anchor
Total Tool Length:	141.00				



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64490

DST#: 4

ATTN: Vern Schrag

Test Start: 2015.11.21 @ 02:28:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

28000 ppm

Viscosity: 73.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.17 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3900.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
124.00	gcmw 3%g 15% w 82%m (collars)	0.610
558.00	gcw om 3%g 17%o 30%m 50%w	7.827
186.00	gcw om 3%g 5%w 22%o 70%m	2.609
186.00	gcm 2%g 98%m	2.609

Total Length: 1054.00 ft Total Volume: 13.655 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

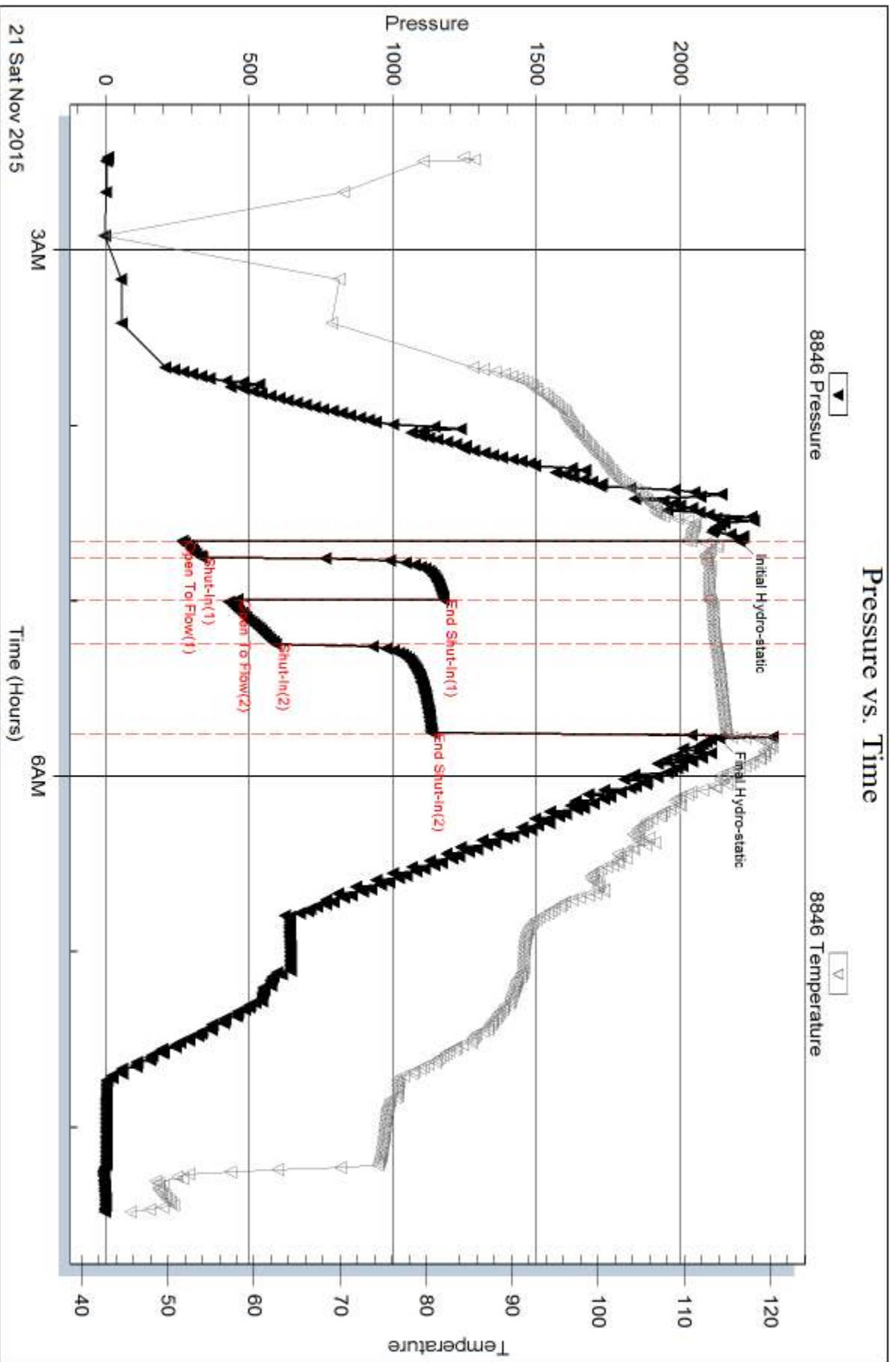
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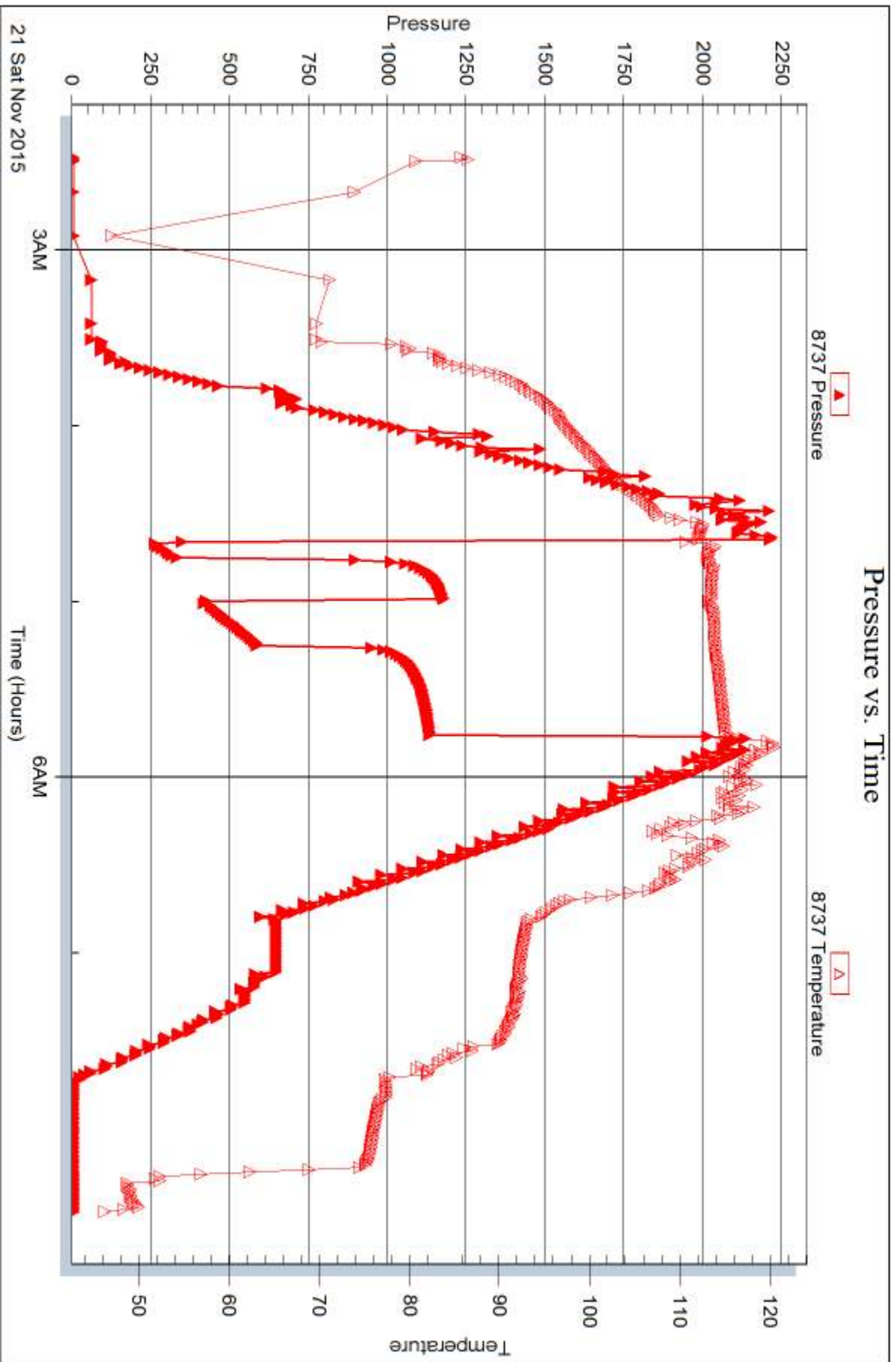
Laboratory Name:

