

Confidentiality Requested:

Yes No

**KANSAS CORPORATION COMMISSION
OIL & GAS CONSERVATION DIVISION**

Form ACO-1

January 2018

Form must be Typed

Form must be Signed

All blanks must be Filled

**WELL COMPLETION FORM
WELL HISTORY - DESCRIPTION OF WELL & LEASE**

OPERATOR: License # _____

Name: _____

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____ + _____

Contact Person: _____

Phone: (_____) _____

CONTRACTOR: License # _____

Name: _____

Wellsite Geologist: _____

Purchaser: _____

Designate Type of Completion:

New Well Re-Entry Workover

Oil WSW SWD

Gas DH EOR

OG GSW

CM (Coal Bed Methane)

Cathodic Other (Core, Expl., etc.): _____

If Workover/Re-entry: Old Well Info as follows:

Operator: _____

Well Name: _____

Original Comp. Date: _____ Original Total Depth: _____

Deepening Re-perf. Conv. to EOR Conv. to SWD
 Plug Back Liner Conv. to GSW Conv. to Producer

Commingled Permit #: _____

Dual Completion Permit #: _____

SWD Permit #: _____

EOR Permit #: _____

GSW Permit #: _____

Spud Date or Date Reached TD Completion Date or Recompletion Date

API No.: _____

Spot Description: _____

_____ - _____ - _____ Sec. _____ Twp. _____ S. R. _____ East West

_____ Feet from North / South Line of Section

_____ Feet from East / West Line of Section

Footages Calculated from Nearest Outside Section Corner:

NE NW SE SW

GPS Location: Lat: _____, Long: _____
(e.g. xx.xxxxx) (e.g. -xxx.xxxxx)

Datum: NAD27 NAD83 WGS84

County: _____

Lease Name: _____ Well #: _____

Field Name: _____

Producing Formation: _____

Elevation: Ground: _____ Kelly Bushing: _____

Total Vertical Depth: _____ Plug Back Total Depth: _____

Amount of Surface Pipe Set and Cemented at: _____ Feet

Multiple Stage Cementing Collar Used? Yes No

If yes, show depth set: _____ Feet

If Alternate II completion, cement circulated from: _____

feet depth to: _____ w/ _____ sx cmt.

Drilling Fluid Management Plan

(Data must be collected from the Reserve Pit)

Chloride content: _____ ppm Fluid volume: _____ bbls

Dewatering method used: _____

Location of fluid disposal if hauled offsite: _____

Operator Name: _____

Lease Name: _____ License #: _____

Quarter _____ Sec. _____ Twp. _____ S. R. _____ East West

County: _____ Permit #: _____

AFFIDAVIT

I am the affiant and I hereby certify that all requirements of the statutes, rules and regulations promulgated to regulate the oil and gas industry have been fully complied with and the statements herein are complete and correct to the best of my knowledge.

Submitted Electronically

KCC Office Use ONLY

Confidentiality Requested

Date: _____

Confidential Release Date: _____

Wireline Log Received Drill Stem Tests Received

Geologist Report / Mud Logs Received

UIC Distribution

ALT I II III Approved by: _____ Date: _____

Operator Name: _____ Lease Name: _____ Well #: _____

Sec. _____ Twp. _____ S. R. _____ East West County: _____

INSTRUCTIONS: Show important tops of formations penetrated. Detail all cores. Report all final copies of drill stems tests giving interval tested, time tool open and closed, flowing and shut-in pressures, whether shut-in pressure reached static level, hydrostatic pressures, bottom hole temperature, fluid recovery, and flow rates if gas to surface test, along with final chart(s). Attach extra sheet if more space is needed.

Final Radioactivity Log, Final Logs run to obtain Geophysical Data and Final Electric Logs must be emailed to kcc-well-logs@kcc.ks.gov. Digital electronic log files must be submitted in LAS version 2.0 or newer AND an image file (TIFF or PDF).

Drill Stem Tests Taken <input type="checkbox"/> Yes <input type="checkbox"/> No <i>(Attach Additional Sheets)</i> Samples Sent to Geological Survey <input type="checkbox"/> Yes <input type="checkbox"/> No Cores Taken <input type="checkbox"/> Yes <input type="checkbox"/> No Electric Log Run <input type="checkbox"/> Yes <input type="checkbox"/> No Geologist Report / Mud Logs <input type="checkbox"/> Yes <input type="checkbox"/> No List All E. Logs Run:	<input type="checkbox"/> Log Formation (Top), Depth and Datum <input type="checkbox"/> Sample Name Top Datum
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CASING RECORD <input type="checkbox"/> New <input type="checkbox"/> Used							
Report all strings set-conductor, surface, intermediate, production, etc.							
Purpose of String	Size Hole Drilled	Size Casing Set (In O.D.)	Weight Lbs. / Ft.	Setting Depth	Type of Cement	# Sacks Used	Type and Percent Additives

ADDITIONAL CEMENTING / SQUEEZE RECORD				
Purpose:	Depth Top Bottom	Type of Cement	# Sacks Used	Type and Percent Additives
<input type="checkbox"/> Perforate <input type="checkbox"/> Protect Casing <input type="checkbox"/> Plug Back TD <input type="checkbox"/> Plug Off Zone				

1. Did you perform a hydraulic fracturing treatment on this well? Yes No *(If No, skip questions 2 and 3)*
2. Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? Yes No *(If No, skip question 3)*
3. Was the hydraulic fracturing treatment information submitted to the chemical disclosure registry? Yes No *(If No, fill out Page Three of the ACO-1)*

Date of first Production/Injection or Resumed Production/Injection:	Producing Method: <input type="checkbox"/> Flowing <input type="checkbox"/> Pumping <input type="checkbox"/> Gas Lift <input type="checkbox"/> Other <i>(Explain)</i> _____				
Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity

DISPOSITION OF GAS: <input type="checkbox"/> Vented <input type="checkbox"/> Sold <input type="checkbox"/> Used on Lease <i>(If vented, Submit ACO-18.)</i>	METHOD OF COMPLETION: <input type="checkbox"/> Open Hole <input type="checkbox"/> Perf. <input type="checkbox"/> Dually Comp. <input type="checkbox"/> Commingled <i>(Submit ACO-5)</i> <i>(Submit ACO-4)</i>	PRODUCTION INTERVAL: Top _____ Bottom _____
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Shots Per Foot	Perforation Top	Perforation Bottom	Bridge Plug Type	Bridge Plug Set At	Acid, Fracture, Shot, Cementing Squeeze Record <i>(Amount and Kind of Material Used)</i>

TUBING RECORD:	Size:	Set At:	Packer At:	
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DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.19 @ 04:17:00

End Date: 2018.02.19 @ 12:47:30

Job Ticket #: 64398 DST #: 1

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

Printed: 2018.03.01 @ 11:00:10



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 64398 **DST#: 1**
 Test Start: 2018.02.19 @ 04:17:00

GENERAL INFORMATION:

Formation: **Oread**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 06:56:45
 Time Test Ended: 12:47:30
 Interval: **3876.00 ft (KB) To 3912.00 ft (KB) (TVD)**
 Total Depth: 3912.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

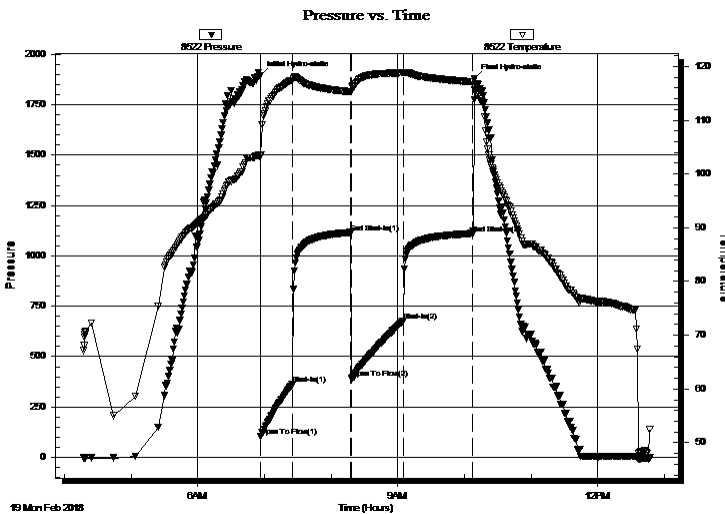
Serial #: 8522

Inside

Press@RunDepth: 676.63 psig @ 3877.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.19 End Date: 2018.02.19 Last Calib.: 2018.02.19
 Start Time: 04:17:05 End Time: 12:47:29 Time On Btm: 2018.02.19 @ 06:56:15
 Time Off Btm: 2018.02.19 @ 10:09:00

TEST COMMENT: IF: 81" blow .
 IS: Receded to 80"
 FF: 108" blow .
 FS: Built to 109"

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1893.28	103.26	Initial Hydro-static
1	106.06	103.56	Open To Flow (1)
29	360.90	117.40	Shut-In(1)
82	1116.02	115.26	End Shut-In(1)
82	391.82	115.39	Open To Flow (2)
129	676.63	118.81	Shut-In(2)
192	1110.88	117.14	End Shut-In(2)
193	1880.24	115.71	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
1120.00	smcw 3m 97w (oil spots)	14.62
300.00	omcw 15o 20m 65w	4.21
100.00	w co 15w 85o (very thick heavy)	1.40

Gas Rates

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



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

30-16s-31w Scott,KS

Grothusen Unit #1

Job Ticket: 64398

DST#: 1

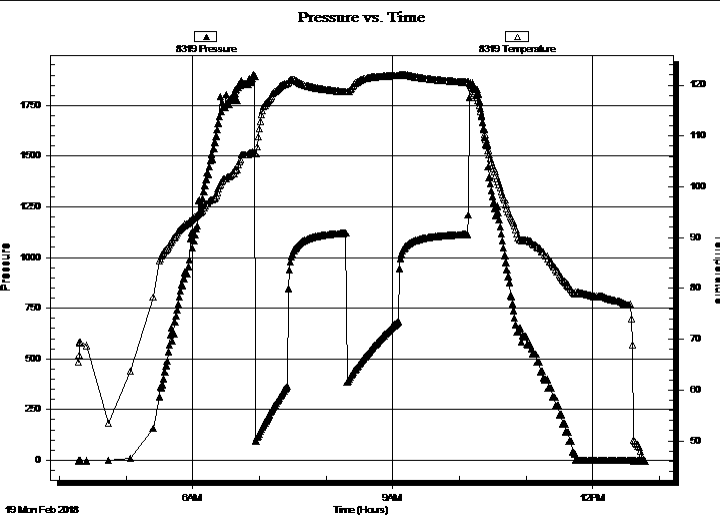
Test Start: 2018.02.19 @ 04:17:00

GENERAL INFORMATION:

Formation: **Oread**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 06:56:45
 Time Test Ended: 12:47:30
 Test Type: Conventional Bottom Hole (Initial)
 Tester: Bradley Walter
 Unit No: 78
 Interval: **3876.00 ft (KB) To 3912.00 ft (KB) (TVD)**
 Total Depth: 3912.00 ft (KB) (TVD)
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Good
 KB to GR/CF: 8.00 ft

Serial #: 8319 Outside
 Press@RunDepth: psig @ 3877.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.19 End Date: 2018.02.19 Last Calib.: 2018.02.19
 Start Time: 04:17:05 End Time: 12:47:29 Time On Btm:
 Time Off Btm:

TEST COMMENT: IF: 81" blow .
 IS: Receded to 80"
 FF: 108" blow .
 FS: Built to 109"



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

Recovery		
Length (ft)	Description	Volume (bbl)
1120.00	smcw 3m 97w (oil spots)	14.62
300.00	omcw 15o 20m 65w	4.21
100.00	w co 15w 85o (very thick heavy)	1.40

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64398

DST#: 1

ATTN: John Goldsmith

Test Start: 2018.02.19 @ 04:17:00

Tool Information

Drill Pipe:	Length: 3734.00 ft	Diameter: 3.80 inches	Volume: 52.38 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 75000.00 lb
			<u>Total Volume: 52.97 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	5.00 ft			String Weight: Initial 50000.00 lb
Depth to Top Packer:	3876.00 ft			Final 55000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	36.00 ft			
Tool Length:	63.00 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			3850.00	
Shut In Tool	5.00			3855.00	
Hydraulic tool	5.00			3860.00	
Jars	5.00			3865.00	
Safety Joint	2.00			3867.00	
Packer	5.00			3872.00	27.00 Bottom Of Top Packer
Packer	4.00			3876.00	
Stubb	1.00			3877.00	
Recorder	0.00	8522	Inside	3877.00	
Recorder	0.00	8319	Outside	3877.00	
Perforations	32.00			3909.00	
Bullnose	3.00			3912.00	36.00 Bottom Packers & Anchor

Total Tool Length: 63.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64398

DST#: 1

ATTN: John Goldsmith

Test Start: 2018.02.19 @ 04:17:00

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:

26000 ppm

Viscosity: 66.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.37 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
1120.00	smcw 3m 97w (oil spots)	14.618
300.00	omcw 15o 20m 65w	4.208
100.00	w co 15w 85o (very thick heavy)	1.403

Total Length: 1520.00 ft Total Volume: 20.229 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

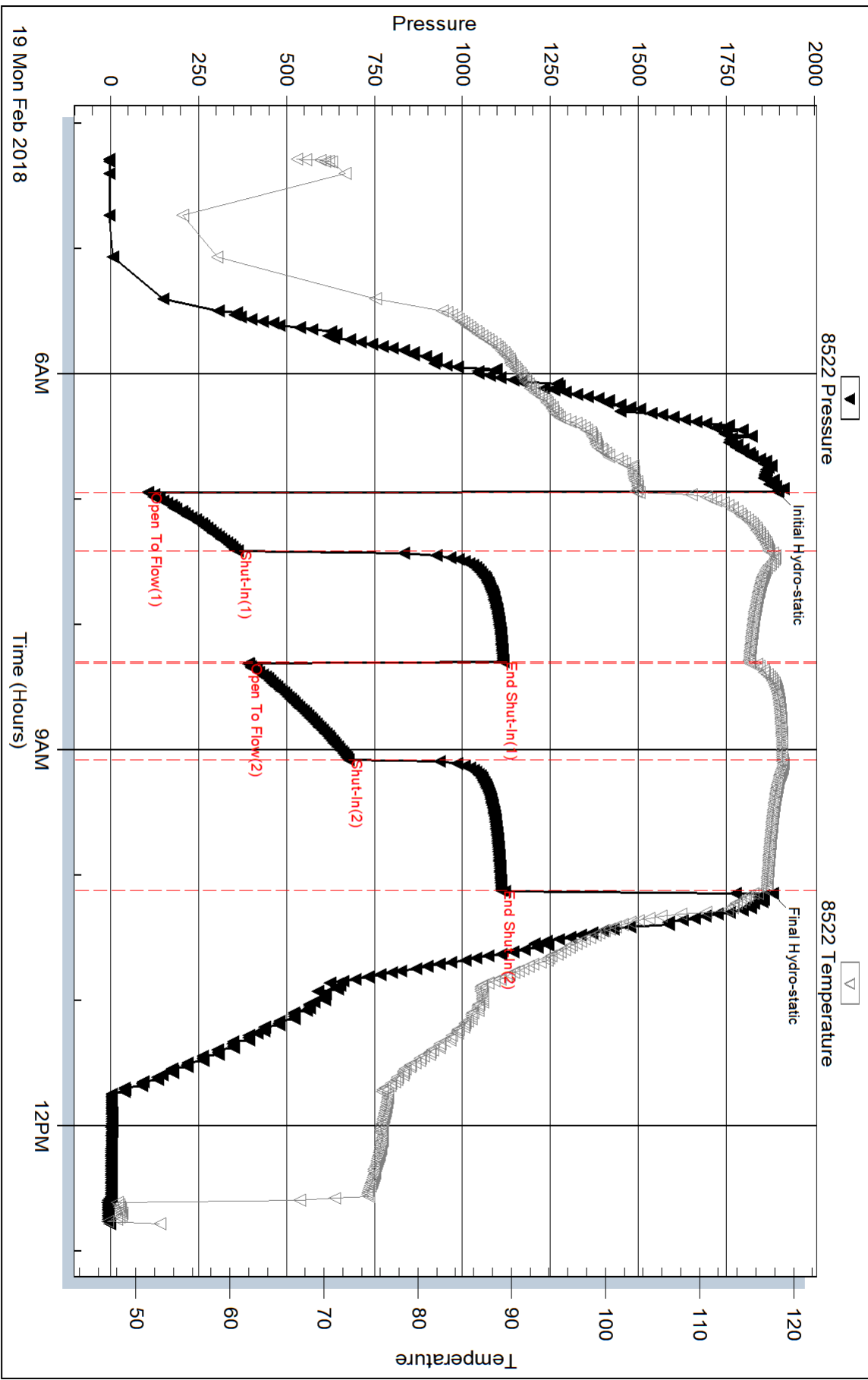
Serial #:

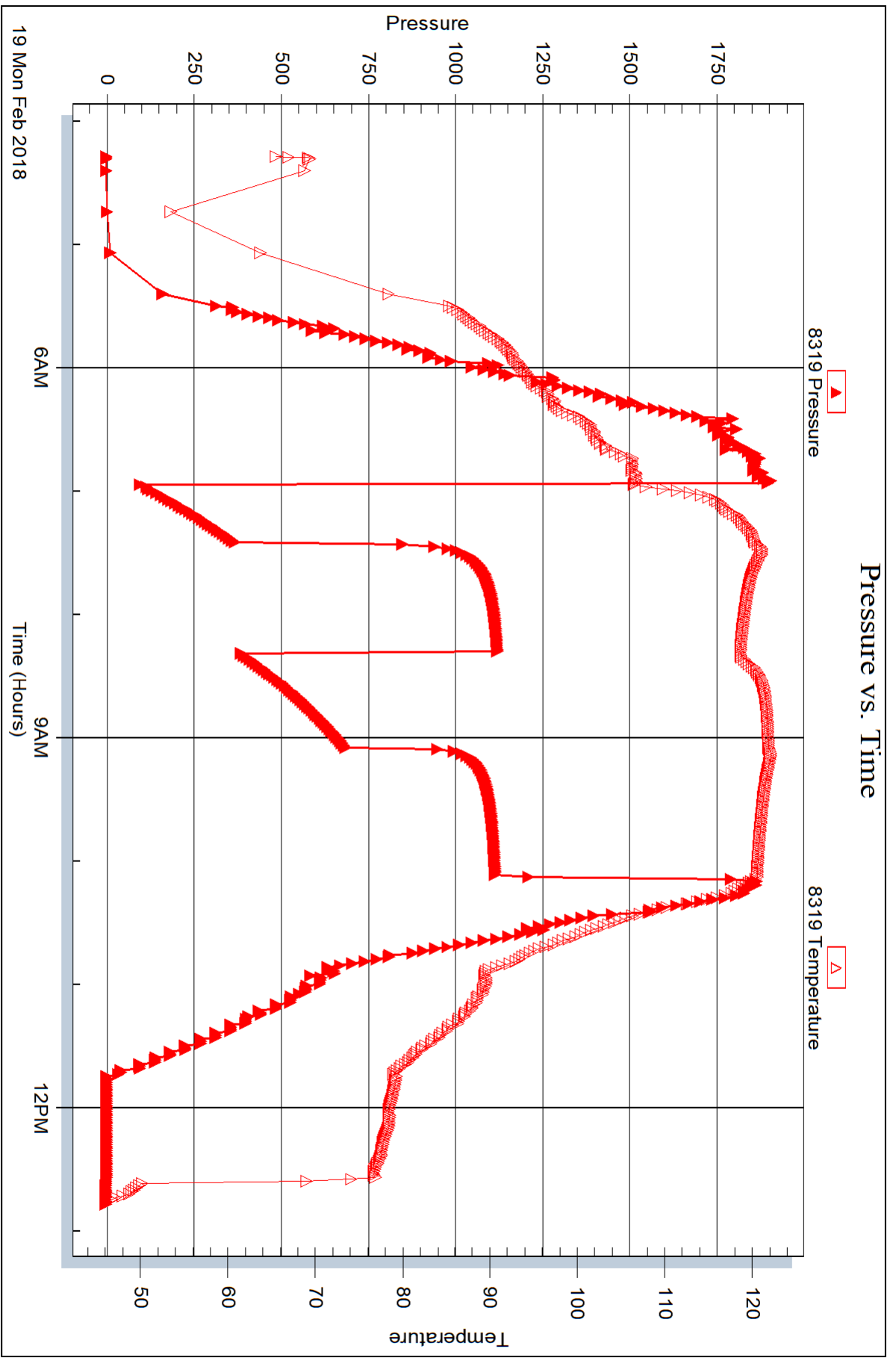
Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .448 @ 41F = 26,000ppm

Pressure vs. Time







DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.20 @ 03:02:00

End Date: 2018.02.20 @ 11:00:30

Job Ticket #: 64399 DST #: 2

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

Printed: 2018.03.01 @ 10:59:44



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS

Grothusen Unit #1

Job Ticket: 64399

DST#: 2

Test Start: 2018.02.20 @ 03:02:00

GENERAL INFORMATION:

Formation: **LKC C**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 05:50:00
 Time Test Ended: 11:00:30
 Interval: **3996.00 ft (KB) To 4018.00 ft (KB) (TVD)**
 Total Depth: 4018.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

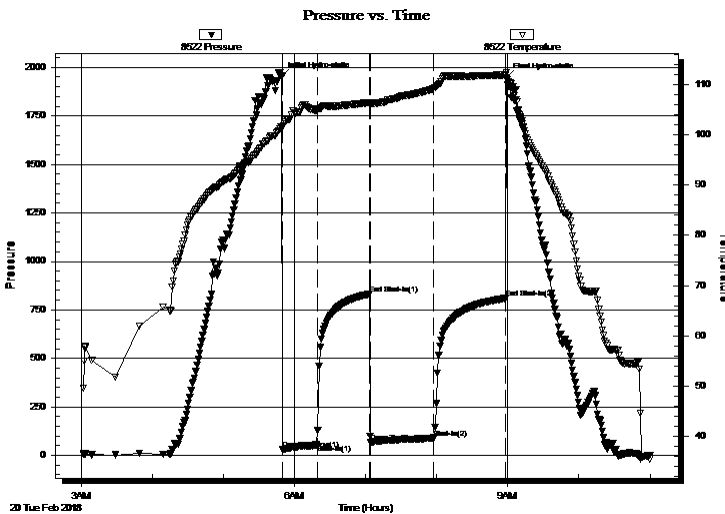
Serial #: 8522

Inside

Press@RunDepth: 90.13 psig @ 3997.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.20 End Date: 2018.02.20 Last Calib.: 2018.02.20
 Start Time: 03:02:05 End Time: 11:00:29 Time On Btm: 2018.02.20 @ 05:49:15
 Time Off Btm: 2018.02.20 @ 08:58:45

TEST COMMENT: IF 4.6" blow .
 ISl: Receded to 4" blow .
 FF: 4.5" blow .
 FSl: Receded to 3.4".