Laboratory Location:

Recovery Comments: RW=.342 @ 72*= 28000 ppm

Pressure vs. Time







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.22 @ 02:33:15

End Date: 2015.11.22 @ 08:13:15

Job Ticket #: 64491 DST #: 5

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2015.11.23 @ 10:55:38



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Larson Engineering
 562 W. State Rd 4
 Olmitz KS 67564
 ATTN: Vern Schrag

8-18s-28w Lane, KS

Ray #1-8

Job Ticket: 64491

DST#: 5

Test Start: 2015.11.22 @ 02:33:15

GENERAL INFORMATION:

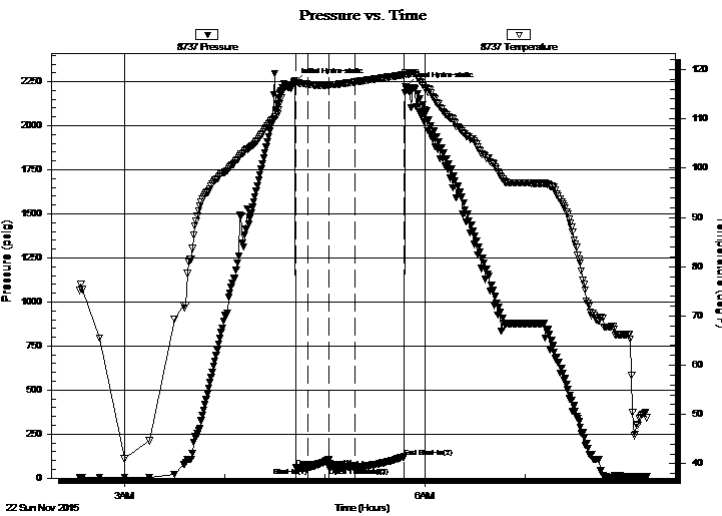
Formation: **Cherokee Sand**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 04:42:45
 Time Test Ended: 08:13:15
 Interval: **4466.00 ft (KB) To 4555.00 ft (KB) (TVD)**
 Total Depth: 4555.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Fair
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Mike Roberts
 Unit No: 65
 Reference Elevations: 2761.00 ft (KB)
 2752.00 ft (CF)
 KB to GR/CF: 9.00 ft

Serial #: 8737

Outside

Press@RunDepth: 60.24 psig @ 4468.00 ft (KB)
 Start Date: 2015.11.22 End Date: 2015.11.22
 Start Time: 02:33:15 End Time: 08:13:15
 Capacity: 8000.00 psig
 Last Calib.: 2015.11.22
 Time On Btm: 2015.11.22 @ 04:42:15
 Time Off Btm: 2015.11.22 @ 05:48:30

TEST COMMENT: IF: Built to weak surface blow
 IS: No return blow
 FF: No blow
 FS: No return blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2242.60	117.81	Initial Hydro-static
1	59.04	117.17	Open To Flow (1)
8	58.87	117.01	Shut-In(1)
20	105.93	116.86	End Shut-In(1)
21	59.18	116.86	Open To Flow (2)
36	60.24	117.47	Shut-In(2)
66	119.70	118.93	End Shut-In(2)
67	2221.71	119.01	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
5.00	mud 100% m	0.02