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1954.19	101.64	Initial Hydro-static
1	30.37	101.53	Open To Flow (1)
30	54.88	104.87	Shut-In(1)
75	831.43	106.40	End Shut-In(1)
75	68.14	106.11	Open To Flow (2)
129	90.13	109.12	Shut-In(2)
189	808.91	111.86	End Shut-In(2)
190	1944.81	112.39	Final Hydro-static

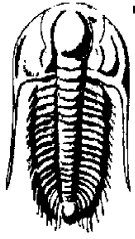
Recovery

Length (ft)	Description	Volume (bbl)
130.00	sow cm 3o 22w 75m	0.73
10.00	oil 100o	0.14

* Recovery from multiple tests

Gas Rates

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



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

30-16s-31w Scott,KS

Grohusen Unit #1

Job Ticket: 64399 **DST#: 2**

Test Start: 2018.02.20 @ 03:02:00

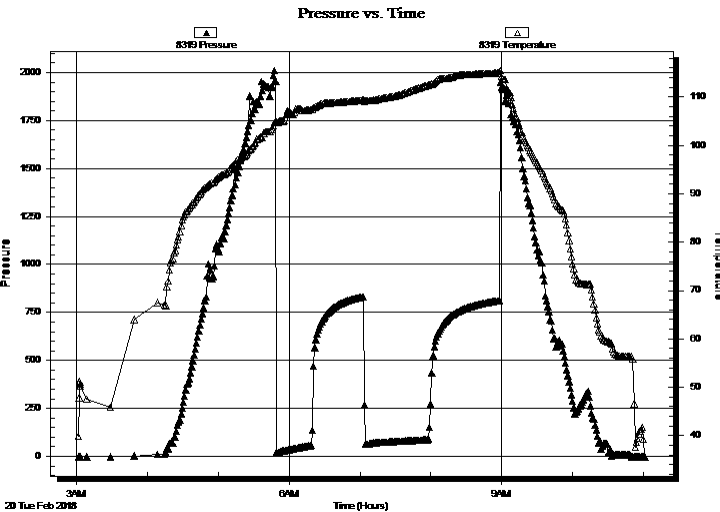
GENERAL INFORMATION:

Formation: **LKC C**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 05:50:00 Tester: Bradley Walter
 Time Test Ended: 11:00:30 Unit No: 78

Interval: **3996.00 ft (KB) To 4018.00 ft (KB) (TVD)** Reference Elevations: 2961.00 ft (KB)
 Total Depth: 4018.00 ft (KB) (TVD) 2953.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 8.00 ft

Serial #: 8319 Outside
 Press@RunDepth: psig @ 3997.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.20 End Date: 2018.02.20 Last Calib.: 2018.02.20
 Start Time: 03:02:05 End Time: 11:01:29 Time On Btm:
 Time Off Btm:

TEST COMMENT: IF 4.6" blow .
 ISI: Receded to 4" blow .
 FF: 4.5" blow .
 FSI: Receded to 3.4".



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
130.00	sow cm 3o 22w 75m	0.73
10.00	oil 100o	0.14

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64399

DST#: 2

ATTN: John Goldsmith

Test Start: 2018.02.20 @ 03:02:00

Tool Information

Drill Pipe:	Length: 3860.00 ft	Diameter: 3.80 inches	Volume: 54.15 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 60000.00 lb
			<u>Total Volume: 54.74 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	11.00 ft			String Weight: Initial 50000.00 lb
Depth to Top Packer:	3996.00 ft			Final 50000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	22.00 ft			
Tool Length:	49.00 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			3970.00	
Shut In Tool	5.00			3975.00	
Hydraulic tool	5.00			3980.00	
Jars	5.00			3985.00	
Safety Joint	2.00			3987.00	
Packer	5.00			3992.00	27.00 Bottom Of Top Packer
Packer	4.00			3996.00	
Stubb	1.00			3997.00	
Recorder	0.00	8522	Inside	3997.00	
Recorder	0.00	8319	Outside	3997.00	
Perforations	18.00			4015.00	
Bullnose	3.00			4018.00	22.00 Bottom Packers & Anchor

Total Tool Length: 49.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64399

DST#: 2

ATTN: John Goldsmith

Test Start: 2018.02.20 @ 03:02:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

29 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 56.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.38 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
130.00	sow cm 3o 22w 75m	0.730
10.00	oil 100o	0.140

Total Length: 140.00 ft Total Volume: 0.870 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

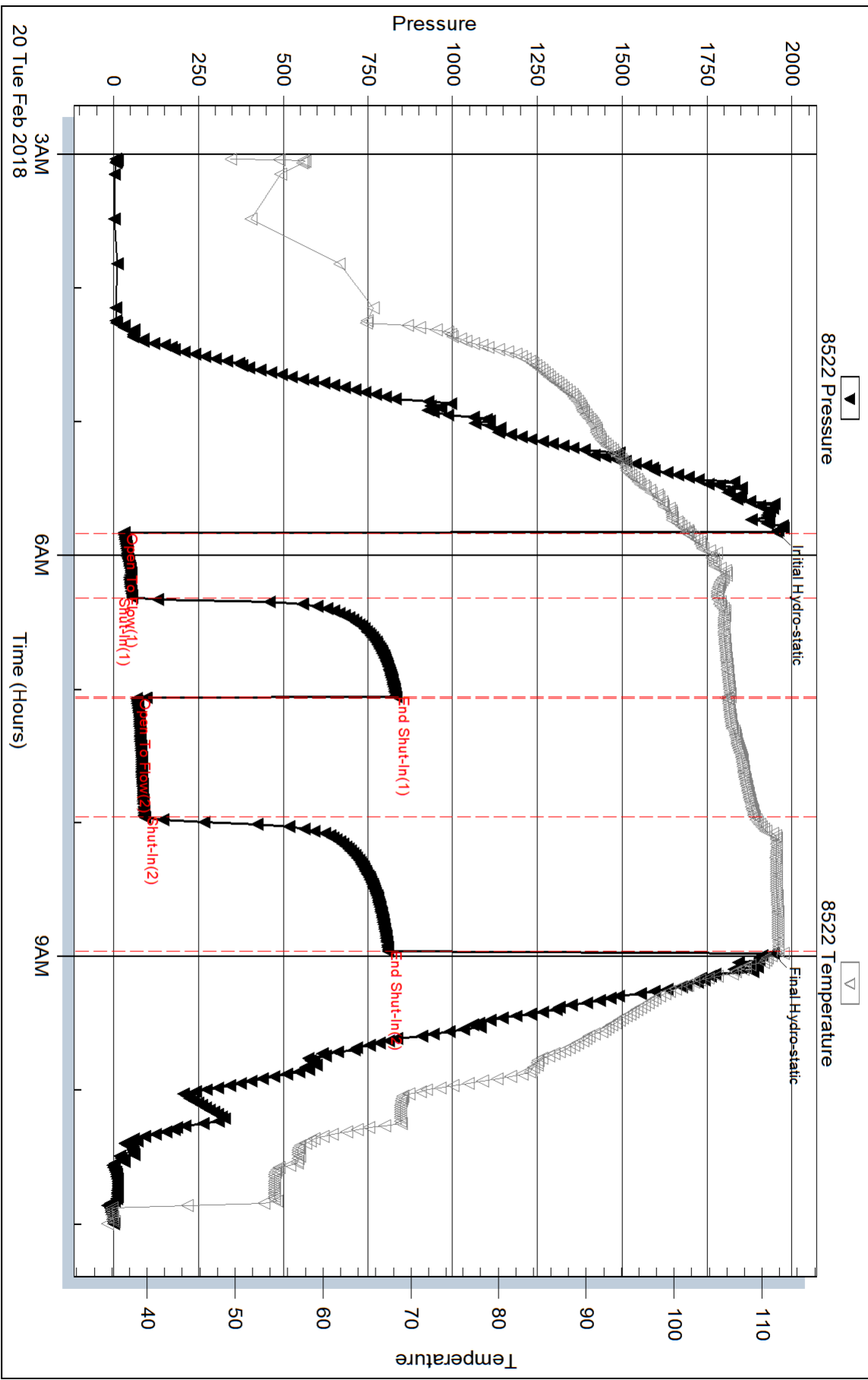
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

Pressure vs. Time

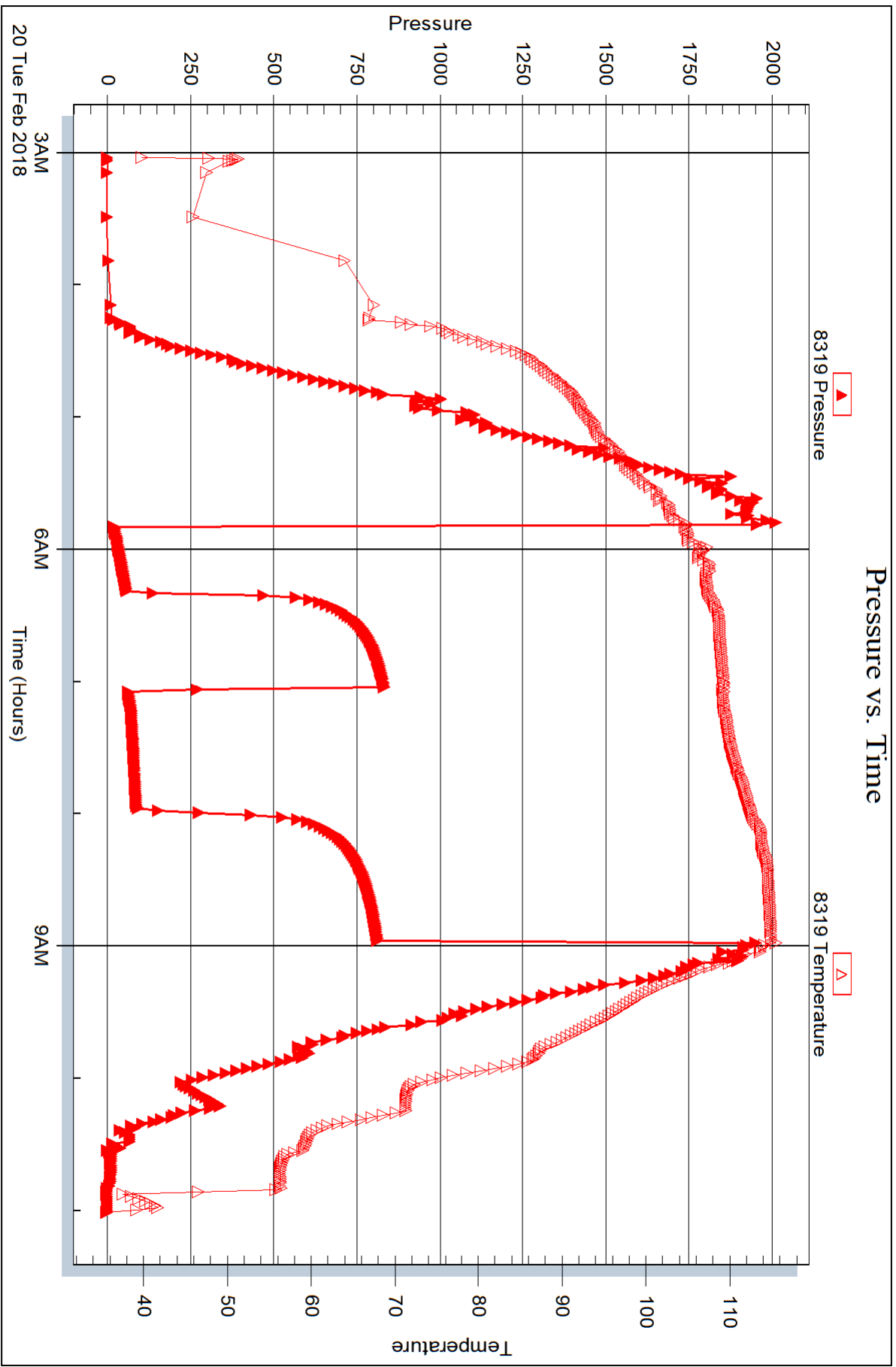


Serial #: 8319

Outside Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 2





DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.21 @ 01:52:00

End Date: 2018.02.21 @ 08:59:45

Job Ticket #: 64400 DST #: 3

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

Printed: 2018.03.01 @ 10:58:58

Ritchie Exploration, Inc
30-16s-31w Scott,KS
Grothusen Unit #1
DST # 3
LKC E - F
2018.02.21



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

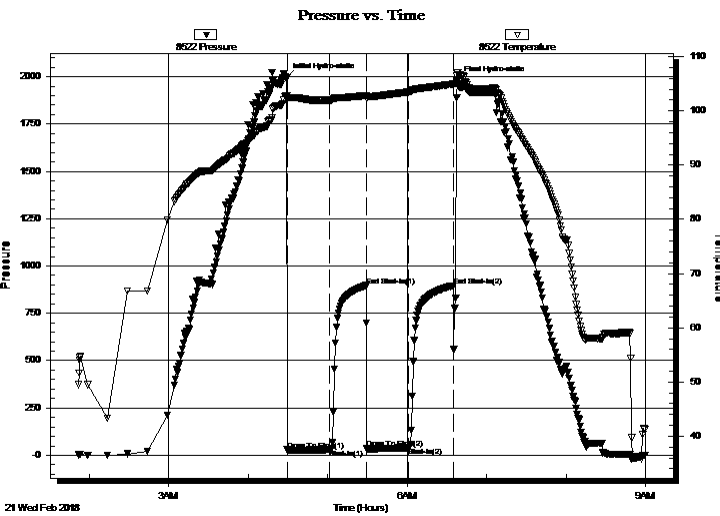
30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 64400 **DST#: 3**
 Test Start: 2018.02.21 @ 01:52:00

GENERAL INFORMATION:

Formation: **LKC E - F**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 04:29:30
 Time Test Ended: 08:59:45
 Interval: **4056.00 ft (KB) To 4082.00 ft (KB) (TVD)**
 Total Depth: 4082.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

Serial #: 8522 Inside
 Press@RunDepth: 39.89 psig @ 4057.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.21 End Date: 2018.02.21 Last Calib.: 2018.02.21
 Start Time: 01:52:05 End Time: 08:59:44 Time On Btm: 2018.02.21 @ 04:29:15
 Time Off Btm: 2018.02.21 @ 06:37:45

TEST COMMENT: IF: 1.4" blow .
 IS: Receded to 0.9".
 FF: Built to .6".
 FS: Receded to .2".



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	1992.40	102.78	Initial Hydro-static
1	28.77	102.15	Open To Flow (1)
33	30.02	102.00	Shut-In(1)
60	896.77	102.83	End Shut-In(1)
61	36.37	102.47	Open To Flow (2)
92	39.89	103.50	Shut-In(2)
126	895.88	104.93	End Shut-In(2)
129	1976.84	107.09	Final Hydro-static

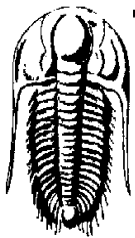
Recovery

Length (ft)	Description	Volume (bbl)
30.00	w cm 20w 80m (oil spots)	0.15

* Recovery from multiple tests

Gas Rates

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



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grohusen Unit #1

Job Ticket: 64400 **DST#: 3**

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 01:52:00

GENERAL INFORMATION:

Formation: **LKC E - F**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 04:29:30

Time Test Ended: 08:59:45

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4056.00 ft (KB) To 4082.00 ft (KB) (TVD)

Reference Elevations: 2961.00 ft (KB)

Total Depth: 4082.00 ft (KB) (TVD)

2953.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

Serial #: 8319

Outside

Press@RunDepth: psig @ 4057.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.02.21

End Date:

2018.02.21

Last Calib.:

2018.02.21

Start Time: 01:52:05

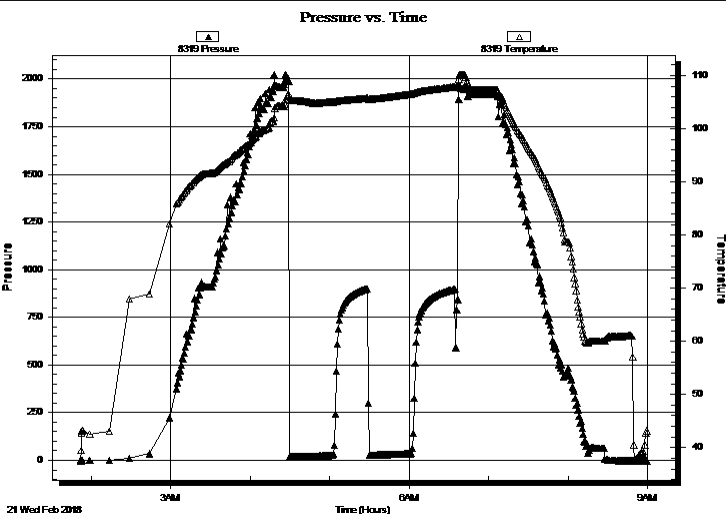
End Time:

08:59:44

Time On Btm:

Time Off Btm:

TEST COMMENT: IF: 1.4" blow .
IS: Receded to 0.9".
FF: Built to .6".
FS: Receded to .2".



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
30.00	w cm 20w 80m (oil spots)	0.15

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64400

DST#: 3

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 01:52:00

Tool Information

Drill Pipe:	Length: 3920.00 ft	Diameter: 3.80 inches	Volume: 54.99 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 60000.00 lb
			<u>Total Volume: 55.58 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	11.00 ft			String Weight: Initial 50000.00 lb
Depth to Top Packer:	4056.00 ft			Final 50000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	26.00 ft			
Tool Length:	53.00 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			4030.00	
Shut In Tool	5.00			4035.00	
Hydraulic tool	5.00			4040.00	
Jars	5.00			4045.00	
Safety Joint	2.00			4047.00	
Packer	5.00			4052.00	27.00 Bottom Of Top Packer
Packer	4.00			4056.00	
Stubb	1.00			4057.00	
Recorder	0.00	8522	Inside	4057.00	
Recorder	0.00	8319	Outside	4057.00	
Perforations	22.00			4079.00	
Bullnose	3.00			4082.00	26.00 Bottom Packers & Anchor

Total Tool Length: 53.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 64400

DST#: 3

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 01:52:00

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:

21000 ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.78 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 4000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
30.00	w cm 20w 80m (oil spots)	0.148

Total Length: 30.00 ft Total Volume: 0.148 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

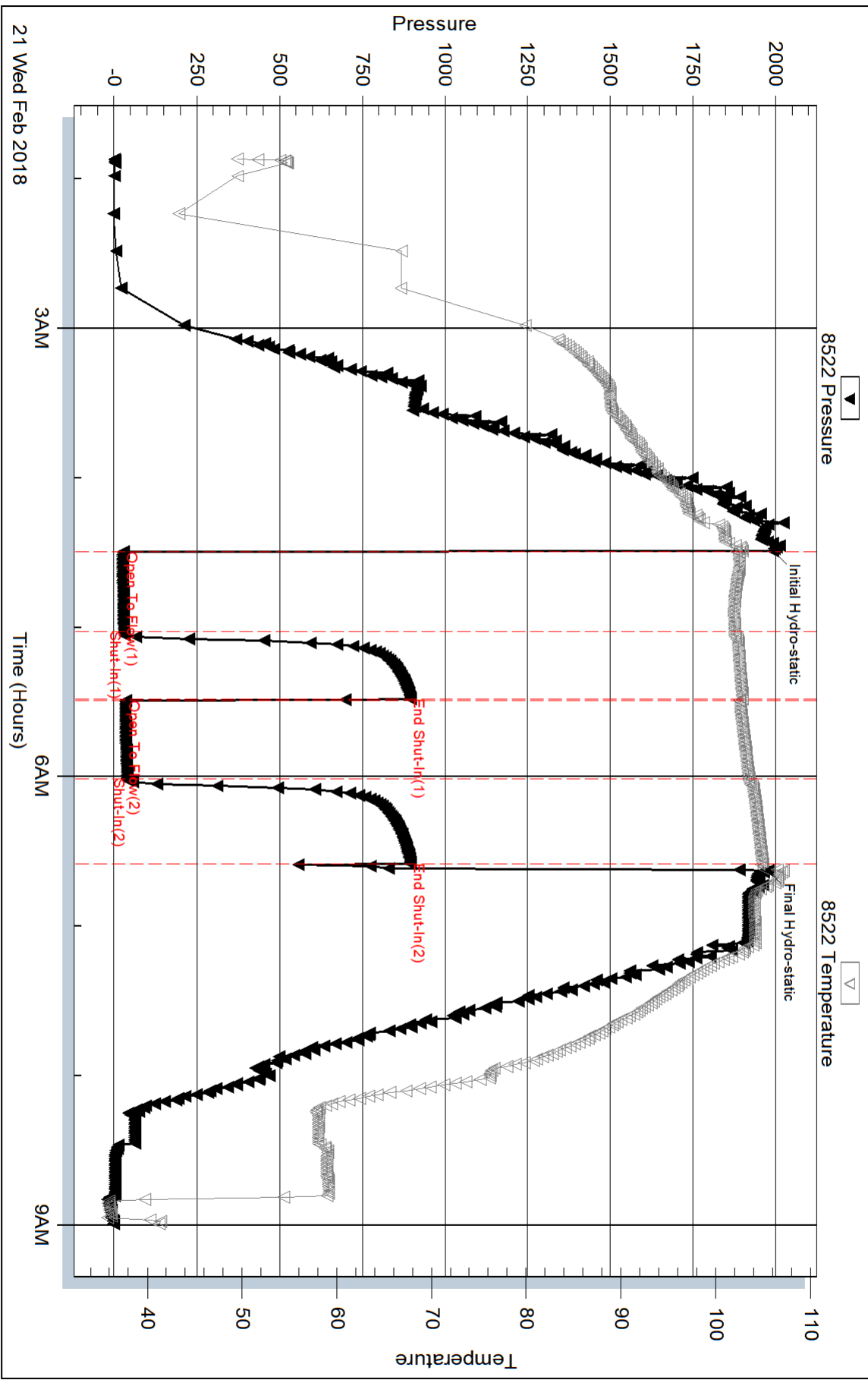
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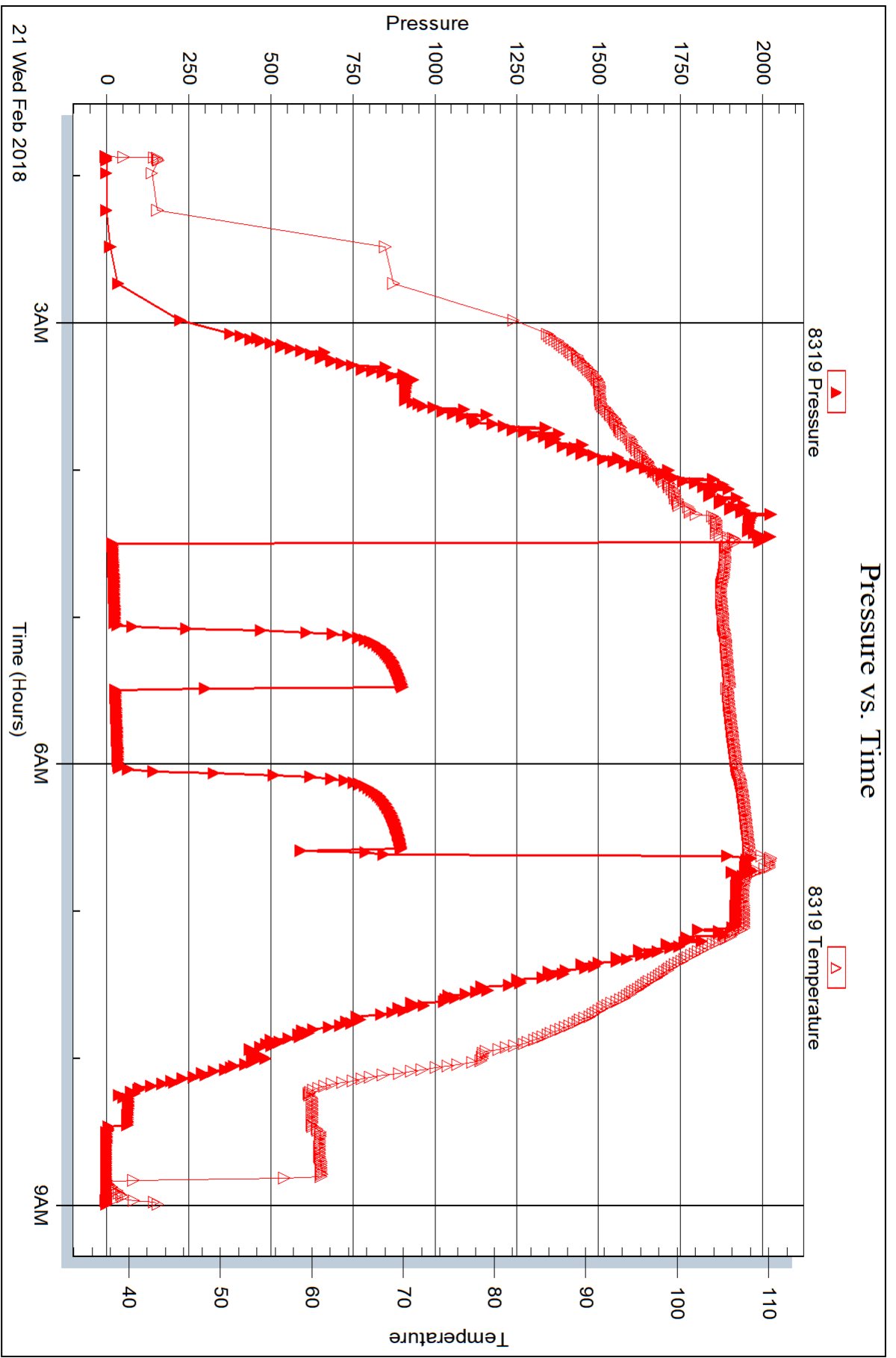
Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .505 @ 44F = 21000ppm