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64491

DST#: 5

ATTN: Vern Schrag

Test Start: 2015.11.22 @ 02:33:15

Tool Information

Drill Pipe:	Length: 4328.00 ft	Diameter: 3.80 inches	Volume: 60.71 bbl	Tool Weight: 1500.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 124.00 ft	Diameter: 2.25 inches	Volume: 0.61 bbl	Weight to Pull Loose: 75000.00 lb
			<u>Total Volume: 61.32 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	14.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4466.00 ft			Final 58000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	89.00 ft			
Tool Length:	117.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4439.00	
Shut In Tool	5.00			4444.00	
Hydraulic tool	5.00			4449.00	
Jars	5.00			4454.00	
Safety Joint	3.00			4457.00	
Packer	5.00			4462.00	28.00 Bottom Of Top Packer
Packer	4.00			4466.00	
Stubb	1.00			4467.00	
Perforations	1.00			4468.00	
Recorder	0.00	8846	Inside	4468.00	
Recorder	0.00	8737	Outside	4468.00	
Change Over Sub	1.00			4469.00	
Drill Pipe	63.00			4532.00	
Change Over Sub	1.00			4533.00	
Perforations	17.00			4550.00	
Bullnose	5.00			4555.00	89.00 Bottom Packers & Anchor
Total Tool Length:	117.00				



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64491

DST#: 5

ATTN: Vern Schrag

Test Start: 2015.11.22 @ 02:33:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 63.00 sec/qt

Cushion Volume:

bbf

Water Loss: 7.58 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3400.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbf
5.00	mud 100%m	0.025

Total Length: 5.00 ft Total Volume: 0.025 bbf

Num Fluid Samples: 0

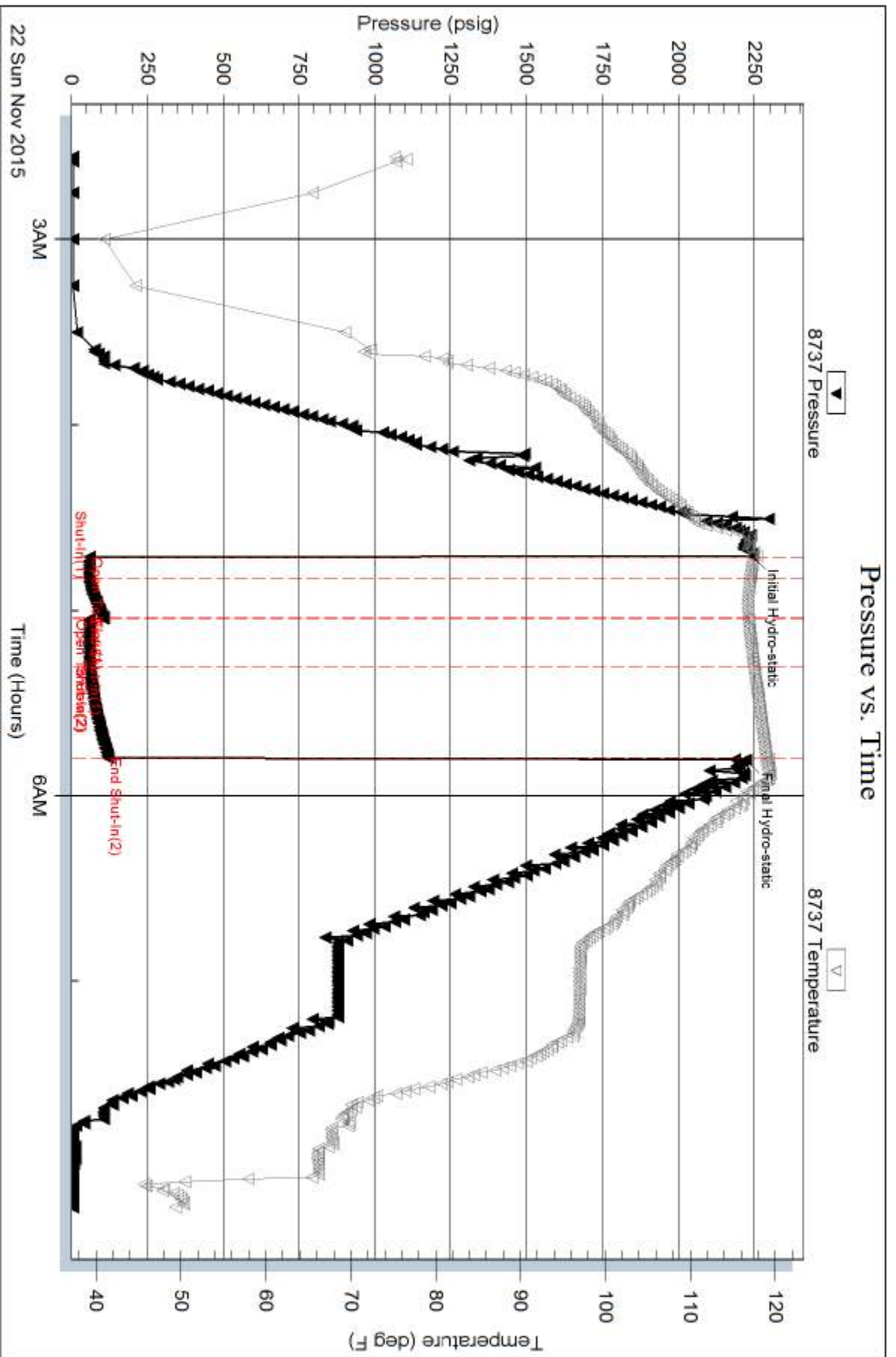
Num Gas Bombs: 0

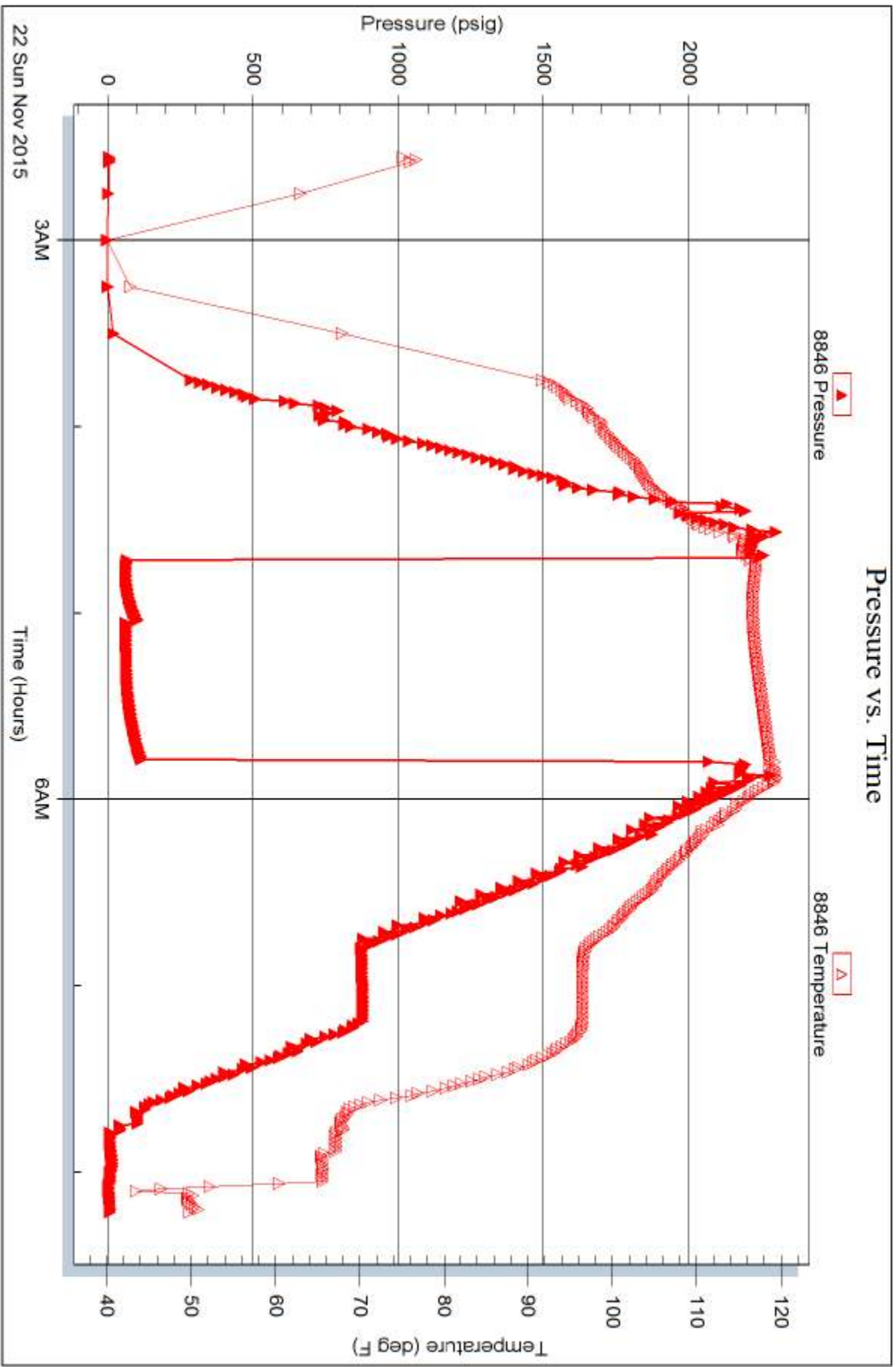
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64487**