Pressure vs. Time







DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.21 @ 23:47:00

End Date: 2018.02.22 @ 08:26:23

Job Ticket #: 65276 DST #: 4

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

Printed: 2018.03.01 @ 10:58:01



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

ATTN: John Goldsmith

Job Ticket: 65276

DST#: 4

Test Start: 2018.02.21 @ 23:47:00

GENERAL INFORMATION:

Formation: **LKC I**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 02:29:08

Time Test Ended: 08:26:23

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4185.00 ft (KB) To 4212.00 ft (KB) (TVD)

Reference Elevations: 2961.00 ft (KB)

Total Depth: 3912.00 ft (KB) (TVD)

2953.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

Serial #: 8522

Inside

Press@RunDepth: 398.92 psig @ 4186.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.02.21

End Date:

2018.02.22

Last Calib.:

2018.02.22

Start Time: 23:47:05

End Time:

08:26:22

Time On Btm:

2018.02.22 @ 02:28:08

Time Off Btm:

2018.02.22 @ 05:39:38

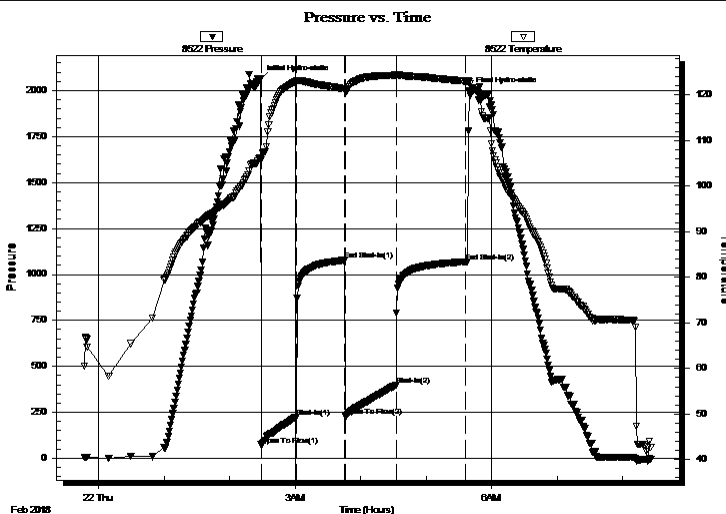
TEST COMMENT: IF: BOB @ 6 min - 38.9" blow .

IS: Built to 39.4"

FF: BOB @ 8 min. - 46.6" blow .

FS: Receded to 46.2".

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2058.91	106.14	Initial Hydro-static
1	70.11	106.25	Open To Flow (1)
33	224.44	122.90	Shut-In(1)
78	1077.00	121.35	End Shut-In(1)
79	227.53	120.90	Open To Flow (2)
125	398.92	124.36	Shut-In(2)
188	1069.45	123.03	End Shut-In(2)
192	1992.90	122.99	Final Hydro-static

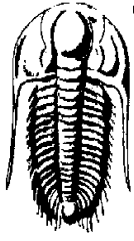
Recovery

Length (ft)	Description	Volume (bbl)
460.00	smcw 3m 97w	5.36
300.00	gomcw 10g 20o 20m 50w	4.21
80.00	oil 100o	1.12
0.00	60' GIP	0.00

Gas Rates

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

* Recovery from multiple tests



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott, KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65276

DST#: 4

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 23:47:00

GENERAL INFORMATION:

Formation: **LKC I**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 02:29:08

Time Test Ended: 08:26:23

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4185.00 ft (KB) To 4212.00 ft (KB) (TVD)

Reference Elevations: 2961.00 ft (KB)

Total Depth: 3912.00 ft (KB) (TVD)

2953.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

Serial #: 8319 Outside

Press@RunDepth: psig @ 4186.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.02.21

End Date:

2018.02.22

Last Calib.:

2018.02.22

Start Time: 23:47:05

End Time:

08:26:45

Time On Btm:

Time Off Btm:

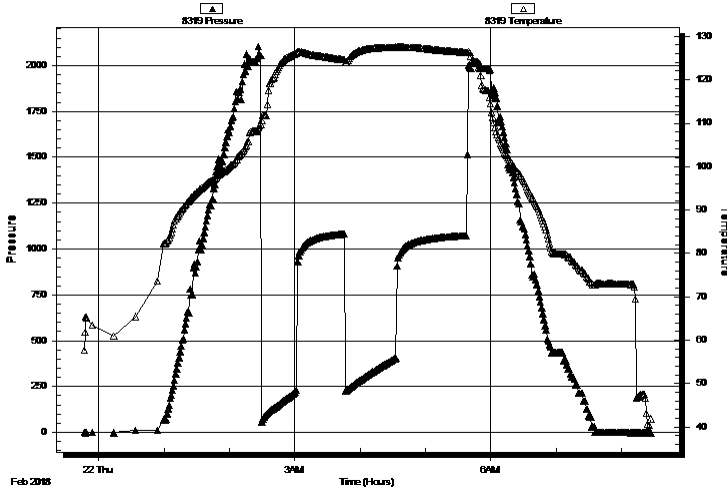
TEST COMMENT: IF: BOB @ 6 min - 38.9" blow .

IS: Built to 39.4"

FF: BOB @ 8 min. - 46.6" blow .

FS: Receded to 46.2".

Pressure vs. Time



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
460.00	smcw 3m 97w	5.36
300.00	gomcw 10g 20o 20m 50w	4.21
80.00	oil 100o	1.12
0.00	60' GIP	0.00

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65276

DST#: 4

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 23:47:00

Tool Information

Drill Pipe:	Length: 4047.00 ft	Diameter: 3.80 inches	Volume: 56.77 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 65000.00 lb
			<u>Total Volume: 57.36 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	9.00 ft			String Weight: Initial 52000.00 lb
Depth to Top Packer:	4185.00 ft			Final 54000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	27.00 ft			
Tool Length:	54.00 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	2.00			4176.00	
Packer	5.00			4181.00	27.00 Bottom Of Top Packer
Packer	4.00			4185.00	
Stubb	1.00			4186.00	
Recorder	0.00	8522	Inside	4186.00	
Recorder	0.00	8319	Outside	4186.00	
Perforations	23.00			4209.00	
Bullnose	3.00			4212.00	27.00 Bottom Packers & Anchor

Total Tool Length: 54.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65276

DST#: 4

ATTN: John Goldsmith

Test Start: 2018.02.21 @ 23:47:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

22 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

36000 ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.18 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 3800.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
460.00	smcw 3m 97w	5.359
300.00	gomcw 10g 20o 20m 50w	4.208
80.00	oil 100o	1.122
0.00	60' GIP	0.000

Total Length: 840.00 ft Total Volume: 10.689 bbl

Num Fluid Samples: 0

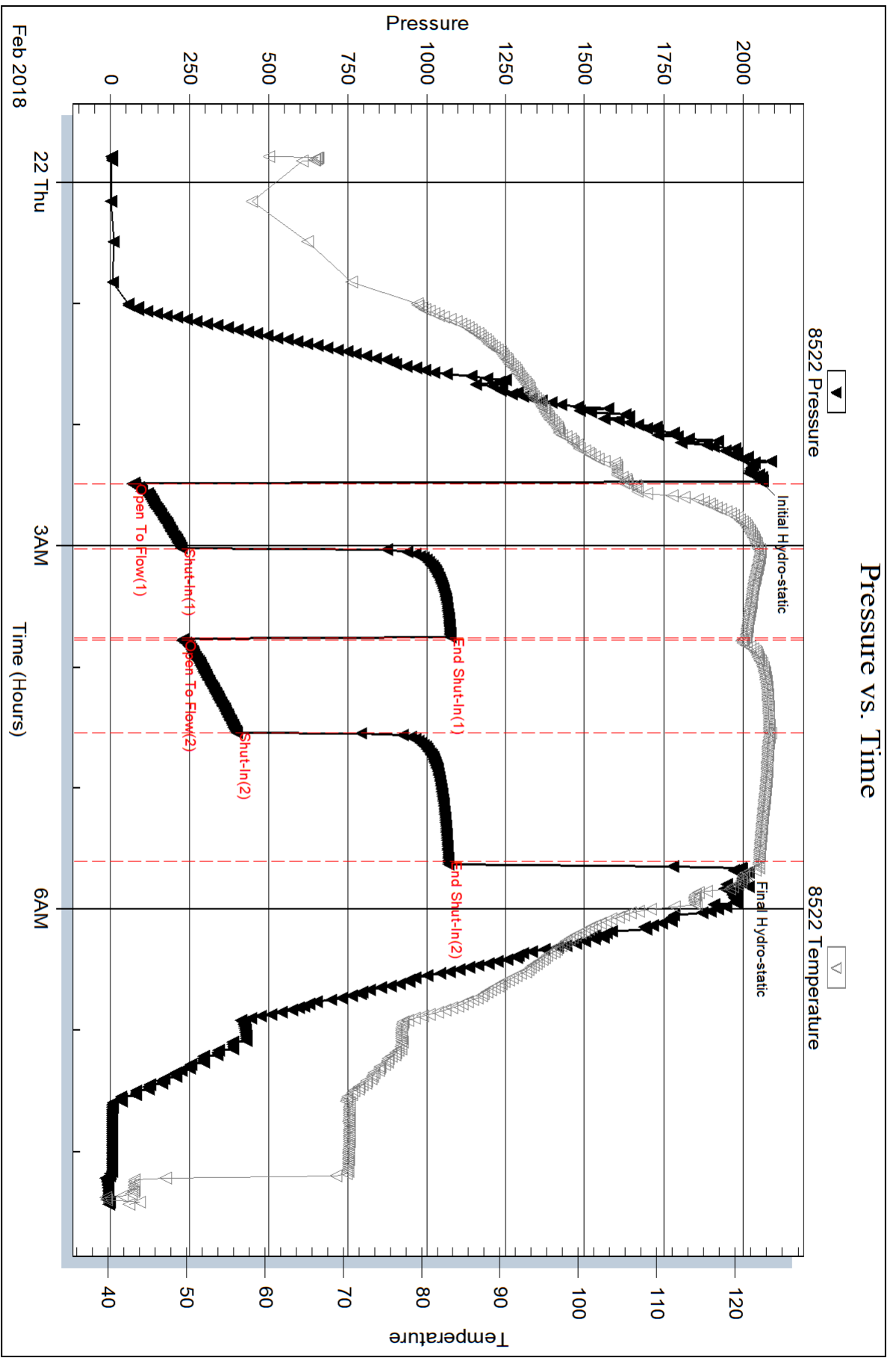
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .354 @ 41F = 36000ppm

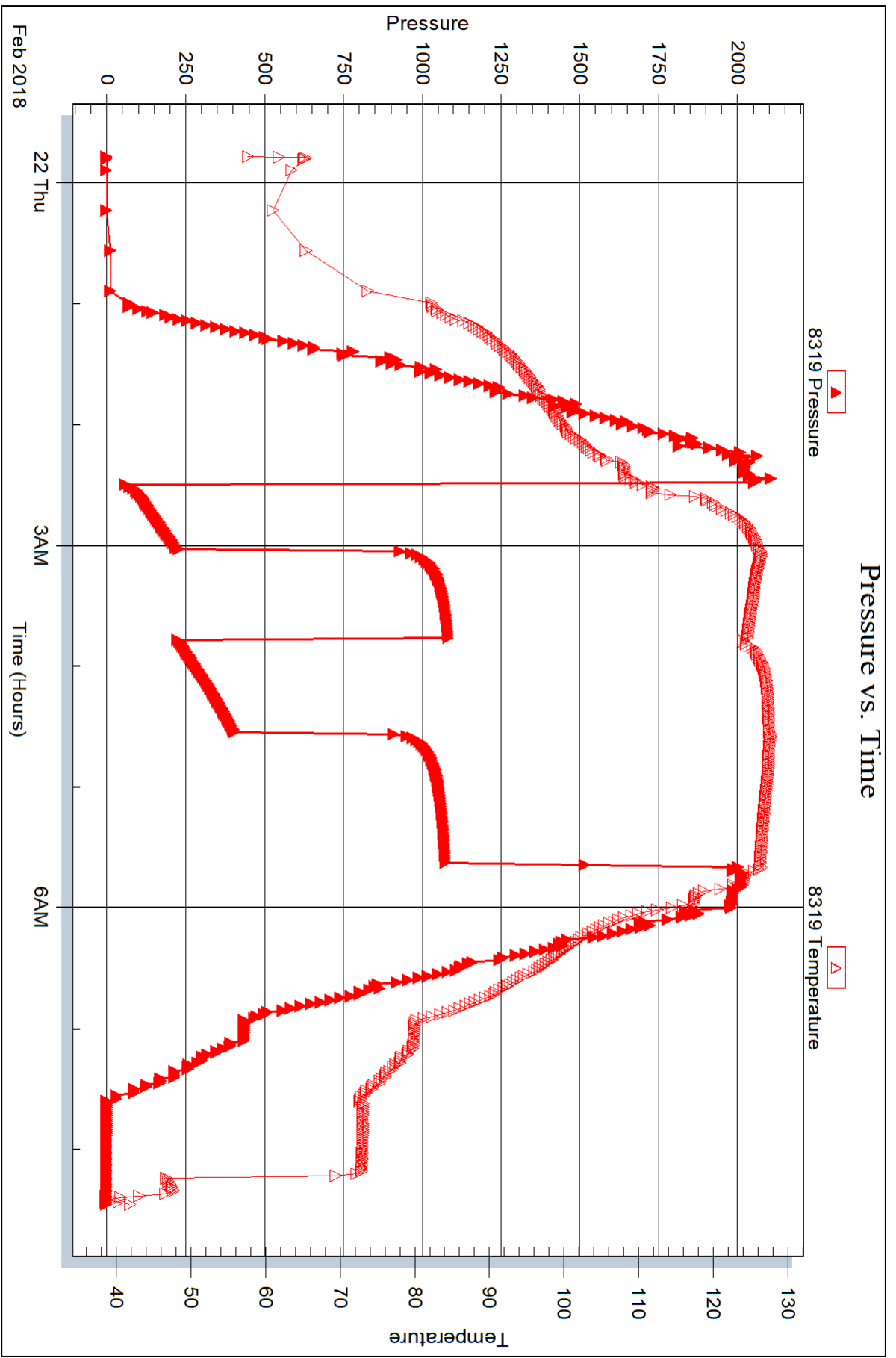


Serial #: 8319

Outside Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 4



Trilobite Testing, Inc

Ref. No: 65276

Printed: 2018.03.01 @ 10:58:02



DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.22 @ 18:25:00

End Date: 2018.02.23 @ 02:14:00

Job Ticket #: 65277 DST #: 5

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

Printed: 2018.03.01 @ 10:56:02



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 65277 **DST#: 5**
 Test Start: 2018.02.22 @ 18:25:00

GENERAL INFORMATION:

Formation: **LKC J**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 20:26:15
 Time Test Ended: 02:14:00
 Interval: **4212.00 ft (KB) To 4234.00 ft (KB) (TVD)**
 Total Depth: 4234.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

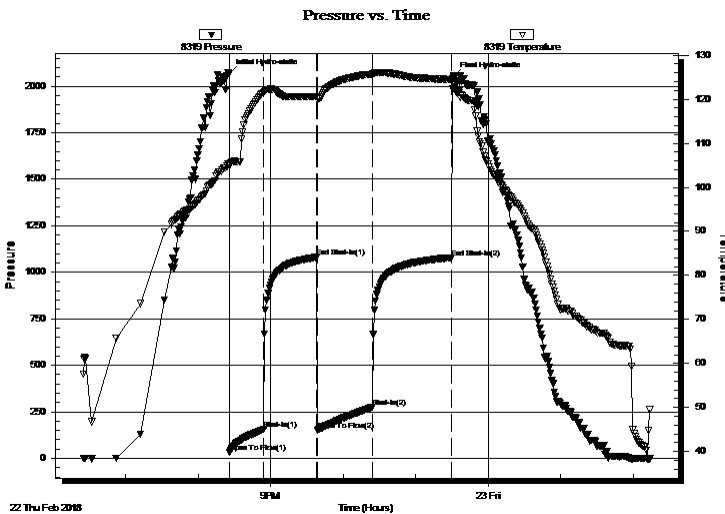
Serial #: 8319

Outside

Press@RunDepth: 275.04 psig @ 4213.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.22 End Date: 2018.02.23 Last Calib.: 2018.02.23
 Start Time: 18:25:05 End Time: 02:13:59 Time On Btm: 2018.02.22 @ 20:26:00
 Time Off Btm: 2018.02.22 @ 23:31:30

TEST COMMENT: IF: BOB @ 10 min built to 20"
 IS: Built to 21" then receded
 FF: BOB @ 12 min. built to 28"
 FS: No return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2068.63	105.43	Initial Hydro-static
1	33.80	105.01	Open To Flow (1)
29	156.16	121.53	Shut-In(1)
72	1079.80	120.53	End Shut-In(1)
73	150.78	120.26	Open To Flow (2)
119	275.04	125.68	Shut-In(2)
184	1078.63	124.47	End Shut-In(2)
186	2053.64	124.13	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
500.00	smcw 3m 97w (oil spots throughout)	5.92
60.00	omcw 10o 20m 70w	0.84
20.00	oil 100o	0.28
0.00	100' 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

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65277

DST#: 5

ATTN: John Goldsmith

Test Start: 2018.02.22 @ 18:25:00

Tool Information

Drill Pipe:	Length: 4078.00 ft	Diameter: 3.80 inches	Volume: 57.20 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 65000.00 lb
			<u>Total Volume: 57.79 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	13.00 ft			String Weight: Initial 52000.00 lb
Depth to Top Packer:	4212.00 ft			Final 54000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	22.00 ft			
Tool Length:	49.00 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			4186.00	
Shut In Tool	5.00			4191.00	
Hydraulic tool	5.00			4196.00	
Jars	5.00			4201.00	
Safety Joint	2.00			4203.00	
Packer	5.00			4208.00	27.00 Bottom Of Top Packer
Packer	4.00			4212.00	
Stubb	1.00			4213.00	
Recorder	0.00	8522	Inside	4213.00	
Recorder	0.00	8319	Outside	4213.00	
Perforations	18.00			4231.00	
Bullnose	3.00			4234.00	22.00 Bottom Packers & Anchor

Total Tool Length: 49.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65277

DST#: 5

ATTN: John Goldsmith

Test Start: 2018.02.22 @ 18:25:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

28 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

42000 ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.39 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 4500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbbl
500.00	smcw 3m 97w (oil spots throughout)	5.921
60.00	omcw 10o 20m 70w	0.842
20.00	oil 100o	0.281
0.00	100' GIP	0.000