Well Name & No. Ray 1-8 Test No. 1 Date 11-18-15
 Company Larson Engineering Inc Elevation 2761 KB 2752 GL
 Address 562 W State Rd 4 Olmitz KS 67564
 Co. Rep / Geo. Vern Schrage Rig HD#3
 Location: Sec. 8 Twp. 18S Rge. 28W Co. Lane State KS

Interval Tested 4186-4206 Zone Tested J
 Anchor Length 20 Drill Pipe Run 4048 Mud Wt. 8.9
 Top Packer Depth 4181 ~~4181~~ Drill Collars Run 124 Vis 50
 Bottom Packer Depth ~~4181~~ 4186 Wt. Pipe Run Ø WL 6.8
 Total Depth 4206 Chlorides 2300 ppm System LCM 2
 Blow Description IF: Built to 1" Blow
IS: No Return Blow
IF: Built to 3" Blow
IS: No Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>7</u>	<u>MUD with trace of oil</u>			<u>100</u>	
<u>124</u>	<u>mcw</u>		<u>50</u>	<u>50</u>	

Rec Total 131 BHT 120 Gravity - API RW H @ 52.31° F Chlorides 28,000 ppm

(A) Initial Hydrostatic <u>2024</u>	<input checked="" type="checkbox"/> Test <u>\$1150.00</u>	T-On Location <u>09:30</u>
(B) First Initial Flow <u>23</u>	<input checked="" type="checkbox"/> Jars <u>\$250.00</u>	T-Started <u>10:55</u>
(C) First Final Flow <u>39</u>	<input checked="" type="checkbox"/> Safety Joint <u>75.00</u>	T-Open <u>13:00</u>
(D) Initial Shut-In <u>958</u>	<input checked="" type="checkbox"/> Circ Sub <u>NC</u>	T-Pulled <u>14:50</u>
(E) Second Initial Flow <u>41</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>16:39</u>
(F) Second Final Flow <u>80</u>	<input checked="" type="checkbox"/> Mileage <u>SHORT \$56.00</u>	Comments
(G) Final Shut-In <u>968</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>2073</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>5</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>15</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>30</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby	Total <u>1531</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>\$1531.00</u>	

Approved By Vern Schrage Our Representative Mike Roberts
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64488**

Well Name & No. Ray 1-8 Test No. 2 Date 11-19-15
 Company Larson Engineering Elevation 2761 KB 2752 GL
 Address 562 W State Rd Olmitz KS 67564
 Co. Rep / Geo. Vern Schrag Rig HD #3
 Location: Sec. B Twp. 18S Rge. 28W Co. Lane State KS