Total Length: 580.00 ft Total Volume: 7.044 bbl

Num Fluid Samples: 0

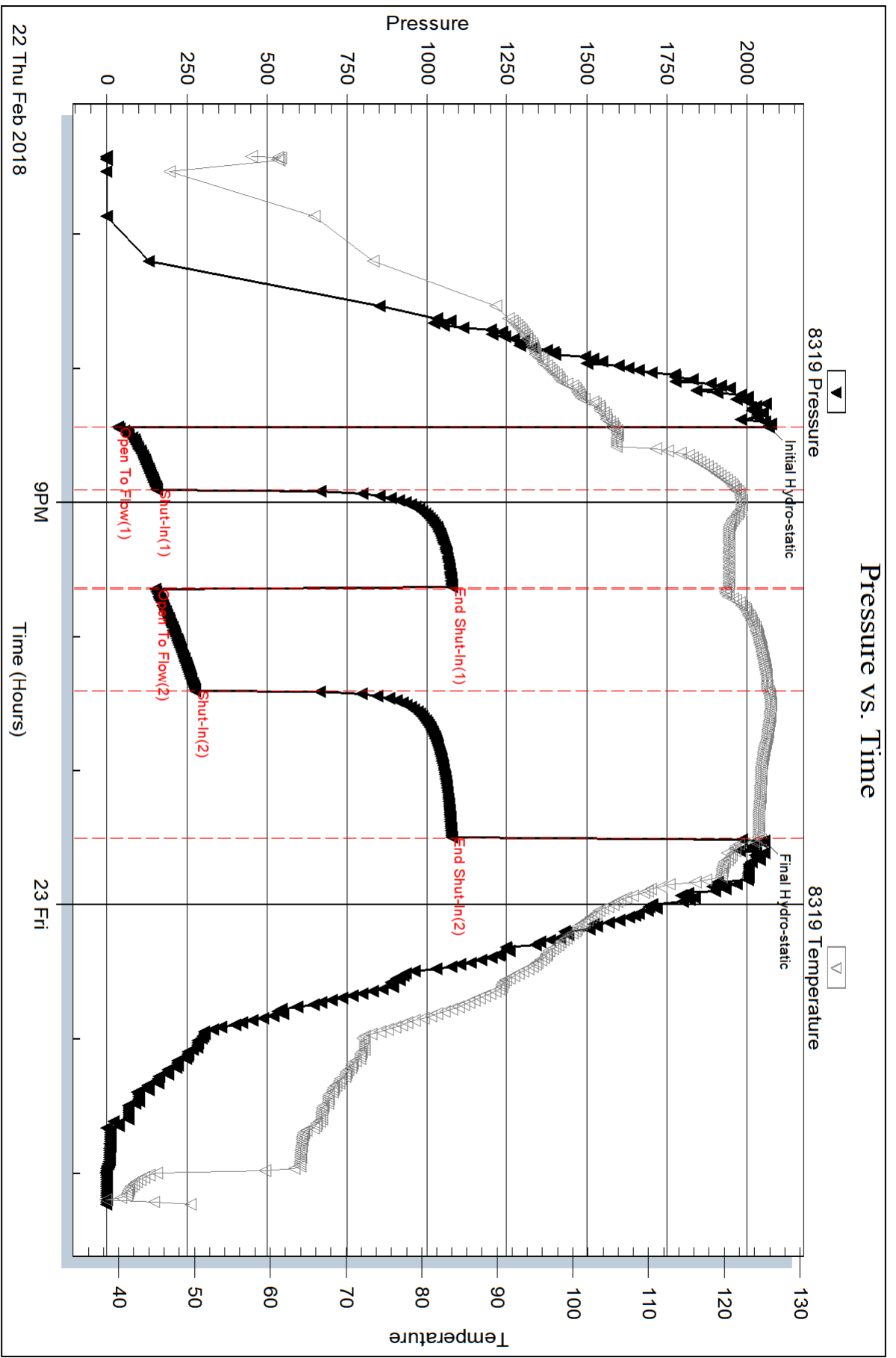
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .253 @ 47F = 42000ppm



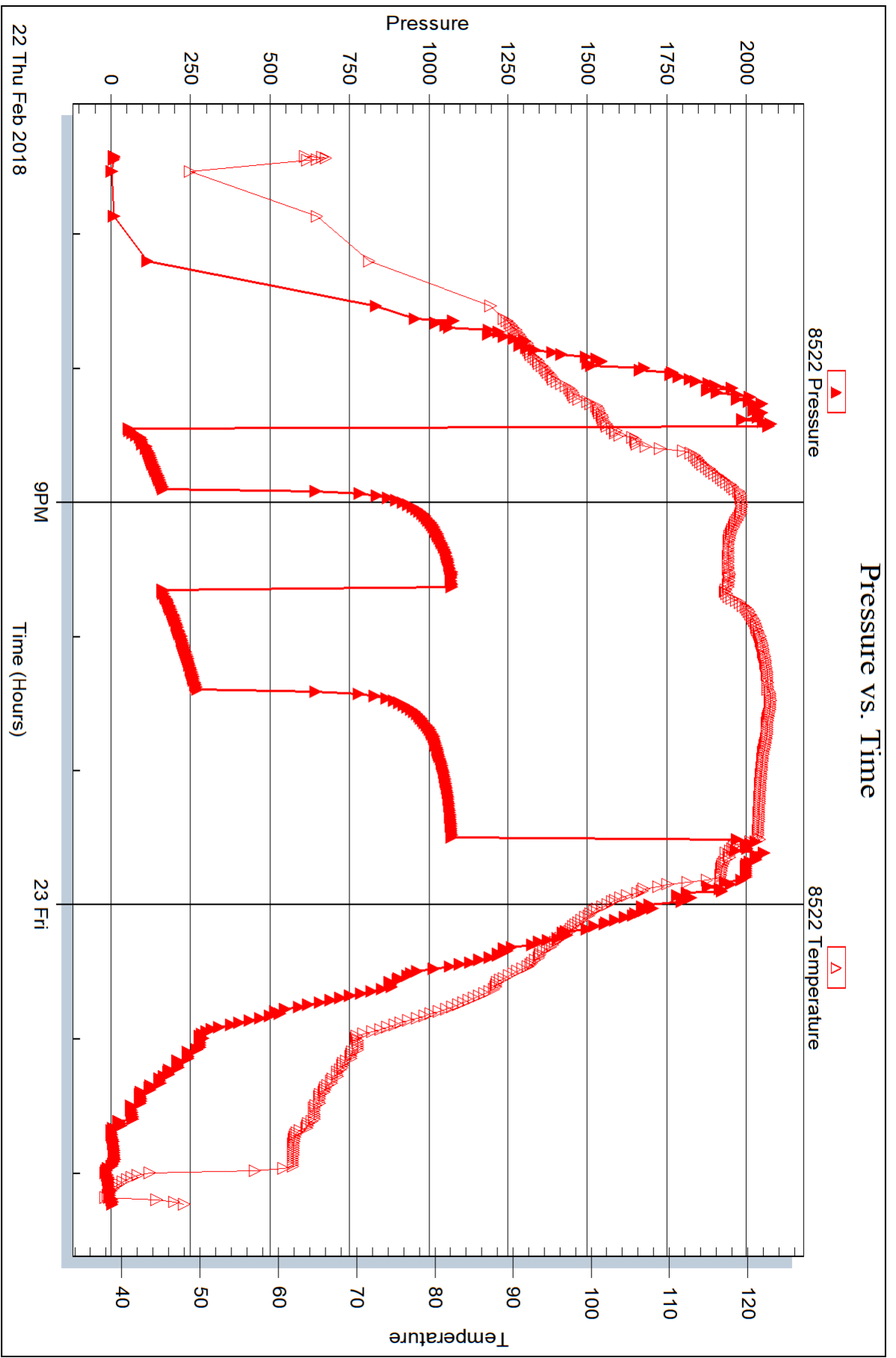
Serial #: 8522

Inside

Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 5



Trilobite Testing, Inc

Ref. No: 65277

Printed: 2018.03.01 @ 10:56:03



DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.23 @ 14:07:00

End Date: 2018.02.23 @ 21:49:15

Job Ticket #: 65278 DST #: 6

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

Printed: 2018.03.01 @ 10:55:30



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 65278 **DST#: 6**
 Test Start: 2018.02.23 @ 14:07:00

GENERAL INFORMATION:

Formation: **LKC K**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 16:09:30
 Time Test Ended: 21:49:15
 Interval: **4236.00 ft (KB) To 4270.00 ft (KB) (TVD)**
 Total Depth: 4270.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

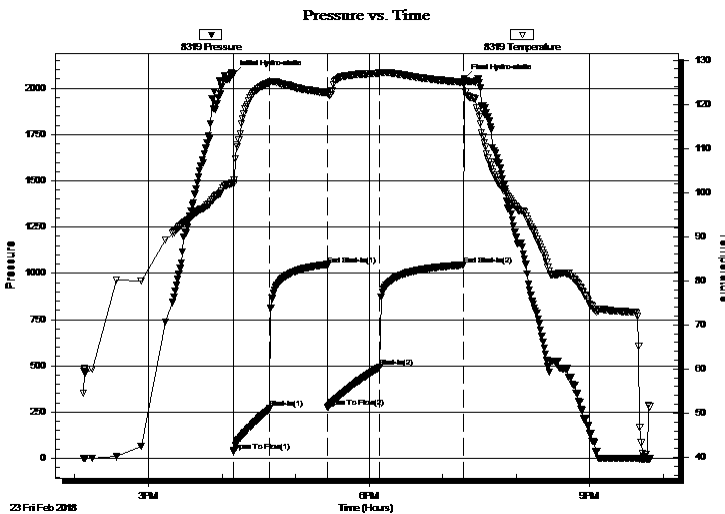
Serial #: 8319

Outside

Press@RunDepth: 492.16 psig @ 4237.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.23 End Date: 2018.02.23 Last Calib.: 2018.02.23
 Start Time: 14:07:05 End Time: 21:49:14 Time On Btm: 2018.02.23 @ 16:09:15
 Time Off Btm: 2018.02.23 @ 19:17:30

TEST COMMENT: IF: BOB @ 6 min. - built to 49.3".
 IS: no return.
 FF: BOB @ 6 min. built to 69"
 FS: no return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2075.78	102.25	Initial Hydro-static
1	37.39	101.91	Open To Flow (1)
30	268.72	124.91	Shut-In(1)
77	1047.78	122.64	End Shut-In(1)
77	276.84	122.38	Open To Flow (2)
120	492.16	127.03	Shut-In(2)
188	1045.09	125.00	End Shut-In(2)
189	2051.64	125.06	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
1050.00	smcw 3m 97w (oil spots)	13.64

* Recovery from multiple tests

Gas Rates

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



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott, KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

ATTN: John Goldsmith

Job Ticket: 65278

DST#: 6

Test Start: 2018.02.23 @ 14:07:00

GENERAL INFORMATION:

Formation: **LKC K**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 16:09:30

Time Test Ended: 21:49:15

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: **4236.00 ft (KB) To 4270.00 ft (KB) (TVD)**

Total Depth: 4270.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 2961.00 ft (KB)

2953.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 8522 Inside

Press@RunDepth: psig @ 4237.00 ft (KB)

Start Date: 2018.02.23

End Date:

2018.02.23

Start Time: 14:07:05

End Time:

21:49:14

Capacity: 8000.00 psig

Last Calib.: 1899.12.30

Time On Btm:

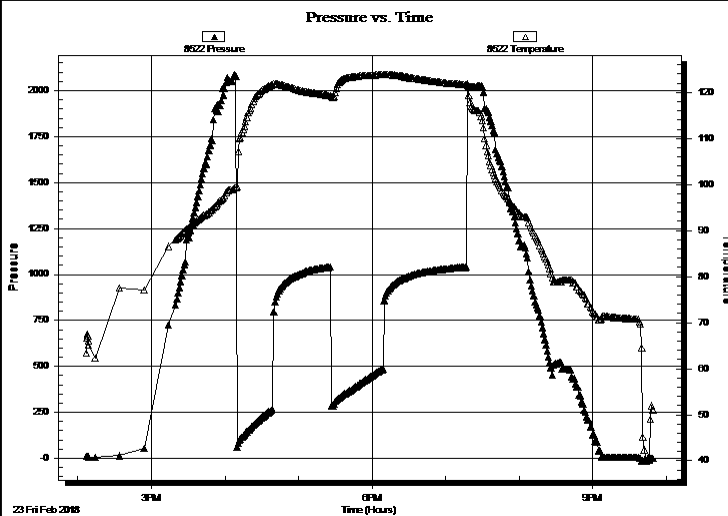
Time Off Btm:

TEST COMMENT: IF: BOB @ 6 min. - built to 49.3".

IS! no return.

FF: BOB @ 6 min. built to 69"

FS! no return.



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
1050.00	smcw 3m 97w (oil spots)	13.64

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65278

DST#: 6

ATTN: John Goldsmith

Test Start: 2018.02.23 @ 14:07:00

Tool Information

Drill Pipe:	Length: 4110.00 ft	Diameter: 3.80 inches	Volume: 57.65 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 58.24 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	21.00 ft			String Weight: Initial 52000.00 lb
Depth to Top Packer:	4236.00 ft			Final 56000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	34.00 ft			
Tool Length:	61.00 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			4210.00	
Shut In Tool	5.00			4215.00	
Hydraulic tool	5.00			4220.00	
Jars	5.00			4225.00	
Safety Joint	2.00			4227.00	
Packer	5.00			4232.00	27.00 Bottom Of Top Packer
Packer	4.00			4236.00	
Stubb	1.00			4237.00	
Recorder	0.00	8522	Inside	4237.00	
Recorder	0.00	8319	Outside	4237.00	
Perforations	30.00			4267.00	
Bullnose	3.00			4270.00	34.00 Bottom Packers & Anchor

Total Tool Length: 61.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65278

DST#: 6

ATTN: John Goldsmith

Test Start: 2018.02.23 @ 14:07:00

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:

47000 ppm

Viscosity: 54.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.19 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 4000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
1050.00	smcw 3m 97w (oil spots)	13.636

Total Length: 1050.00 ft Total Volume: 13.636 bbl

Num Fluid Samples: 0

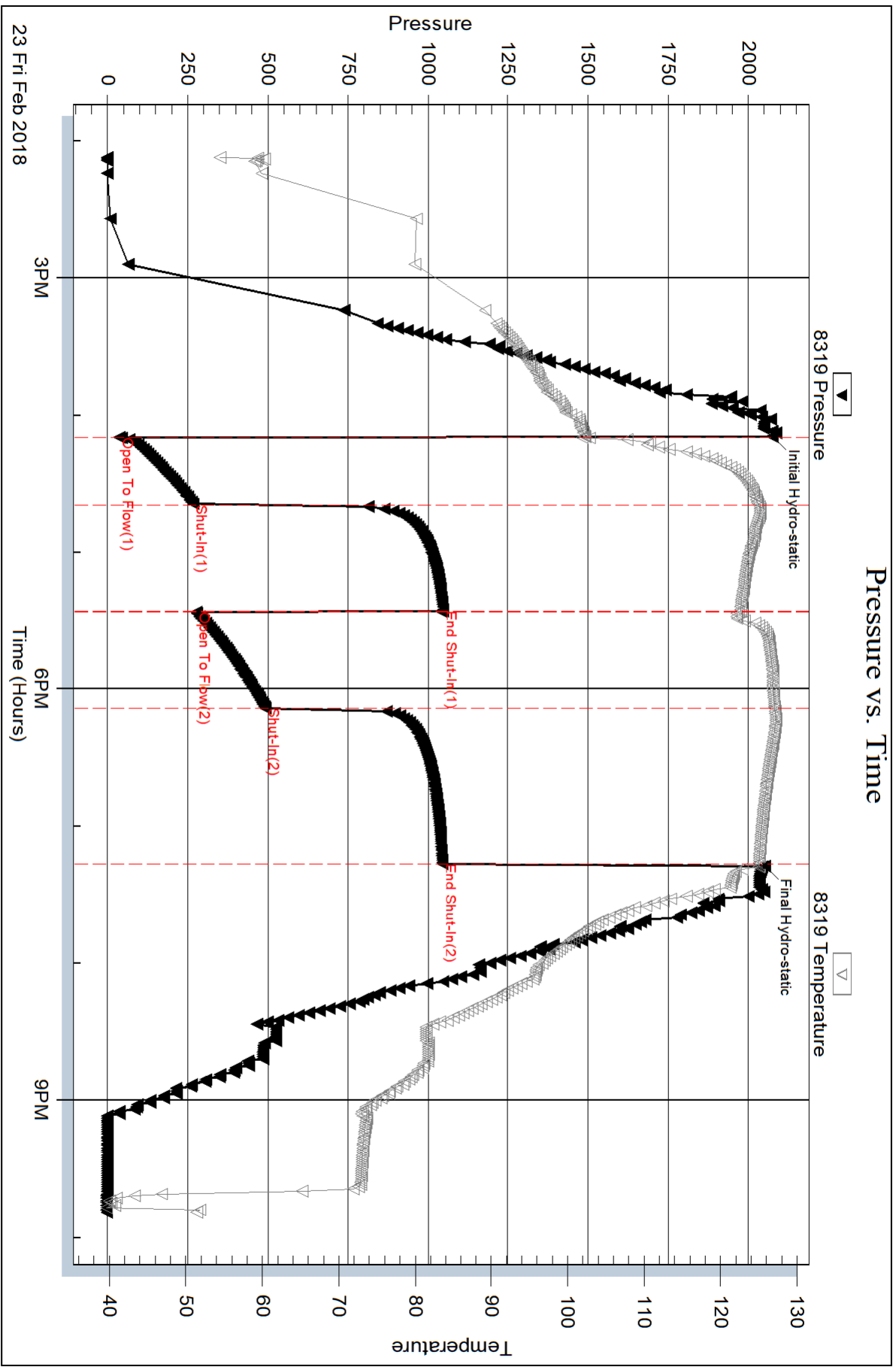
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .248 @ 45f = 47000ppm



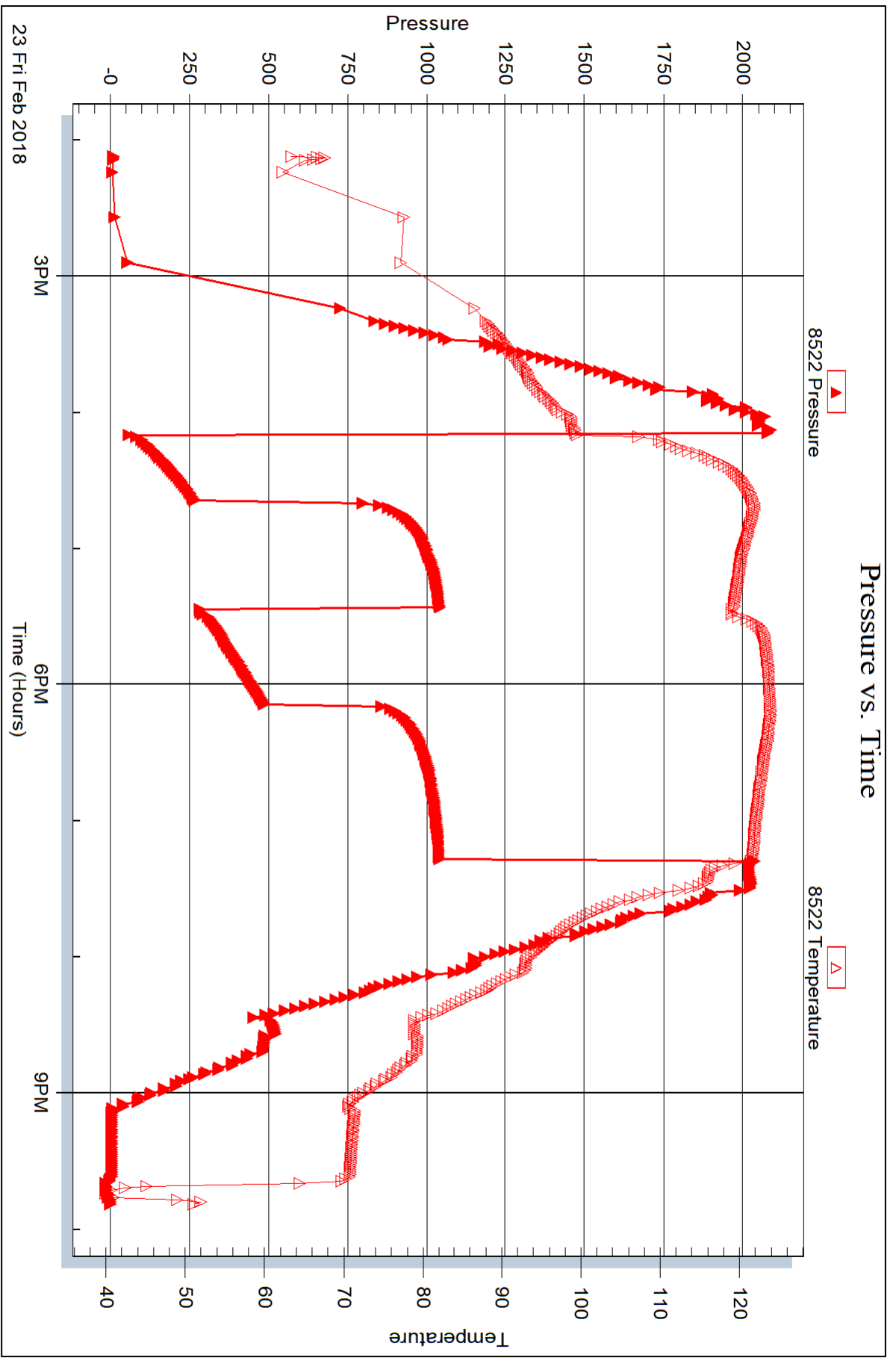
Serial #: 8522

Inside

Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 6





DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.24 @ 07:39:00

End Date: 2018.02.24 @ 15:10:00

Job Ticket #: 65279 DST #: 7

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

Printed: 2018.03.01 @ 10:55:00



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

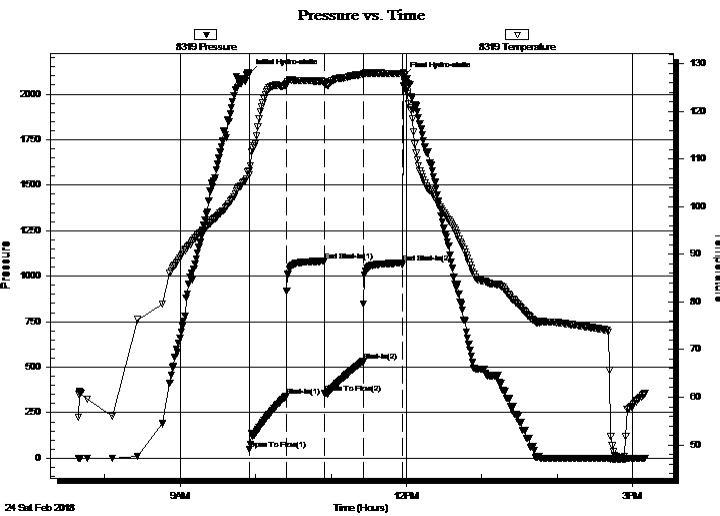
30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 65279 **DST#: 7**
 Test Start: 2018.02.24 @ 07:39:00

GENERAL INFORMATION:

Formation: **LKC L**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 09:55:00 Tester: Bradley Walter
 Time Test Ended: 15:10:00 Unit No: 78
 Interval: **4282.00 ft (KB) To 4320.00 ft (KB) (TVD)** Reference Elevations: 2961.00 ft (KB)
 Total Depth: 4320.00 ft (KB) (TVD) 2953.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 8.00 ft

Serial #: 8319 Outside
 Press@RunDepth: 531.58 psig @ 4283.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.24 End Date: 2018.02.24 Last Calib.: 2018.02.24
 Start Time: 07:39:05 End Time: 15:09:59 Time On Btm: 2018.02.24 @ 09:54:45
 Time Off Btm: 2018.02.24 @ 11:58:00

TEST COMMENT: IF: BOB @ 2.5 min. Built to 72"
 IS: No return.
 FF: BOB @ 5 min. Built to 56"
 FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2111.81	107.52	Initial Hydro-static
1	49.11	106.64	Open To Flow (1)
30	342.37	125.53	Shut-In(1)
60	1082.33	126.30	End Shut-In(1)
61	357.47	125.89	Open To Flow (2)
91	531.58	127.70	Shut-In(2)
122	1072.29	127.87	End Shut-In(2)
124	2096.35	127.71	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
120.00	gmw co 10g 50w 10m 30o	0.59
1130.00	gsmw co 20g 10w 5m 65o	15.85

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS

Grothusen Unit #1

Job Ticket: 65279

DST#: 7

Test Start: 2018.02.24 @ 07:39:00

GENERAL INFORMATION:

Formation: **LKC L**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 09:55:00

Time Test Ended: 15:10:00

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4282.00 ft (KB) To 4320.00 ft (KB) (TVD)

Reference Elevations: 2961.00 ft (KB)

Total Depth: 4320.00 ft (KB) (TVD)

2953.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

Serial #: 8522 **Inside**

Press@RunDepth: psig @ 4283.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.02.24 End Date: 2018.02.24

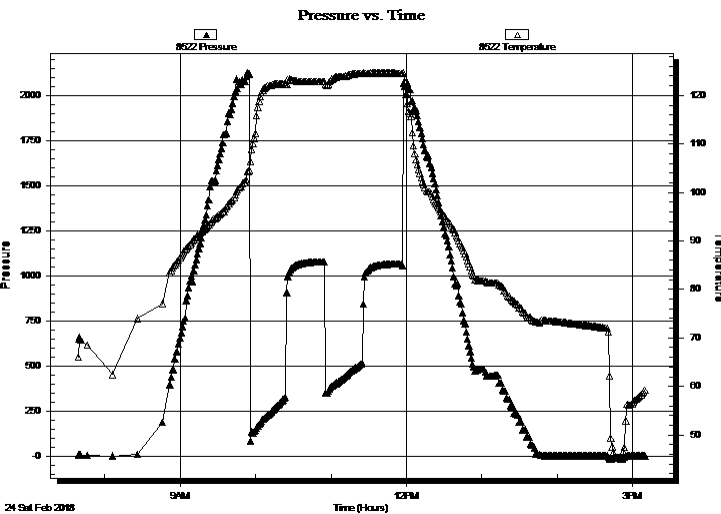
Last Calib.: 2018.02.24

Start Time: 07:39:05 End Time: 15:09:59

Time On Btm:

Time Off Btm:

TEST COMMENT: IF: BOB @ 2.5 min. Built to 72"
 IS!: No return.
 FF: BOB @ 5 min. Built to 56"
 FS!: No return.



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
120.00	gmw co 10g 50w 10m 30o	0.59
1130.00	gsmw co 20g 10w 5m 65o	15.85

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65279

DST#: 7

ATTN: John Goldsmith

Test Start: 2018.02.24 @ 07:39:00

Tool Information

Drill Pipe:	Length: 4142.00 ft	Diameter: 3.80 inches	Volume: 58.10 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 58.69 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	7.00 ft			String Weight: Initial 52000.00 lb
Depth to Top Packer:	4282.00 ft			Final 58000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	38.00 ft			
Tool Length:	65.00 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			4256.00	
Shut In Tool	5.00			4261.00	
Hydraulic tool	5.00			4266.00	
Jars	5.00			4271.00	
Safety Joint	2.00			4273.00	
Packer	5.00			4278.00	27.00 Bottom Of Top Packer
Packer	4.00			4282.00	
Stubb	1.00			4283.00	
Recorder	0.00	8522	Inside	4283.00	
Recorder	0.00	8319	Outside	4283.00	
Perforations	34.00			4317.00	
Bullnose	3.00			4320.00	38.00 Bottom Packers & Anchor

Total Tool Length: 65.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65279

DST#: 7

ATTN: John Goldsmith

Test Start: 2018.02.24 @ 07:39:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

18 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 63.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.59 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 4600.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
120.00	gmw co 10g 50w 10m 30o	0.590
1130.00	gsmw co 20g 10w 5m 65o	15.851

Total Length: 1250.00 ft Total Volume: 16.441 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

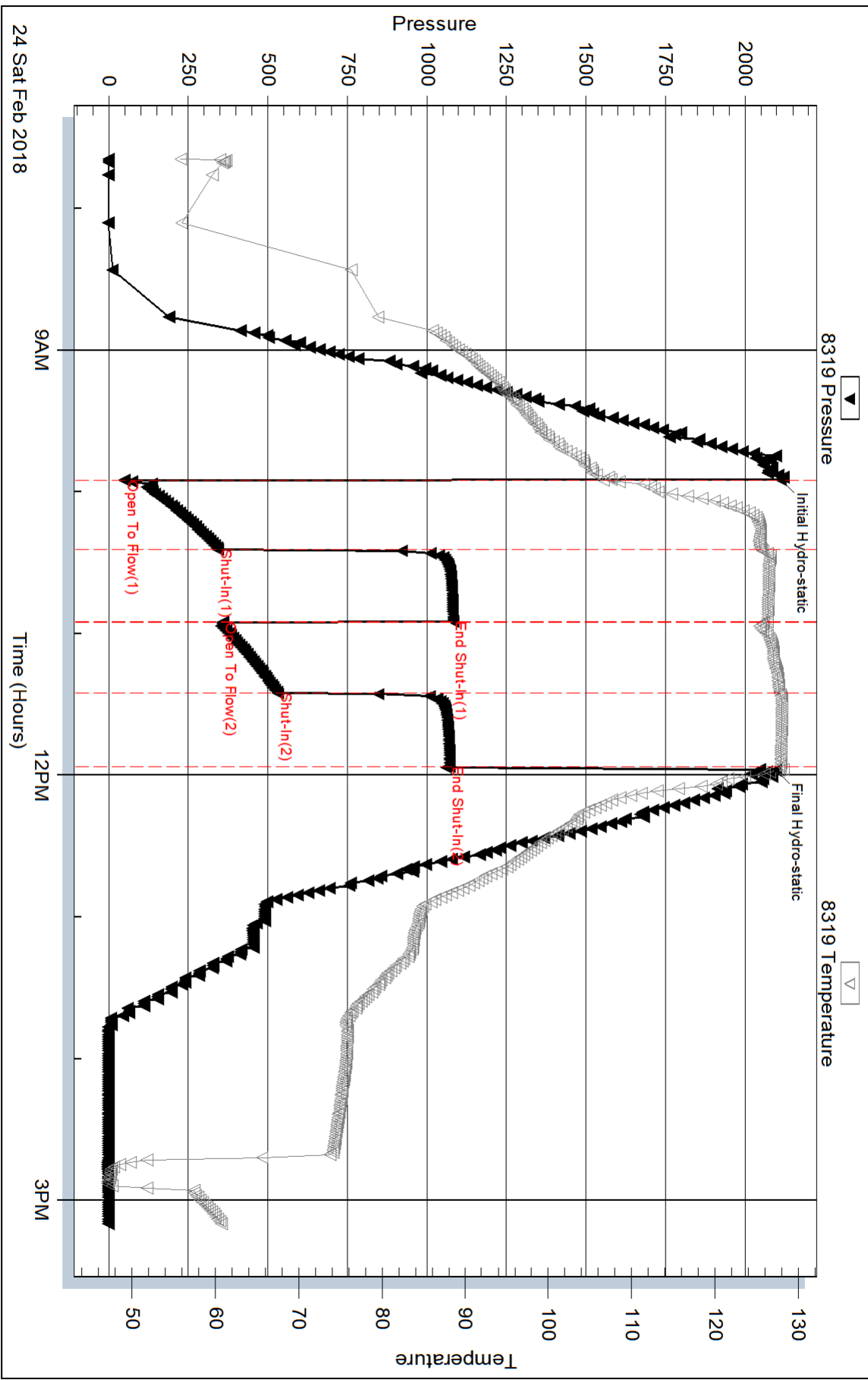
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

Pressure vs. Time



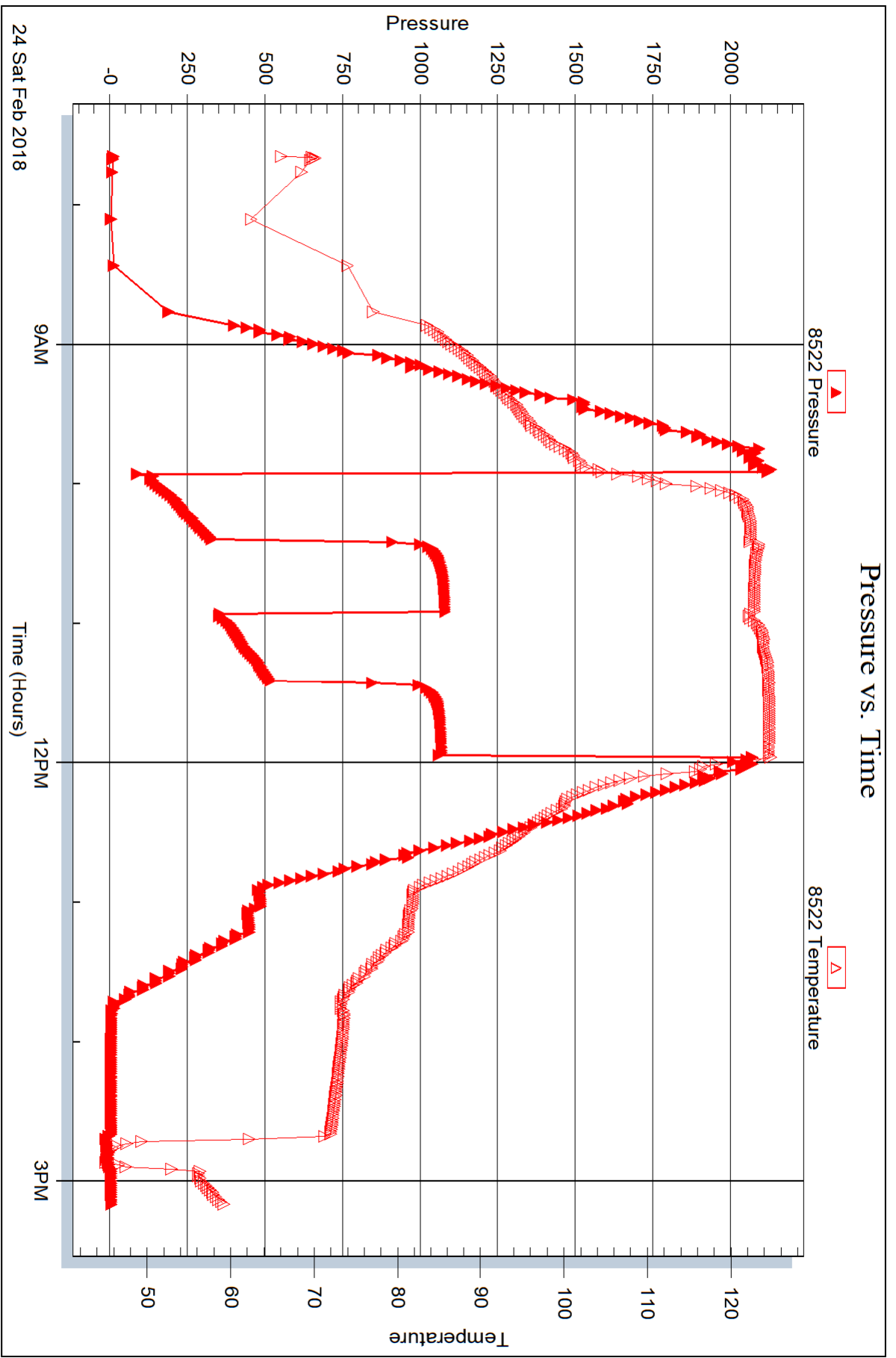
Serial #: 8522

Inside

Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 7



Trilobite Testing, Inc

Ref. No: 65279

Printed: 2018.03.01 @ 10:55:01



DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.25 @ 13:13:00

End Date: 2018.02.25 @ 19:23:15

Job Ticket #: 65280 DST #: 8

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

Printed: 2018.03.01 @ 10:53:11



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

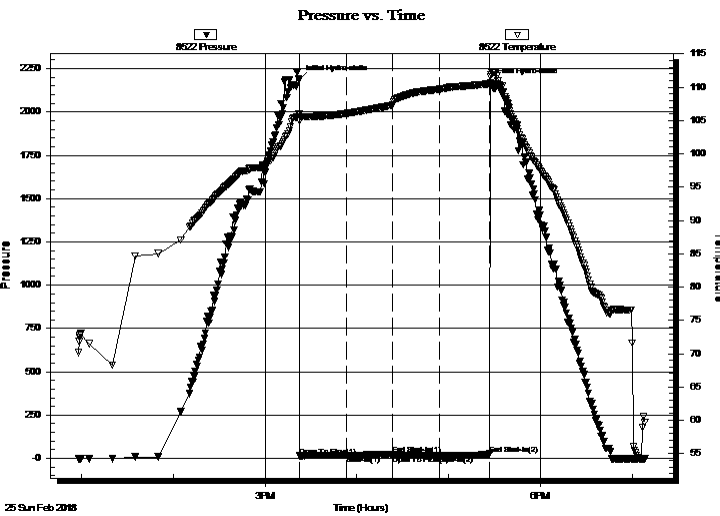
30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 65280 **DST#: 8**
 Test Start: 2018.02.25 @ 13:13:00

GENERAL INFORMATION:

Formation: **Altamont**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 15:37:45
 Time Test Ended: 19:23:15
 Interval: **4428.00 ft (KB) To 4452.00 ft (KB) (TVD)**
 Total Depth: 4452.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

Serial #: 8522 Inside
 Press@RunDepth: 16.33 psig @ 4429.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.25 End Date: 2018.02.25 Last Calib.: 2018.02.25
 Start Time: 12:58:05 End Time: 19:08:14 Time On Btm: 2018.02.25 @ 15:22:30
 Time Off Btm: 2018.02.25 @ 17:27:30

TEST COMMENT: IF: 1/2" blow.
 IS: No return.
 FF: No blow.
 FS: No return.



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2187.57	105.99	Initial Hydro-static
1	14.87	105.00	Open To Flow (1)
31	16.27	106.06	Shut-In(1)
61	25.27	107.30	End Shut-In(1)
61	15.78	107.30	Open To Flow (2)
92	16.33	109.72	Shut-In(2)
124	20.97	110.52	End Shut-In(2)
125	2168.40	111.61	Final Hydro-static

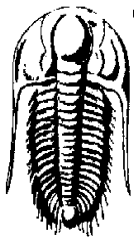
Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100m (oil spots)	0.02

* Recovery from multiple tests

Gas Rates

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



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott, KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

ATTN: John Goldsmith

Job Ticket: 65280

DST#: 8

Test Start: 2018.02.25 @ 13:13:00

GENERAL INFORMATION:

Formation: **Altamont**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 15:37:45

Time Test Ended: 19:23:15

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4428.00 ft (KB) To 4452.00 ft (KB) (TVD)

Total Depth: 4452.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 2961.00 ft (KB)

2953.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 8319 Outside

Press@RunDepth: psig @ 4429.00 ft (KB)

Start Date: 2018.02.25

End Date:

Start Time: 12:58:05

End Time:

Capacity: 8000.00 psig

Last Calib.: 2018.02.25

Time On Btm:

Time Off Btm:

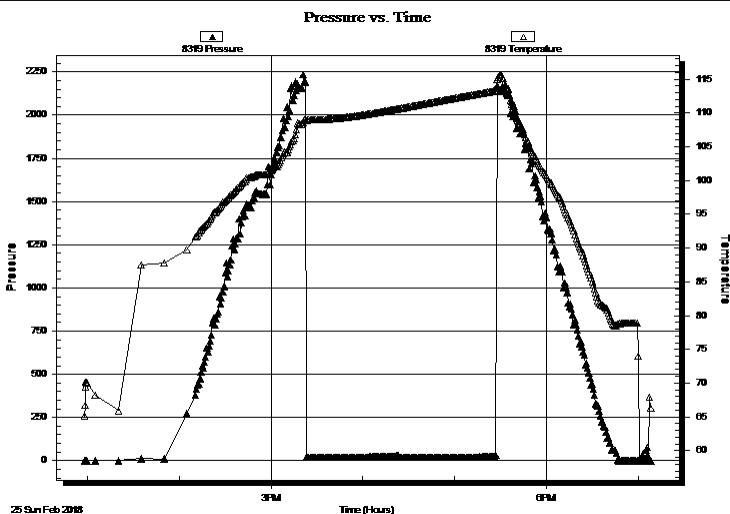
TEST COMMENT: IF: 1/2" blow.

IS: No return.

FF: No blow.

FS: No return.

PRESSURE SUMMARY



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

Recovery

Length (ft)	Description	Volume (bbl)
5.00	Mud 100m (oil spots)	0.02

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65280

DST#: 8

ATTN: John Goldsmith

Test Start: 2018.02.25 @ 13:13:00

Tool Information

Drill Pipe:	Length: 4299.00 ft	Diameter: 3.80 inches	Volume: 60.30 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 65000.00 lb
			<u>Total Volume: 60.89 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	18.00 ft			String Weight: Initial 54000.00 lb
Depth to Top Packer:	4428.00 ft			Final 54000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	24.00 ft			
Tool Length:	51.00 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			4402.00	
Shut In Tool	5.00			4407.00	
Hydraulic tool	5.00			4412.00	
Jars	5.00			4417.00	
Safety Joint	2.00			4419.00	
Packer	5.00			4424.00	27.00 Bottom Of Top Packer
Packer	4.00			4428.00	
Stubb	1.00			4429.00	
Recorder	0.00	8522	Inside	4429.00	
Recorder	0.00	8319	Outside	4429.00	
Perforations	20.00			4449.00	
Bullnose	3.00			4452.00	24.00 Bottom Packers & Anchor

Total Tool Length: 51.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65280

DST#: 8

ATTN: John Goldsmith

Test Start: 2018.02.25 @ 13:13:00

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: 50.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.39 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 5500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	Mud 100m (oil spots)	0.025

Total Length: 5.00 ft Total Volume: 0.025 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