Interval Tested 4222-4242 Zone Tested IK
 Anchor Length 20 Drill Pipe Run 4078 Mud Wt. 9.0
 Top Packer Depth 4217 Drill Collars Run 124 Vis 64
 Bottom Packer Depth 4222 Wt. Pipe Run φ WL 6.4
 Total Depth 4242 Chlorides 2500 ppm System LCM 2
 Blow Description IF: Drill to Weak Surface Blow
IS: No Return Blow
FF: No Blow
FS: NO Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>2</u>	<u>mud with oil spots</u>			<u>100</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 2 BHT 121 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic <u>2077</u>	<input checked="" type="checkbox"/> Test <u>\$1150.⁰⁰</u>	T-On Location <u>04:15</u>
(B) First Initial Flow <u>32</u>	<input checked="" type="checkbox"/> Jars <u># 250.⁰⁰</u>	T-Started <u>05:38</u>
(C) First Final Flow <u>26</u>	<input checked="" type="checkbox"/> Safety Joint <u>75.⁰⁰</u>	T-Open <u>07:44</u>
(D) Initial Shut-In <u>88</u>	<input checked="" type="checkbox"/> Circ Sub <u>NO</u>	T-Pulled <u>08:49</u>
(E) Second Initial Flow <u>27</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>10:30</u>
(F) Second Final Flow <u>28</u>	<input checked="" type="checkbox"/> Mileage <u>BLORT #56.⁰⁰</u>	Comments
(G) Final Shut-In <u>344</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>2022</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>5</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>15</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>15</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>30</u>	<input type="checkbox"/> Day Standby	Total <u>1531</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>\$1531.⁰⁰/-</u>	

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64489**

Well Name & No. Ray #1-8 Test No. 3 Date 11-19-15
 Company Larson Engineering Inc Elevation 2761 KB 2752 GL
 Address 562 W. State Rd Olmitz KS 67564
 Co. Rep / Geo. Vern Schrag Rig HD#3
 Location: Sec. 8 Twp. 18S Rge. 28W Co. Lane State KS

Interval Tested 4260-4270 Zone Tested L
 Anchor Length 10 Drill Pipe Run 4138 Mud Wt. 9.2
 Top Packer Depth 4255 Drill Collars Run 124 Vis 52
 Bottom Packer Depth 4260 Wt. Pipe Run Ø WL 6.4
 Total Depth 4270 Chlorides 2000 ppm System LCM 2
 Blow Description IF: BOB in 3 Min
IS: Return Blow Built to 6"
FF: BOB in 1 Min
FS: Return Blow Built to 4"

Rec	Feet of	%gas	%oil	%water	%mud
439	glo	20	80		
248	gcmo	10	75	15	
62	ocgm	20	10	70	
62	ocm		20	80	
Ø	GIP = 806'				

Rec Total 811 BHT 113 Gravity 31 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2083 Test \$1150.00/- T-On Location 19:15
 (B) First Initial Flow 122 Jars \$250.00/- T-Started 20:08
 (C) First Final Flow 175 Safety Joint \$75.00/- T-Open 21:48
 (D) Initial Shut-In 904 Circ Sub NC T-Pulled 22:53
 (E) Second Initial Flow 207 Hourly Standby — T-Out 01:43
 (F) Second Final Flow 362 Mileage 56 RT \$56.00/- Comments —
 (G) Final Shut-In 843 Sampler —
 (H) Final Hydrostatic 2011 Straddle — Ruined Shale Packer —
 Shale Packer — Ruined Packer —
 Extra Packer — Extra Copies —
 Extra Recorder — Sub Total 0
 Day Standby — Total 1531
 Accessibility — MP/DST Disc't —
 Sub Total \$1531.00/-