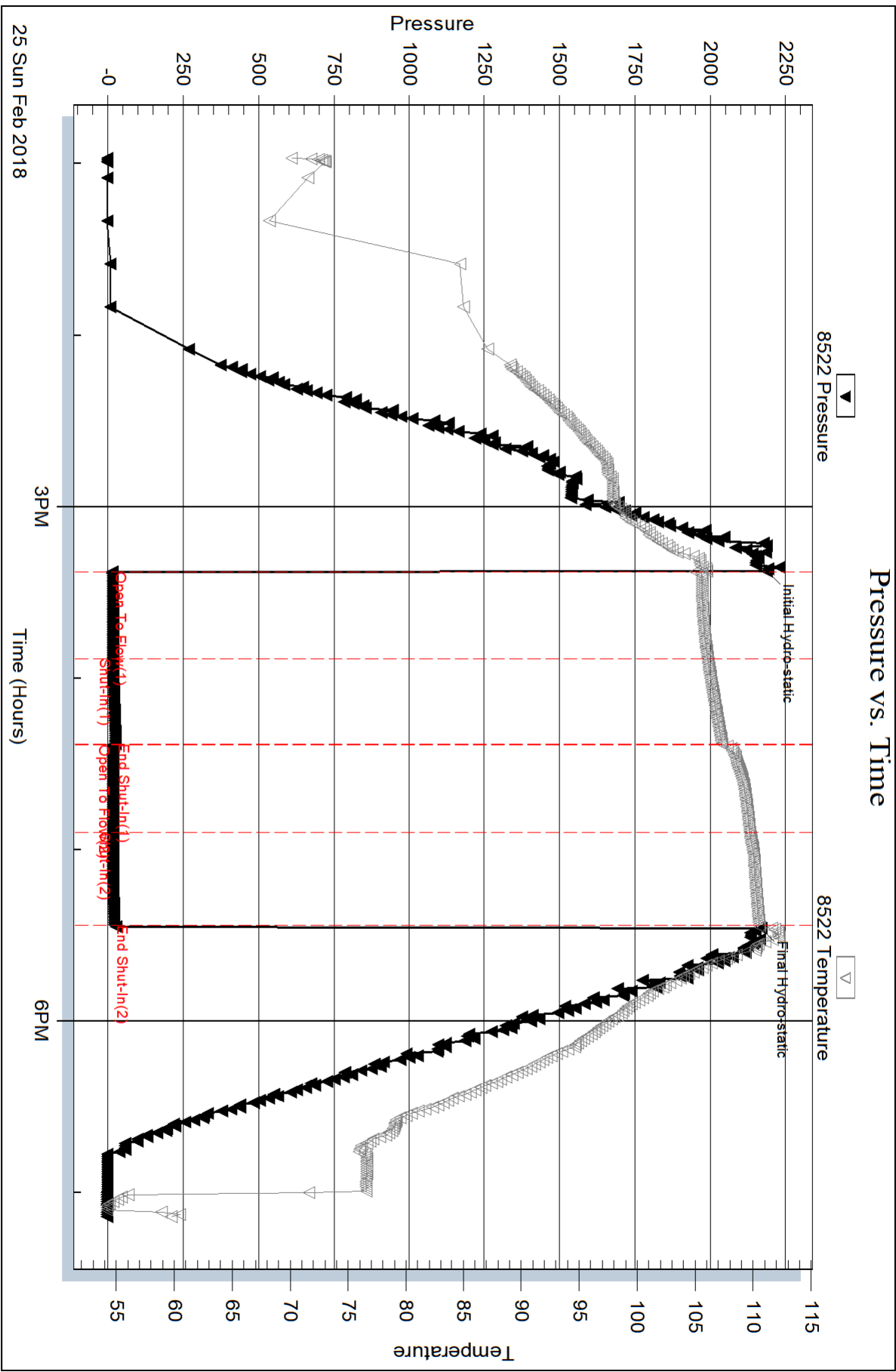
Serial #: 8522

Inside

Ritchie Exploration, Inc

Grothusen Unit #1

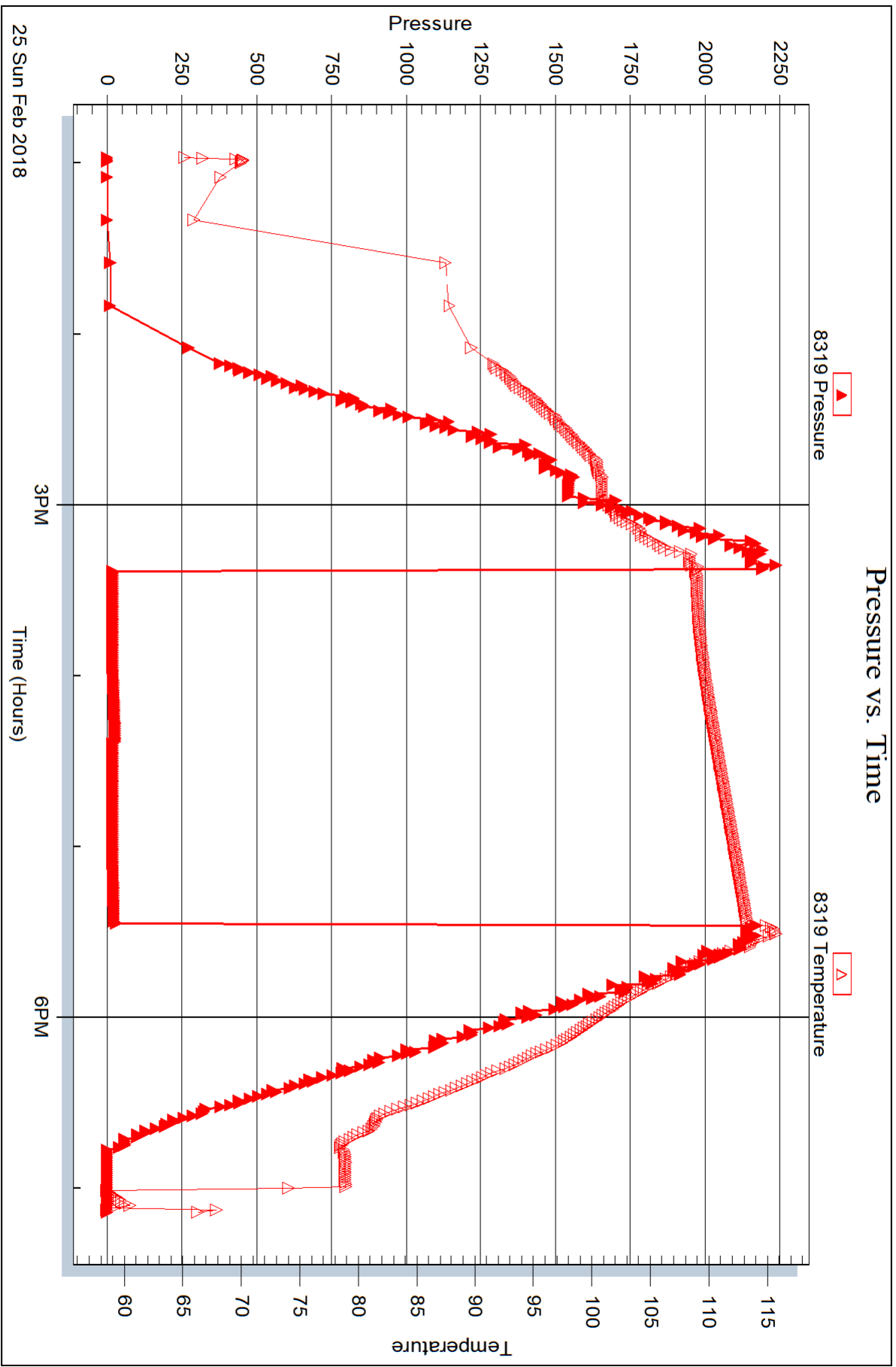
DST Test Number: 8



Triobite Testing, Inc

Ref. No: 65280

Printed: 2018.03.01 @ 10:53:12





DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.27 @ 18:26:00

End Date: 2018.02.28 @ 02:20:30

Job Ticket #: 65281 DST #: 9

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

Printed: 2018.03.01 @ 10:52:43



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
 Box 783188
 Wichita, KS 67278
 ATTN: John Goldsmith

30-16s-31w Scott,KS
Grothusen Unit #1
 Job Ticket: 65281 **DST#: 9**
 Test Start: 2018.02.27 @ 18:26:00

GENERAL INFORMATION:

Formation: **Pawnee - Johnson**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 20:37:30
 Time Test Ended: 02:20:30
 Interval: **4453.00 ft (KB) To 4600.00 ft (KB) (TVD)**
 Total Depth: 4600.00 ft (KB) (TVD)
 Hole Diameter: 7.88 inches Hole Condition: Good
 Test Type: Conventional Bottom Hole (Reset)
 Tester: Bradley Walter
 Unit No: 78
 Reference Elevations: 2961.00 ft (KB)
 2953.00 ft (CF)
 KB to GR/CF: 8.00 ft

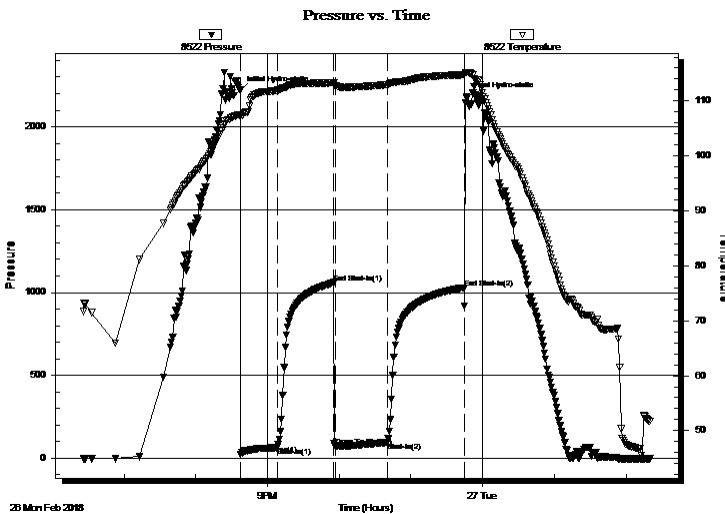
Serial #: 8522

Inside

Press@RunDepth: 95.89 psig @ 4454.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2018.02.26 End Date: 2018.02.27 Last Calib.: 2018.02.27
 Start Time: 18:26:05 End Time: 02:20:29 Time On Btm: 2018.02.26 @ 20:37:00
 Time Off Btm: 2018.02.26 @ 23:46:30

TEST COMMENT: IF: BOB @ 21 min. built to 15.5"
 IS: Built 3" to 18.5"
 FF: BOB@ 20 min. Built to 23.5"
 FS: Built 5.5" to 29".

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2220.50	107.50	Initial Hydro-static
1	25.15	107.19	Open To Flow (1)
31	65.56	111.91	Shut-In(1)
79	1059.93	113.30	End Shut-In(1)
80	73.36	112.84	Open To Flow (2)
123	95.89	112.98	Shut-In(2)
188	1029.36	114.77	End Shut-In(2)
190	2184.05	115.20	Final Hydro-static

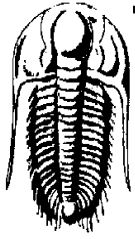
Recovery

Length (ft)	Description	Volume (bbl)
100.00	gocm 20g 20o 60m	0.49
110.00	gmco 40g 5m 55o	1.36
0.00	100' GIP	0.00

* Recovery from multiple tests

Gas Rates

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



TRILOBITE
TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
Box 783188
Wichita, KS 67278
ATTN: John Goldsmith

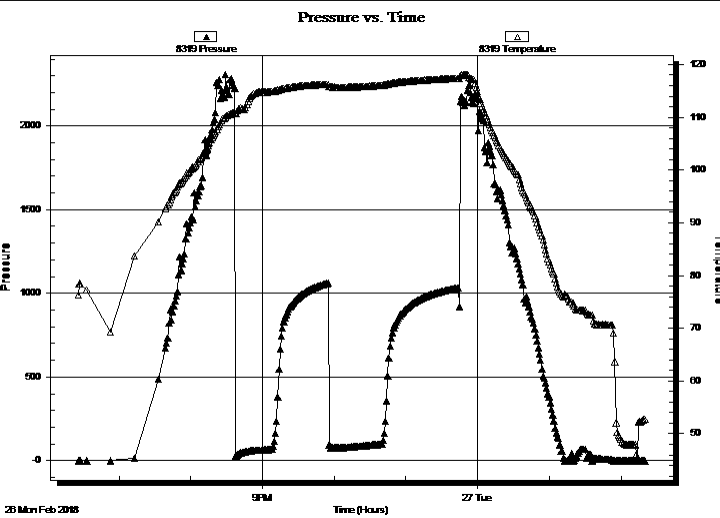
30-16s-31w Scott,KS
Grothusen Unit #1
Job Ticket: 65281 **DST#: 9**
Test Start: 2018.02.27 @ 18:26:00

GENERAL INFORMATION:

Formation: **Pawnee - Johnson**
Deviated: No Whipstock: ft (KB)
Time Tool Opened: 20:37:30
Time Test Ended: 02:20:30
Interval: **4453.00 ft (KB) To 4600.00 ft (KB) (TVD)**
Total Depth: 4600.00 ft (KB) (TVD)
Hole Diameter: 7.88 inches Hole Condition: Good
Test Type: Conventional Bottom Hole (Reset)
Tester: Bradley Walter
Unit No: 78
Reference Elevations: 2961.00 ft (KB)
2953.00 ft (CF)
KB to GR/CF: 8.00 ft

Serial #: 8319 Outside
Press@RunDepth: psig @ 4454.00 ft (KB) Capacity: 8000.00 psig
Start Date: 2018.02.26 End Date: 2018.02.27 Last Calib.: 2018.02.27
Start Time: 18:26:05 End Time: 02:20:29 Time On Btm:
Time Off Btm:

TEST COMMENT: IF: BOB @ 21 min. built to 15.5"
IS: Built 3" to 18.5".
FF: BOB @ 20 min. Built to 23.5"
FS: Built 5.5" to 29".



PRESSURE SUMMARY

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

Recovery

Length (ft)	Description	Volume (bbl)
100.00	gocm 20g 20o 60m	0.49
110.00	gmco 40g 5m 55o	1.36
0.00	100' 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

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65281

DST#: 9

ATTN: John Goldsmith

Test Start: 2018.02.27 @ 18:26:00

Tool Information

Drill Pipe:	Length: 4333.00 ft	Diameter: 3.80 inches	Volume: 60.78 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 61.37 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	27.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4453.00 ft			Final 59000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	147.00 ft			
Tool Length:	174.00 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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Change Over Sub	1.00			4427.00	
Shut In Tool	5.00			4432.00	
Hydraulic tool	5.00			4437.00	
Jars	5.00			4442.00	
Safety Joint	2.00			4444.00	
Packer	5.00			4449.00	27.00 Bottom Of Top Packer
Packer	4.00			4453.00	
Stubb	1.00			4454.00	
Recorder	0.00	8522	Inside	4454.00	
Recorder	0.00	8319	Outside	4454.00	
Perforations	16.00			4470.00	
Change Over Sub	1.00			4471.00	
Drill Pipe	125.00			4596.00	
Change Over Sub	1.00			4597.00	
Bullnose	3.00			4600.00	147.00 Bottom Packers & Anchor

Total Tool Length: 174.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65281

DST#: 9

ATTN: John Goldsmith

Test Start: 2018.02.27 @ 18:26:00

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

26 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 54.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.99 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 6000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
100.00	gocm 20g 20o 60m	0.492
110.00	gmco 40g 5m 55o	1.361
0.00	100' GIP	0.000

Total Length: 210.00 ft Total Volume: 1.853 bbl

Num Fluid Samples: 0

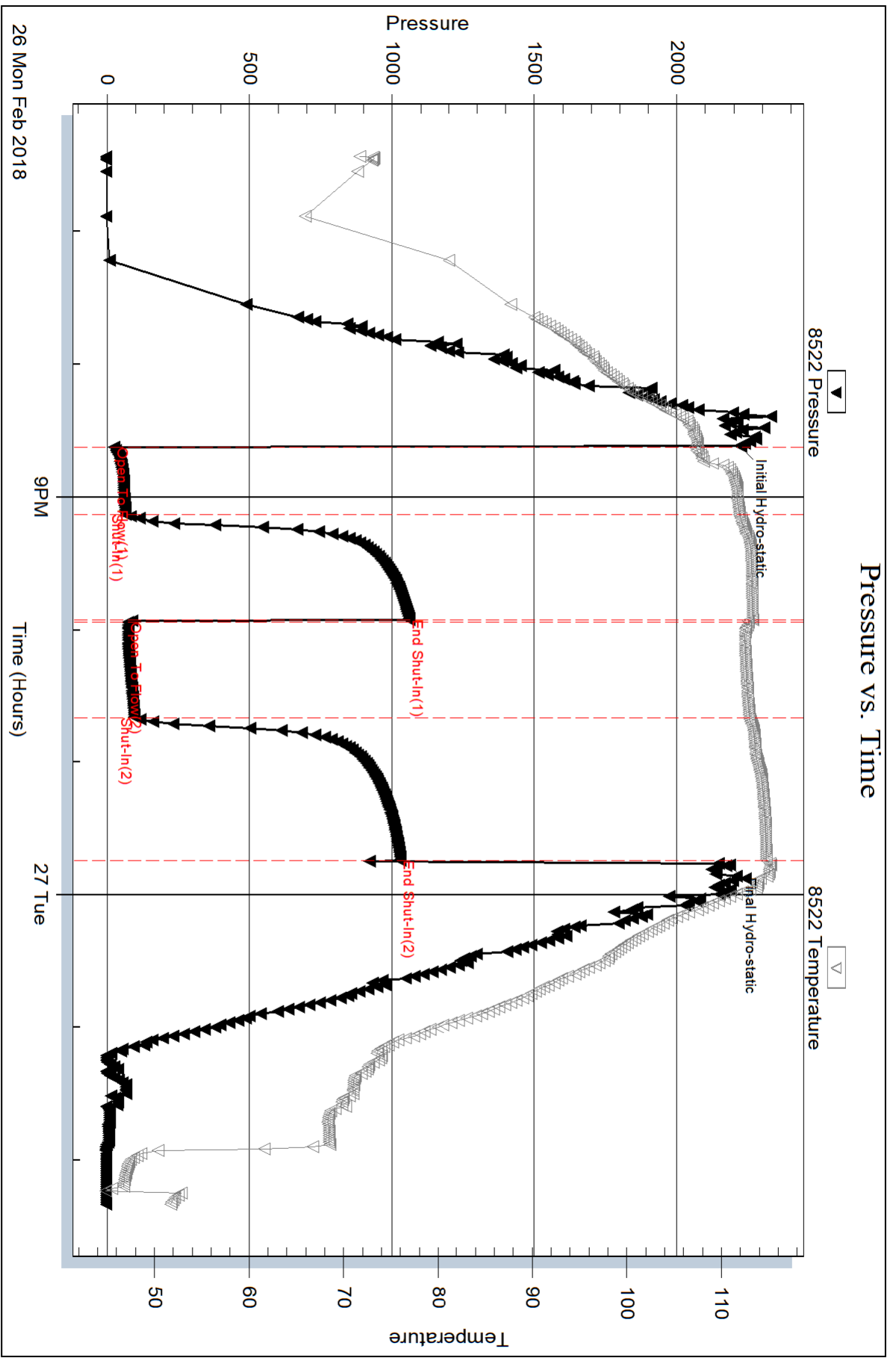
Num Gas Bombs: 0

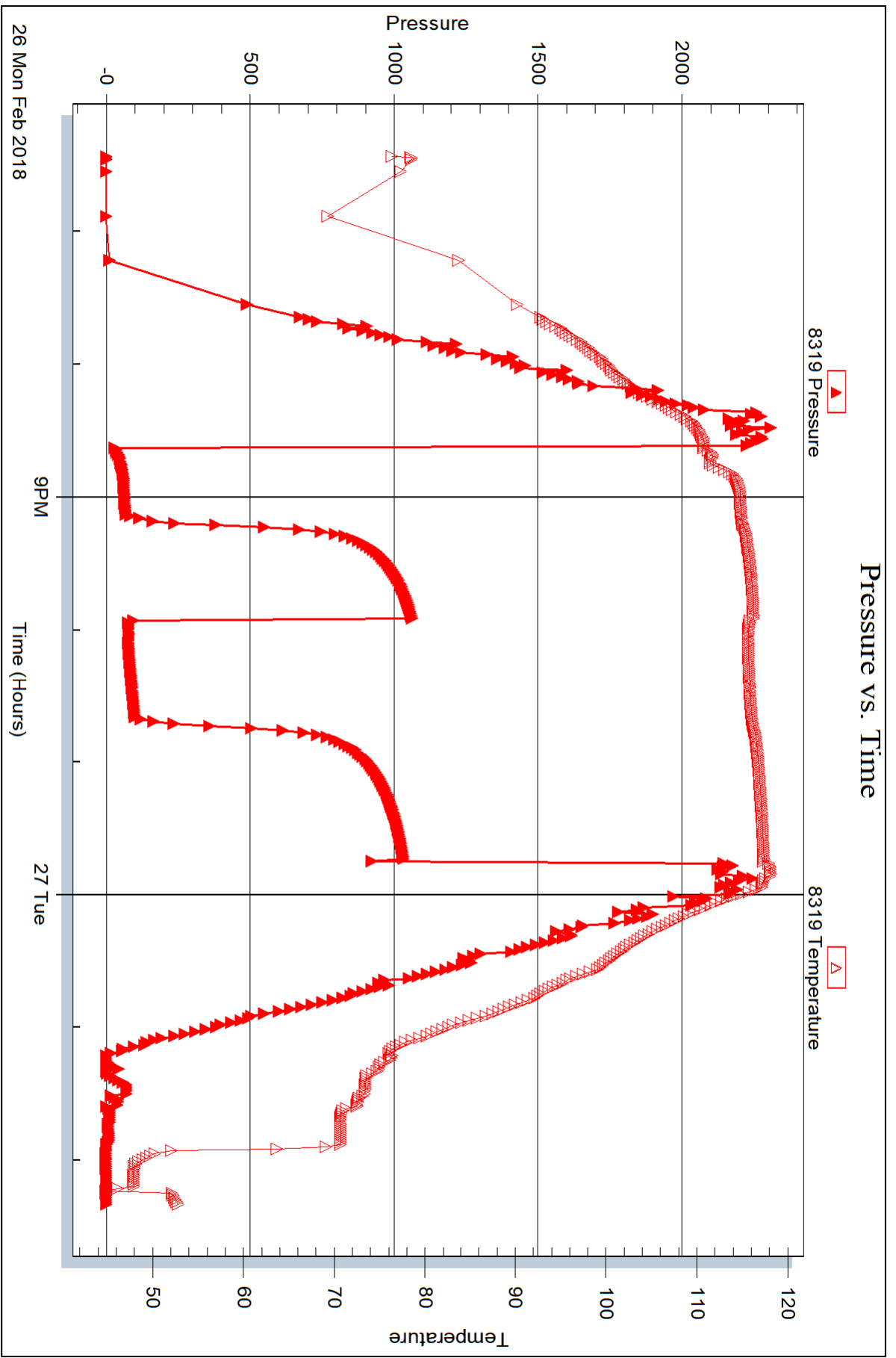
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Ritchie Exploration, Inc**

Box 783188
Wichita, KS 67278

ATTN: John Goldsmith

Grothusen Unit #1

30-16s-31w Scott,KS

Start Date: 2018.02.27 @ 10:11:00

End Date: 2018.02.27 @ 17:36:00

Job Ticket #: 65282 DST #: 10

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

Printed: 2018.03.01 @ 10:52:07



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65282

DST#: 10

ATTN: John Goldsmith

Test Start: 2018.02.27 @ 10:11:00

GENERAL INFORMATION:

Formation: **Morrow**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 12:34:15

Time Test Ended: 17:36:00

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4598.00 ft (KB) To 4634.00 ft (KB) (TVD)

Reference Elevations: 2961.00 ft (KB)

Total Depth: 4634.00 ft (KB) (TVD)

2953.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

Serial #: 8522 Inside

Press@RunDepth: 71.07 psig @ 4599.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2018.02.27

End Date: 2018.02.27

Last Calib.: 2018.02.27

Start Time: 10:11:05

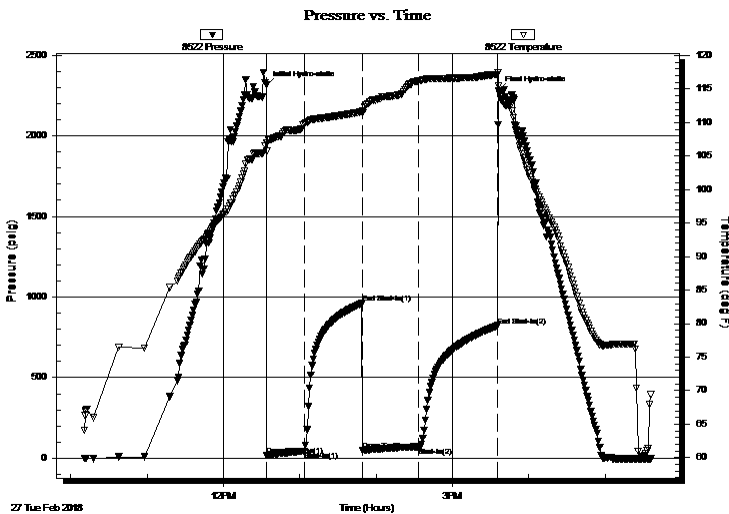
End Time: 17:35:59

Time On Btm: 2018.02.27 @ 12:33:45

Time Off Btm: 2018.02.27 @ 15:36:15

TEST COMMENT: IF: 2 1/2" blow .
IS: No return.
FF: 3" blow .
FS: No return.

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2313.62	106.92	Initial Hydro-static
1	18.43	105.72	Open To Flow (1)
30	45.09	109.83	Shut-In(1)
76	960.93	111.63	End Shut-In(1)
76	49.00	111.50	Open To Flow (2)
120	71.07	116.27	Shut-In(2)
182	821.82	117.19	End Shut-In(2)
183	2277.80	115.46	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
120.00	mcw 30m 70w (oil spots)	0.59
3.00	oil 100o (thick heavy)	0.04

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

Ritchie Exploration, Inc
Box 783188
Wichita, KS 67278
ATTN: John Goldsmith

30-16s-31w Scott,KS

Grothusen Unit #1

Job Ticket: 65282

DST#: 10

Test Start: 2018.02.27 @ 10:11:00

GENERAL INFORMATION:

Formation: **Morrow**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 12:34:15

Time Test Ended: 17:36:00

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

Interval: 4598.00 ft (KB) To 4634.00 ft (KB) (TVD)

Total Depth: 4634.00 ft (KB) (TVD)

Hole Diameter: 7.88 inches Hole Condition: Good

Reference Elevations: 2961.00 ft (KB)

2953.00 ft (CF)

KB to GR/CF: 8.00 ft

Serial #: 8319 Outside

Press@RunDepth: psig @ 4599.00 ft (KB)

Start Date: 2018.02.27

End Date:

2018.02.27

Start Time: 10:11:05

End Time:

17:35:59

Capacity: 8000.00 psig

Last Calib.:

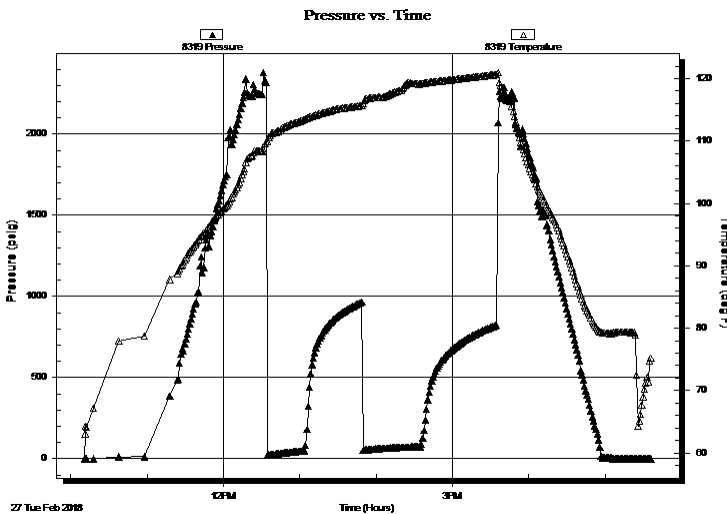
2018.02.27

Time On Btm:

Time Off Btm:

TEST COMMENT: IF: 2 1/2" blow .
IS: No return.
FF: 3" blow .
FS: No return.

PRESSURE SUMMARY



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

Recovery

Length (ft)	Description	Volume (bbl)
120.00	mcw 30m 70w (oil spots)	0.59
3.00	oil 100o (thick heavy)	0.04

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65282

DST#: 10

ATTN: John Goldsmith

Test Start: 2018.02.27 @ 10:11:00

Tool Information

Drill Pipe:	Length: 4455.00 ft	Diameter: 3.80 inches	Volume: 62.49 bbl	Tool Weight: 2500.00 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: 120.00 ft	Diameter: 2.25 inches	Volume: 0.59 bbl	Weight to Pull Loose: 70000.00 lb
			<u>Total Volume: 63.08 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	4.00 ft			String Weight: Initial 58000.00 lb
Depth to Top Packer:	4598.00 ft			Final 58000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	36.00 ft			
Tool Length:	63.00 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			4572.00	
Shut In Tool	5.00			4577.00	
Hydraulic tool	5.00			4582.00	
Jars	5.00			4587.00	
Safety Joint	2.00			4589.00	
Packer	5.00			4594.00	27.00 Bottom Of Top Packer
Packer	4.00			4598.00	
Stubb	1.00			4599.00	
Recorder	0.00	8522	Inside	4599.00	
Recorder	0.00	8319	Outside	4599.00	
Perforations	32.00			4631.00	
Bullnose	3.00			4634.00	36.00 Bottom Packers & Anchor

Total Tool Length: 63.00



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

FLUID SUMMARY

Ritchie Exploration, Inc

30-16s-31w Scott,KS

Box 783188
Wichita, KS 67278

Grothusen Unit #1

Job Ticket: 65282

DST#: 10

ATTN: John Goldsmith

Test Start: 2018.02.27 @ 10:11:00

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:

37000 ppm

Viscosity: 58.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 8.78 in³

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 6200.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
120.00	mcw 30m 70w (oil spots)	0.590
3.00	oil 100o (thick heavy)	0.042

Total Length: 123.00 ft Total Volume: 0.632 bbl

Num Fluid Samples: 0

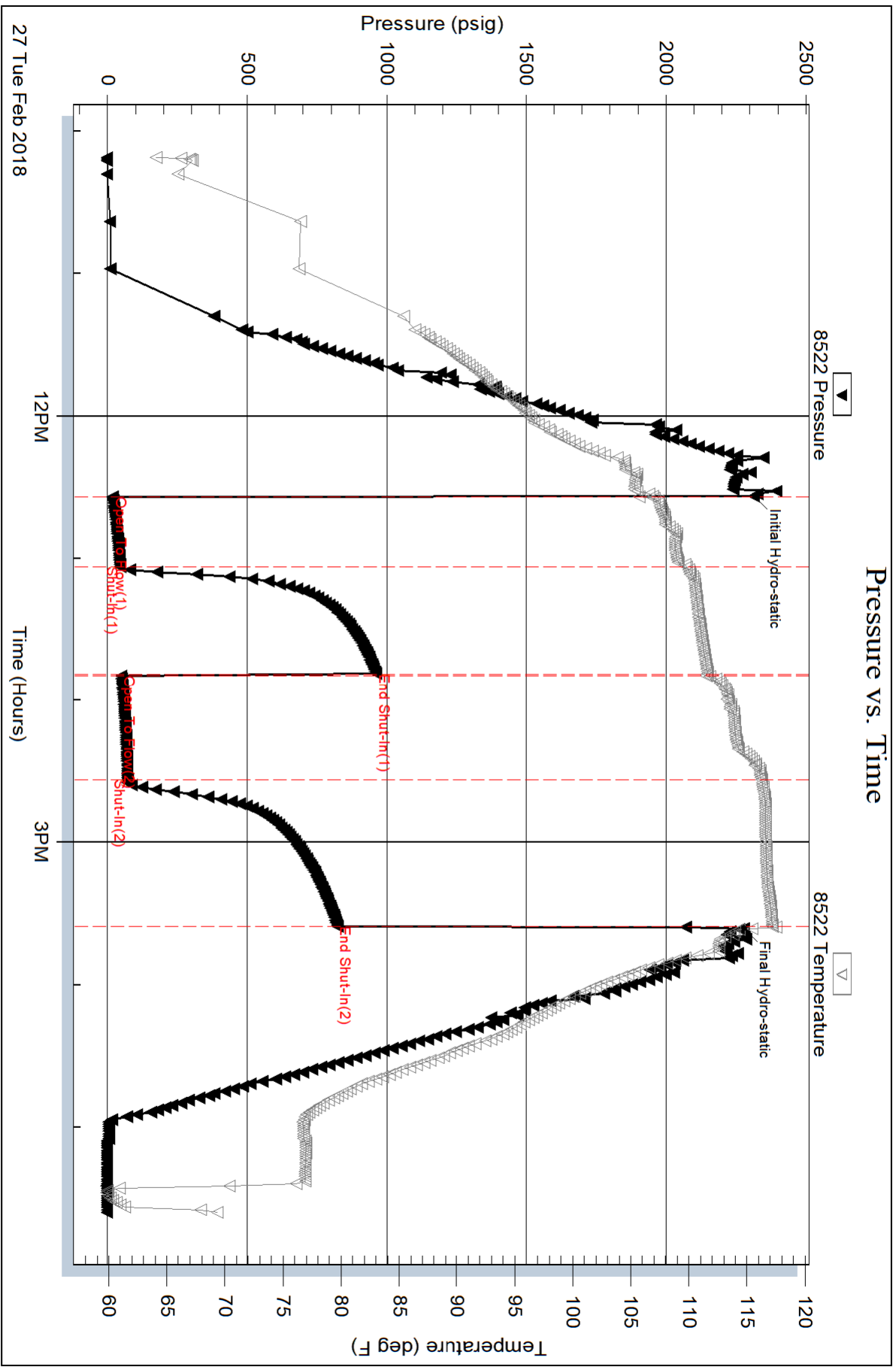
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: rw is .226 @ 61F = 37000ppm

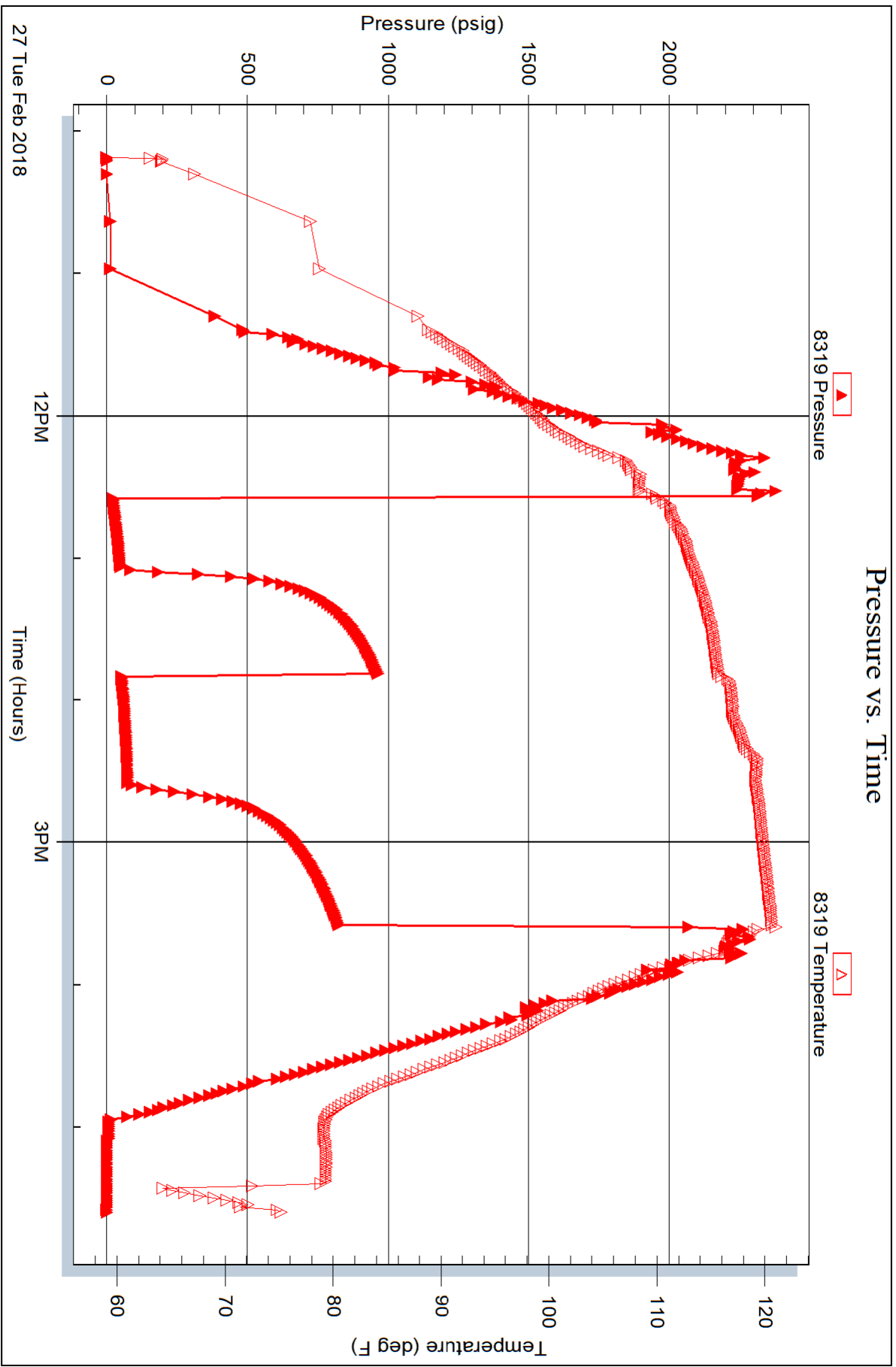


Serial #: 8319

Outside Ritchie Exploration, Inc

Grothusen Unit #1

DST Test Number: 10





TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64398**

Well Name & No. Grothusen Unit #1 Test No. 1 Date 2/19/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, Ks 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16S Rge. 31W Co. Scott State Ks

Interval Tested 3876 - 3912 Zone Tested Oriad
 Anchor Length 36' Drill Pipe Run 3734 Mud Wt. 9.1
 Top Packer Depth 3871 Drill Collars Run 120 Vis 66
 Bottom Packer Depth 3876 Wt. Pipe Run 0 WL 6.4
 Total Depth 3912 Chlorides 2,000 ppm System LCM 3#

Blow Description IF 81" blow
ISI receded to 80"
FF 108" blow
FSI Bolt to 109"

Rec	Feet of	Notes	%gas	%oil	%water	%mud
<u>100</u>	<u>WCO</u>	<u>Thick Heavy</u>	<u>85</u>	<u>15</u>	<u>0</u>	<u>0</u>
<u>300</u>	<u>OMCW</u>		<u>15</u>	<u>65</u>	<u>20</u>	<u>0</u>
<u>1120</u>	<u>SMCW</u>	<u>(OIL SPOTS)</u>	<u>0</u>	<u>97</u>	<u>3</u>	<u>0</u>
<u> </u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>		<u> </u>	<u> </u>	<u> </u>	<u> </u>

Rec Total 1520 BHT 117 Gravity API RW 148 @ 41 °F Chlorides 26,000 ppm

- (A) Initial Hydrostatic 1893
- (B) First Initial Flow 106
- (C) First Final Flow 361
- (D) Initial Shut-In 1116
- (E) Second Initial Flow 392
- (F) Second Final Flow 677
- (G) Final Shut-In 1111
- (H) Final Hydrostatic 1880

- Test 1050
- Jars 250
- Safety Joint 75
- Circ Sub N/C
- Hourly Standby
- Mileage 39 RT 39
- Sampler
- Straddle
- Shale Packer
- Extra Packer
- Extra Recorder
- Day Standby
- Accessibility

T-On Location 0230
 T-Started 0353
 T-Open 0655
 T-Pulled 1005
 T-Out 1247

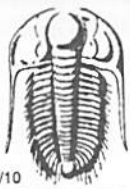
Comments _____

 Ruined Shale Packer
 Ruined Packer
 Extra Copies
 Sub Total 0
 Total 1414
 MP/DST Disc't _____

Initial Open 30
 Initial Shut-In 45
 Final Flow 45
 Final Shut-In 60

Sub Total 1414

Approved By _____ Our Representative [Signature]
 Trilobite Testing Inc. shall not be liable for damaged of any kind of the property or personnel of the one for whom a test is made, or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statements or opinion concerning the results of any test. Tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 64399

Well Name & No. Grothusen Unit #1 Test No. 2 Date 2/20/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, Ks 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16 S Rge. 31 W Co. Scott State Ks

Interval Tested 3996 - 4018 Zone Tested LKC C
 Anchor Length 22' Drill Pipe Run 3860 Mud Wt. 9.0
 Top Packer Depth 3991 Drill Collars Run 120 Vis 56
 Bottom Packer Depth 3996 Wt. Pipe Run Ø WL 6.4
 Total Depth 4018 Chlorides 2300 ppm System LCM 2#

Blow Description IF: 4.6" blow
ISI: Receded to 4" blow
FF: 4.5" blow
FSI: Receded to 3.4"

Rec	Feet of	%gas	%oil	%water	%mud
<u>10</u>	<u>OTL</u>				
<u>130</u>	<u>50 wcm</u>		<u>3</u>	<u>22</u>	<u>75</u>

Rec Total 140 BHT 111 Gravity 29 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic <u>1954</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>0300</u>
(B) First Initial Flow <u>30</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>0302</u>
(C) First Final Flow <u>55</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>0550</u>
(D) Initial Shut-In <u>831</u>	<input checked="" type="checkbox"/> Circ Sub <u>NC</u>	T-Pulled <u>0900</u>
(E) Second Initial Flow <u>68</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>1102</u>
(F) Second Final Flow <u>90</u>	<input checked="" type="checkbox"/> Mileage <u>39Rt</u> <u>39</u>	Comments
(G) Final Shut-In <u>809</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>1945</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>30</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>45</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>45</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby	Total <u>1514</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>1514</u>	

Approved By _____ Our Representative [Signature]
 Trilobite Testing Inc. shall not be liable for damaged of any kind of the property or personnel of the one for whom a test is made, or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statements or opinion concerning the results of any test, tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64400**

Well Name & No. Grothusen Unit #1 Test No. 3 Date 2/21/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Scott State KS

Interval Tested 4056-4082 Zone Tested LKC E-F
 Anchor Length 26' Drill Pipe Run 3920 Mud Wt. 9.1
 Top Packer Depth 4051 Drill Collars Run 120 Vis 52
 Bottom Packer Depth 4056 Wt. Pipe Run 0 WL 6.8
 Total Depth 4082 Chlorides 4000 ppm System LCM 2#

Blow Description IF 1.4" blow
ISI Receded to 0.9"
FF 0.6" blow
FSL Receded to 0.2"

Rec	Feet of	%gas	%oil	%water	%mud
<u>30</u>	<u>wcm (OIL SPOTS)</u>			<u>20</u>	<u>80</u>

Rec Total 30 BHT 105 Gravity — API RW 505 @ 44 °F Chlorides 21,000 ppm

(A) Initial Hydrostatic 1992 Test 1150 T-On Location 0145
 (B) First Initial Flow 29 Jars 250 T-Started 0152
 (C) First Final Flow 30 Safety Joint 75 T-Open 0430
 (D) Initial Shut-In 897 Circ Sub N/C T-Pulled 0638
 (E) Second Initial Flow 36 Hourly Standby _____ T-Out 0900
 (F) Second Final Flow 40 Mileage 39RT 39 Comments _____
 (G) Final Shut-In 896 Sampler _____
 (H) Final Hydrostatic 1977 Straddle _____
 Shale Packer _____ Ruined Shale Packer _____
 Extra Packer _____ Ruined Packer _____
 Extra Recorder _____ Sub Total 0
 Day Standby _____ Total 1514
 Accessibility _____ MP/DST Disc't _____
 Sub Total 1514

Approved By _____ Our Representative [Signature]
 Trilobite Testing Inc. shall not be liable for damaged of any kind of the property or personnel of the one for whom a test is made, or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statements or opinion concerning the results of any test, tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65276**

Well Name & No. Grothusen Unit #1 Test No. 4 Date 2/22/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Scott State Ks

Interval Tested 4185-4212 Zone Tested LKC I
 Anchor Length 27' Drill Pipe Run 4147 Mud Wt. 9.1
 Top Packer Depth 4180 Drill Collars Run 120 Vis 52
 Bottom Packer Depth 4185 Wt. Pipe Run Ø WL 7.2
 Total Depth 4212 Chlorides 3800 ppm System LCM 2#

Blow Description IF BOB@ 6 min - 38.9" blow
ISF BURT to 39.4"
FF BOB@ 8 min. - 46.6" blow
PSI Receded to 46.2"

Rec	Feet of	%gas	%oil	%water	%mud
<u>80</u>	<u>0.1</u>		<u>100%</u>		
<u>300</u>	<u>6 MOCW</u>	<u>10%</u>	<u>20%</u>	<u>30%</u>	<u>20%</u>
<u>460</u>	<u>SMCW</u>			<u>97%</u>	<u>3%</u>
	<u>60' @ IP</u>				

Rec Total 840 BHT 124 Gravity 22 API RW 354 @ 41 °F Chlorides 36,000 ppm
 (A) Initial Hydrostatic 2059 Test 1150 T-On Location 2530
 (B) First Initial Flow 70 Jars 250 T-Started 2347
 (C) First Final Flow 224 Safety Joint 75 T-Open 0227
 (D) Initial Shut-In 1077 Circ Sub N/C T-Pulled 0527
 (E) Second Initial Flow 228 Hourly Standby _____ T-Out 0827
 (F) Second Final Flow 399 Mileage 39RT 39 Comments _____
 (G) Final Shut-In 1069 Sampler _____
 (H) Final Hydrostatic 1993 Straddle _____
 Ruined Shale Packer _____
 Ruined Packer _____

Initial Open 30 Extra Packer _____
 Initial Shut-In 45 Extra Recorder _____
 Final Flow 45 Day Standby _____
 Final Shut-In 60 Accessibility _____
 Sub Total 1514 MP/DST Disc't _____

Approved By _____ Our Representative [Signature]
 Trilobite Testing Inc. shall not be liable for damaged of any kind of the property or personnel of the one for whom a test is made, or for any loss suffered or sustained, directly or indirectly, through the use of its equipment, or its statements or opinion concerning the results of any test, tools lost or damaged in the hole shall be paid for at cost by the party for whom the test is made.



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65277**

Well Name & No. Grothosen Unit # 1 Test No. 5 Date 2/22/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 283188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW#12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Scott State Ks

Interval Tested 4212-4234 Zone Tested LKC - J
 Anchor Length 22 Drill Pipe Run 4078 Mud Wt. 9.1
 Top Packer Depth 4207 Drill Collars Run 120 Vis 52
 Bottom Packer Depth 4212 Wt. Pipe Run Ø WL 6.4
 Total Depth 4234 Chlorides 4500 ppm System LCM 2#

Blow Description IF BOB @ 10 min built to 20"
BSI built to 21" - receded
FF BOB @ 12 min. built to 28"
FSI No return.

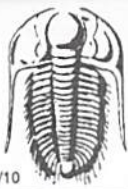
Rec	Feet of	%gas	%oil	%water	%mud
<u>20</u>	<u>011</u>	<u>100</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>60</u>	<u>0 mcd</u>	<u>10</u>	<u>70</u>	<u>20</u>	<u>0</u>
<u>500</u>	<u>SMCW oil spotted</u>	<u>97</u>	<u>3</u>	<u>0</u>	<u>0</u>
	<u>100' GIP</u>				
<u>580</u>	<u>BHT 125</u>	<u>—</u>	<u>API RW 1253 @ 47 °F</u>	<u>Chlorides 4200</u>	<u>ppm</u>

(A) Initial Hydrostatic	<u>2069</u>	<input checked="" type="checkbox"/> Test	<u>1150</u>	T-On Location	<u>1800</u>
(B) First Initial Flow	<u>34</u>	<input checked="" type="checkbox"/> Jars	<u>250</u>	T-Started	<u>1824</u>
(C) First Final Flow	<u>156</u>	<input checked="" type="checkbox"/> Safety Joint	<u>75</u>	T-Open	<u>2024</u>
(D) Initial Shut-In	<u>1080</u>	<input checked="" type="checkbox"/> Circ Sub	<u>N/C</u>	T-Pulled	<u>2324</u>
(E) Second Initial Flow	<u>151</u>	<input type="checkbox"/> Hourly Standby		T-Out	<u>0214</u>
(F) Second Final Flow	<u>275</u>	<input checked="" type="checkbox"/> Mileage	<u>39 RT 39</u>	Comments	
(G) Final Shut-In	<u>1079</u>	<input type="checkbox"/> Sampler			
(H) Final Hydrostatic	<u>2054</u>	<input type="checkbox"/> Straddle			

Initial Open	<u>30</u>	<input type="checkbox"/> Ruined Shale Packer	
Initial Shut-In	<u>45</u>	<input type="checkbox"/> Ruined Packer	
Final Flow	<u>45</u>	<input type="checkbox"/> Extra Copies	
Final Shut-In	<u>60</u>	Sub Total	<u>0</u>
		Total	<u>1514</u>
		MP/DST Disc't	
		Sub Total	<u>1514</u>

Approved By _____ Our Representative

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65278**

Well Name & No. Grothusen Unit #1 Test No. 6 Date 2/23/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 283188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Seott State Ks

Interval Tested 4236 - 4270 Zone Tested LKC K
 Anchor Length 34 Drill Pipe Run 4110 Mud Wt. 9.2
 Top Packer Depth 4231 Drill Collars Run 120 Vis 54
 Bottom Packer Depth 4236 Wt. Pipe Run 8 WL 7.2
 Total Depth 4270 Chlorides 4,000 ppm System LCM 2[#]
 Blow Description IF BOB @ 6 min. Built to 49.3".
ISI No return.
FF BOB @ 6 min. Built to 69".
FSI No return.