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64490**

Well Name & No. Ray #1-8 Test No. 4 Date 11-21-15
 Company Larson Engineering Inc. Elevation 2761 KB 2752 GL
 Address 562 W. State Rd Omitz KS 67564
 Co. Rep / Geo. Vern Schrag Rig HD#3
 Location: Sec. 8 Twp. 18S Rge. 28W Co. Lane State KS

Interval Tested 4292-4405 Zone Tested Marmaton
 Anchor Length ~~4297~~ 113 Drill Pipe Run 4173 Mud Wt. 9.1
 Top Packer Depth ~~4292~~ 4287 Drill Collars Run 124 Vis 73
 Bottom Packer Depth 4292 Wt. Pipe Run 6 WL 7.2
 Total Depth 4405 Chlorides 3900 ppm System LCM 2
 Blow Description IF: BOB in 1 Min
IS: No Return Blow
FF: BOB in 4 Min - Died to 6"
FS: No Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>186</u>	<u>gcm</u>	<u>2</u>		<u>98</u>	
<u>186</u>	<u>gcwom</u>	<u>3</u>	<u>22</u>	<u>5</u>	<u>70</u>
<u>558</u>	<u>gcwom</u>	<u>3</u>	<u>17</u>	<u>50</u>	<u>30</u>
<u>124</u>	<u>gcwm (Collars)</u>	<u>3</u>		<u>15</u>	<u>82</u>

Rec Total 1054 BHT 115 Gravity — API RW .342 @ 72 °F Chlorides 28000 ppm
 (A) Initial Hydrostatic 2205 Test 1150 T-On Location 01:16
 (B) First Initial Flow 266 Jars 250 T-Started 02:28
 (C) First Final Flow 334 Safety Joint 75 T-Open 04:40
 (D) Initial Shut-In 1175 Circ Sub NC T-Pulled 05:45
 (E) Second Initial Flow 456 Hourly Standby _____ T-Out 08:28
 (F) Second Final Flow 590 Mileage 56 RT Comments _____
 (G) Final Shut-In 1132 Sampler _____
 (H) Final Hydrostatic 2134 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1531 MP/DST Disc't _____

Initial Open 5
 Initial Shut-In 15
 Final Flow 15
 Final Shut-In 30

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64491**

Well Name & No. Ray #1-8 Test No. 5 Date 11-22-15
 Company Larson Engineering Inc. Elevation 2761 KB 2752 GL
 Address 562 W. State Rd Olmitz. KS 67564
 Co. Rep / Geo. Vern Schrag Rig HD#3
 Location: Sec. 8 Twp. 18S Rge. 28w Co. Lane State KS

Interval Tested 4466-4555 Zone Tested Cherokee Sand
 Anchor Length 89 Drill Pipe Run 4328 Mud Wt. 9.3
 Top Packer Depth 4461 Drill Collars Run 124 Vis 63
 Bottom Packer Depth 4466 Wt. Pipe Run 0 WL 7.6
 Total Depth 4555 Chlorides 3400 ppm System LCM 1
 Blow Description IF: Built to weak surface Blow
IS: NO Return Blow
FF: NO Blow
FS: NO Return Blow

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

Rec Total 5 BHT 117 Gravity API RW @ ° F Chlorides ppm
 (A) Initial Hydrostatic 2242 Test 1150 T-On Location 01:45
 (B) First Initial Flow 59 Jars 250 T-Started 02:33
 (C) First Final Flow 58 Safety Joint 75 T-Open 04:43
 (D) Initial Shut-In 105 Circ Sub NL T-Pulled 05:48
 (E) Second Initial Flow 59 Hourly Standby _____ T-Out 08:13
 (F) Second Final Flow 60 Mileage 56 RT Comments _____
 (G) Final Shut-In 119 Sampler _____
 (H) Final Hydrostatic 2221 Straddle _____
 Initial Open 5 Shale Packer _____
 Initial Shut-In 15 Shale Packer _____
 Final Flow 15 Extra Packer _____
 Final Shut-In 30 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1531 MP/DST Disc't _____

Approved By Vern C. Schrag Our Representative Mike Rohlf
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