Rec	Feet of	%gas	%oil	%water	%mud
<u>1050</u>	<u>smcw</u>		<u>97</u>	<u>3</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 1050 BHT 125 Gravity — API RW 248 @ 45 ° F Chlorides 47,000 ppm
 (A) Initial Hydrostatic 2076 Test 1150 T-On Location 1400
 (B) First Initial Flow 37 Jars 250 T-Started 1407
 (C) First Final Flow 269 Safety Joint 75 T-Open 1609
 (D) Initial Shut-In 1048 Circ Sub N/C T-Pulled 1909
 (E) Second Initial Flow 277 Hourly Standby _____ T-Out 2150
 (F) Second Final Flow 492 Mileage 39 RT 39 Comments _____
 (G) Final Shut-In 1045 Sampler _____
 (H) Final Hydrostatic 2052 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1514

Initial Open 30
 Initial Shut-In 45
 Final Flow 45
 Final Shut-In 60
 Sub Total 1514
 Total 1514
 MP/DST Disc't _____
 Approved By _____ Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65279**

Well Name & No. Grothosen Unit #1 Test No. 7 Date 2/24/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Scott State KS

Interval Tested 4282-4320 Zone Tested LKC L
 Anchor Length 38 Drill Pipe Run 4142 Mud Wt. 9.3
 Top Packer Depth 4277 Drill Collars Run 120 Vis 63
 Bottom Packer Depth 4282 Wt. Pipe Run Ø WL 7.6
 Total Depth 4320 Chlorides 4600 ppm System LCM 2#

Blow Description IF BOB@ 2 min. Bolt to 72"
ISI No return.
FF BOB@ 5 min Bolt to 56"
ISI No return.

Rec	Feet of	%gas	%oil	%water	%mud
<u>1130</u>	<u>GSMWCO</u>	<u>20</u>	<u>65</u>	<u>10</u>	<u>5</u>
<u>120</u>	<u>GMWCO</u>	<u>10</u>	<u>30</u>	<u>50</u>	<u>10</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 1250 BHT 128 Gravity 18 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic <u>2112</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>0630</u>
(B) First Initial Flow <u>49</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>0714</u>
(C) First Final Flow <u>342</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>0957</u>
(D) Initial Shut-In <u>1082</u>	<input checked="" type="checkbox"/> Circ Sub <u>NC</u>	T-Pulled <u>1157</u>
(E) Second Initial Flow <u>357</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>1510</u>
(F) Second Final Flow <u>532</u>	<input checked="" type="checkbox"/> Mileage <u>39RT</u> <u>39</u>	Comments
(G) Final Shut-In <u>1072</u>	<input type="checkbox"/> Sampler	
(H) Final Hydrostatic <u>2096</u>	<input type="checkbox"/> Straddle	
Initial Open <u>30</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>30</u>	<input type="checkbox"/> Extra Recorder	<input type="checkbox"/> Extra Copies
Final Shut-In <u>30</u>	<input type="checkbox"/> Day Standby	Sub Total <u>0</u>
	<input type="checkbox"/> Accessibility	Total <u>1514</u>
	Sub Total <u>1514</u>	MP/DST Disc't

Approved By _____ Our Representative [Signature]

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65280**

Well Name & No. Grothusen Unit #1 Test No. 8 Date 2/25/2018
 Company Ritchie Exploration, Inc. Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, Ks 67278
 Co. Rep / Geo. John Goldsmith Rig WW #12
 Location: Sec. 30 Twp. 16s Rge. 31 W Co. Scott State Ks

Interval Tested 4428 - 4452 Zone Tested Altamon+
 Anchor Length 24' Drill Pipe Run 4399 Mud Wt. 9.2
 Top Packer Depth 4423 Drill Collars Run 120 Vis 50
 Bottom Packer Depth 4428 Wt. Pipe Run 0 WL 6.4
 Total Depth 4452 Chlorides 5500 ppm System LCM 2#

Blow Description IF: 1/2" blow,
ISI: No return.
FF: No blow.
FSI: No return.

Rec	Feet of	%gas	%oil	%water	%mud
<u>5</u>	<u>Mod</u>			<u>100</u>	
	<u>OIL SPOTS</u>				

Rec Total 5 BHT 113 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2188 Test 1150 T-On Location 1240
 (B) First Initial Flow 15 Jars 250 T-Started 1314
 (C) First Final Flow 16 Safety Joint 75 T-Open 1522
 (D) Initial Shut-In 25 Circ Sub N/C T-Pulled 1722
 (E) Second Initial Flow 16 Hourly Standby _____ T-Out 2008
 (F) Second Final Flow 16 ~~21~~ Mileage 39 RT 39 Comments _____
 (G) Final Shut-In 21 Sampler _____
 (H) Final Hydrostatic 2168 Straddle _____
 Shale Packer _____
 Ruined Shale Packer _____
 Ruined Packer _____
 Extra Packer _____
 Extra Copies _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1514 Total 1514 MP/DST Disc't _____

Approved By _____ Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65281**

Well Name & No. Grothusen Unit #1 Test No. 9 Date 2/27/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 783188 Wichita, ks 67278
 Co. Rep / Geo. John Goldsmith Rig WW#12
 Location: Sec. 30 Twp. 16s Rge. 31 W Co. Scott State Ks

Interval Tested 4453 - 4600 Zone Tested Pawnee - Johnson
 Anchor Length 147 Drill Pipe Run 4333 Mud Wt. 9.3
 Top Packer Depth 4448 Drill Collars Run 120 Vis 54
 Bottom Packer Depth 4453 Wt. Pipe Run Ø WL 8.0
 Total Depth 4600 Chlorides 6000 ppm System LCM 2#

Blow Description IF BOB @ 21 min. Built to 15.5"
ISI Built 3" to 18.5"
FF BOB @ 20 min. Built to 23.5"
FST Built 5.5" to 29"

Rec	Feet of	%gas	%oil	%water	%mud
<u>110</u>	<u>6 MCO</u>	<u>40</u>	<u>55</u>	<u>5</u>	
<u>100</u>	<u>60 CM</u>	<u>20</u>	<u>20</u>	<u>60</u>	
	<u>100' GIP</u>				

Rec Total 210 BHT 115 Gravity 26 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2221 Test 1150 T-On Location 1530
 (B) First Initial Flow 25 Jars 250 T-Started 1826
 (C) First Final Flow 66 Safety Joint 75 T-Open 2037
 (D) Initial Shut-In 1060 Circ Sub xc T-Pulled 2337
 (E) Second Initial Flow 73 Hourly Standby _____ T-Out 0221 2/27
 (F) Second Final Flow 96 Mileage 3ART 39 Comments _____
 (G) Final Shut-In 1029 Sampler _____
 (H) Final Hydrostatic 2184 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____

Initial Open 30
 Initial Shut-In 45
 Final Flow 45
 Final Shut-In 60

Sub Total 1514 Total 1514 MP/DST Disc't _____

Approved By _____ Our Representative [Signature]
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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **65282**

Well Name & No. Grothosen Unit #1 Test No. 10 Date 2/27/2018
 Company Ritchie Exploration, Inc Elevation 2961 KB 2953 GL
 Address Box 793188 Wichita, KS 67278
 Co. Rep / Geo. John Goldsmith Rig WW 12
 Location: Sec. 30 Twp. 16s Rge. 31w Co. Scott State KS

Interval Tested ~~4453-4600~~ 4598-4634 Zone Tested Morrow
 Anchor Length 36' Drill Pipe Run 4455 Mud Wt. 9.3
 Top Packer Depth 4448 Drill Collars Run 120 Vis 52
 Bottom Packer Depth 4453 Wt. Pipe Run 0 WL 8.8
 Total Depth 4634 Chlorides 6200 ppm System LCM 2#
 Blow Description IF 2 1/2" blow
ISF No return.
FF 3" blow.
FST No return.

Rec	Feet of	%gas	%oil	%water	%mud
<u>3</u>	<u>07L</u>	<u>100</u>			
<u>120</u>	<u>ncw</u>	<u>oil spots</u>		<u>70</u>	<u>30</u>

Rec Total 123 BHT 117 Gravity — API RW 226 @ 61 °F Chlorides 37000 ppm

(A) Initial Hydrostatic <u>2314</u>	<input checked="" type="checkbox"/> Test <u>1150</u>	T-On Location <u>0930</u>
(B) First Initial Flow <u>18</u>	<input checked="" type="checkbox"/> Jars <u>250</u>	T-Started <u>1011</u>
(C) First Final Flow <u>45</u>	<input checked="" type="checkbox"/> Safety Joint <u>75</u>	T-Open <u>1234</u>
(D) Initial Shut-In <u>961</u>	<input checked="" type="checkbox"/> Circ Sub <u>N/C</u>	T-Pulled <u>1534</u>
(E) Second Initial Flow <u>49</u>	<input type="checkbox"/> Hourly Standby	T-Out <u>1736</u>
(F) Second Final Flow <u>71</u>	<input checked="" type="checkbox"/> Mileage <u>39 x 2</u> <u>78</u>	Comments <u>p/v Tool 1800</u>
(G) Final Shut-In <u>822</u>	<input type="checkbox"/> Sampler	<u>2/28</u>
(H) Final Hydrostatic <u>2278</u>	<input type="checkbox"/> Straddle	<input type="checkbox"/> Ruined Shale Packer
Initial Open <u>36</u>	<input type="checkbox"/> Shale Packer	<input type="checkbox"/> Ruined Packer
Initial Shut-In <u>45</u>	<input type="checkbox"/> Extra Packer	<input type="checkbox"/> Extra Copies
Final Flow <u>45</u>	<input type="checkbox"/> Extra Recorder	Sub Total <u>0</u>
Final Shut-In <u>60</u>	<input type="checkbox"/> Day Standby	Total <u>1553</u>
	<input type="checkbox"/> Accessibility	MP/DST Disc't
	Sub Total <u>1553</u>	

Approved By _____ Our Representative 

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RITCHIE

EXPLORATION, INC.
Wichita, Kansas

#1 Grothusen Unit

702' FNL & 2,071' FWL

42' S & 91' E of NE/4 NW/4 Section 30-16S-31W

Scott County, Kansas

API# 15-171-21218-0000

Elevation: GL: 2953', KB: 2,961'

Sample Tops			Ref. Well
Anhydrite	2347'	+614'	+3
B/Anhydrite	2369'	+592'	+1
Stotler	3555'	-594'	+5
Heebener	3936'	-975	+11
Toronto	3956'	-995	+10
Lansing	3974'	-1013	+12
Muncie	4150'	-1189	+13
Stark	4248'	-1287	+9
Hush	4289'	-1328	+11
Marmaton	4364'	-1403	+14
Altamont	4390'	-1429	+12
Pawnee	4458'	-1497	+12
Myrick	4496'	-1535	+12
Ft. Scott	4512'	-1551	+12
Cherokee	4530'	-1569	+15
Johnson	4570'	-1609	+20
Morrow Shale	4601'	-1640	+19
Mississippian	4734'	-1673	+21
RTD	4750'	-1789	



PRESSURE PUMPING LLC

PO Box 884, Chanute, KS 66720
620-431-9210 or 800-467-8676

10/16/08
10062

TICKET NUMBER 55047

LOCATION Oakley, KS

FOREMAN Miles Shaw

FIELD TICKET & TREATMENT REPORT
CEMENT

Invoice # 812604

KS

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY	
3-1-10	7173	Groth USA unit #1	30	16 S	31 W	Scott	
CUSTOMER <u>Rachro Exploration</u>		Scott city N 10th Hwy 4 E 1st R. Navis N 10th R 200 4 West S.S.		TRUCK #	DRIVER	TRUCK #	DRIVER
MAILING ADDRESS <u>P.O. BOX 783188</u>				<u>753</u>	<u>Tennis W</u>		
CITY <u>Wichita</u>		STATE <u>KS</u>	ZIP CODE <u>67278-3188</u>	<u>1772/F127</u>	<u>Septho</u>		

JOB TYPE Long string HOLE SIZE 7 7/8" HOLE DEPTH 4750' CASING SIZE & WEIGHT 5.5" / 15.5#
 CASING DEPTH 4748' DRILL PIPE _____ TUBING _____ OTHER PC @ 22%
 SLURRY WEIGHT 13.8 SLURRY VOL. 1.4 WATER gal/sk _____ CEMENT LEFT in CASING _____
 DISPLACEMENT 112.75 bbls DISPLACEMENT PSI 1200/1700 MIX PSI _____ RATE _____

REMARKS: Safety meeting & Rig up on WW drilling Rig #12 Run in 12 sets Turbulizers on sets 1, 2, 3, 5, 7, 9, 10, 14, 16, 22, 57, 59, 70. Baskets on sets 10, 13, 17, 20, 58, 69. Run casing to bottom circulate 1 hr pump mud flush mix 220sx OWC w/ 5 # Volsal shut down clear pump & lines release plug displace 112.75 bbls water with 1200 psi lift plug and hold @ 1700 psi pressured up to 520 psi. Shut in

30sx Rtt PC tool on top of set # 58 @ 22% Thanks Miles & crew

ACCOUNT CODE	QUANTITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
CE0453	1	PUMP CHARGE	2800.00	2800.00
CE0002	30	MILEAGE	7.15	214.50
CE0711	11.75 Tons	Ton mileage delivery	60.00	660.00
CC5802	250 SX	Third blend TL OWC	26.00	6500.00
CC5320	100#	Salt	N/C	N/C
CC6000	59#	Friction reducer	17.95	463.15
CC6155	35 #	Cement defoamer	10.20	357.00
CC6077	1250 #	Kolsol	8.80	625.00
CC6125	500 gal	Mud flush	1.65	325.00
CP8254	1	5/2" Latch down plug & assembly	400.00	400.00
CP8485	1	5 1/2" Float shoe AFU	585.00	585.00
CP8576	13	5 1/2" Turbulizer	110.00	1430.00
CP8629	6	5 1/2" baskets	385.00	2310.00
CP8776	1	5 1/2" Port collar	2850.00	2850.00
		Subtotal		19519.65
		less 30% discount		5735.89
		Subtotal		13683.76
		SALES TAX		942.78
		ESTIMATED TOTAL		14606.54

Ravin 3737

AUTHORIZATION

Gay Row

TITLE

DATE

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.



PRESSURE PUMPING LLC
 PO Box 884, Chanute, KS 66720
 620-431-9210 or 800-467-8676

10177
 10000

TICKET NUMBER 55030

LOCATION Oakley, KS

FOREMAN Walt Druka

FIELD TICKET & TREATMENT REPORT
 CEMENT

INVOICE # 812610

DATE	CUSTOMER #	WELL NAME & NUMBER	SECTION	TOWNSHIP	RANGE	COUNTY
3-6-18	7173	Broth Unit #1	30	16S	31W	Scott
CUSTOMER <u>Ritchie Exploration</u>			Sest City with Hwy 4, SE to Radio Rel-3N 70260			
MAILING ADDRESS <u>P.O. BOX 783188</u>			TRUCK # <u>253</u>	DRIVER <u>Travis Wilburns</u>	TRUCK # <u>772-7727</u>	DRIVER <u>Neal White</u>
CITY <u>Wichita</u> STATE <u>KS</u> ZIP CODE <u>67278</u>			DRIVER <u>Keith Casswell</u>			

JOB TYPE <u>Part Colbr</u>	HOLE SIZE <u>7 7/8</u>	HOLE DEPTH <u>3188</u>	CASING SIZE & WEIGHT <u>5 1/2" 15.5#</u>
CASING DEPTH _____	DRILL PIPE _____	TUBING _____	OTHER <u>PCD 2296'</u>
SLURRY WEIGHT <u>12.5</u>	SLURRY VOL _____	WATER gal/sk _____	CEMENT LEFT in CASING _____
DISPLACEMENT <u>13 1/4</u>	DISPLACEMENT PSI _____	MIX PSI _____	RATE _____

REMARKS: Safety Meeting, rig up equipment, Test casing to 1200#, release pressure open Port Colbr, establish Circ, mix 275 - 5ks cement @ 600 #, cement cure to surface, Displaced 12 1/4 BBL H₂O / 400# Hulls
Shut Tool, pressure to 1200# hold, run 5 JTs, reverse cut clean, Pull 10 JTs, pressure to 500# shut in

Thank You
 Walt & Crew

ACCOUNT CODE	QUANTITY or UNITS	DESCRIPTION of SERVICES or PRODUCT	UNIT PRICE	TOTAL
<u>Co0451</u>	<u>1</u>	<u>PUMP CHARGE</u>	<u>1,900.00</u>	<u>1,900.00</u>
<u>Co0002</u>	<u>30</u>	<u>MILEAGE</u>	<u>7.15</u>	<u>214.50</u>
<u>Co0710</u>	<u>11.83</u>	<u>Tan Mileage Delivery</u>	<u>1.25</u>	<u>660.00</u>
<u>CC5831</u>	<u>275 - 5ks</u>	<u>Lite Weight Blend VII</u>	<u>17.50</u>	<u>4812.50</u>
<u>CC6025</u>	<u>69 #</u>	<u>Flo Seal</u>	<u>3.00</u>	<u>207.00</u>
<u>CC6090</u>	<u>400 #</u>	<u>Cotton Seed Hulls</u>	<u>1.00</u>	<u>400.00</u>
				<u>8,194.00</u>
		<u>Loss 30%</u>	<u>-</u>	<u>2,458.20</u>
				<u>5,735.80</u>
				<u>322.46</u>
				<u>6058.26</u>

Ravin 3737

AUTHORIZATION Gay Roun TITLE _____ DATE _____

I acknowledge that the payment terms, unless specifically amended in writing on the front of the form or in the customer's account records, at our office, and conditions of service on the back of this form are in effect for services identified on this form.

Wellsite Services, LLC

John Goldsmith
(316) 640-0236

427 Roosevelt St.
Cheney, KS 67025

Scale 1:240 (5"=100') Imperial Measured Depth Log

Well Name: #1 Grothusen Unit
API: 15-171-21218
Location: 702' FNL & 2,071' FWL, Sec 30-16S-31W, NE NW
License Number: REI #4767
Spud Date: 2/14/2018
Surface Coordinates: LAT: 38.6407391
LONG: -100.7895788
Bottom Hole Vertical Hole
Coordinates: 3/4 Degree Deviation
Ground Elevation (ft): 2953'
Logged Interval (ft): 3700' To: RTD
Formation: Mississippian at RTD
Type of Drilling Fluid: Chemical

Region: Scott County
Drilling Completed: 3/1/2018
K.B. Elevation (ft): 2961'
Total Depth (ft): 4750'

Printed by MUD.LOG from WellSight Systems 1-800-447-1534 www.WellSight.com

OPERATOR

Company: Ritchie Exploration Inc.
Address: 8100 E. 22nd St. N. #700
Wichita, KS 67226
(316) 691-9500

GEOLOGIST

Name: John Goldsmith
Company: Wellsite Services LLC
Address: 427 Roosevelt St.
Cheney, KS 67025
(316) 640-0236

RIG RECORDS

Contractor: WW Drilling Rig #12
Pusher: Calvin Phannensteil

Collar Tally: 435'

Pump: National K-380
Liner & Stroke: 6 x 14

BIT RECORDS

Size:	Type:	Footage:	Condition:	Hours:	Serial #:
12 1/4"	Sm-tooth	0-221'	RR	2.25	F29MH
7 7/8"	Sm-F27	221'-4750'	New	142	RJ5462

COMMENTS

Surface Casing: 5 joints of 8 5/8" set @ 221'
Production Casing: 5.5" production casing was set to TD.
Mud by: MudCo
DST's by: Trilobite Testing
Logs by: Halliburton Wireline Services (DIL, CN-CD, ML, CS)
RTD=4750' LTD=4744'

FORMATION TOPS

FORMATION	SAMPLE TOPS		LOG TOPS	
	Depth	Datum	Depth	Datum
B/Anhydrite	2369'	+592'	2364'	+597
Stotler	3555'	-594'	3550'	-589
Heebner Shale	3936'	-975	3931'	-970
Toronto	3956'	-995	3951'	-990
Lansing	3977'	-1016	3972'	-1011
Muncie Creek Shale	4150'	-1189	4146'	-1185
Stark Shale	4248'	-1287	4242'	-1281
Hushpuckney Shale	4292'	-1331	4287'	-1326
Base of KC	4332'	-1371	4326'	-1365
Marmaton	4364'	-1403	4361'	-1400
Altamont	4390'	-1429	4386'	-1425
Pawnee	4458'	-1497	4452'	-1491
Myrick Station	4496'	-1535	4487'	-1526
Fort Scott	4511'	-1550	4502'	-1541
Cherokee Shale	4530'	-1569	4526'	-1565
Johnson Zone	4570'	-1609	4568'	-1607
Morrow	4601'	-1640	4698'	-1637
Mississippian	4634'	-1673	4628'	-1667
RTD	4750'	-1789		
LTD			4744'	-1783

DST's

DST #1: 3876'-3912' (Oread) Recovered 100' water cut oil (85% oil, 15% water), 300' oil and mud cut water (15% oil, 20% mud, 65% water), and 1,120' slight mud cut water with oil specs (97% water, 3% mud). Chlorides 26,000/ppm

IFP: 106-361# ISIP: 1116#

FFP: 392-677# FSIP: 1110#

DST #2: 3996'-4018' (LKC "C") Recovered 10' clean oil and 130' slight oil and water cut mud (3% oil, 22% water, 75% mud).

IFP: 30-55# ISIP: 831#

FFP: 68-90# FSIP: 809#

DST #3: 4056'-4082' (LKC "E/F") Recovered 30' water cut mud with oil spots (20% water, 80% mud).

IFP: 29-30# ISIP: 897#

FFP: 36-40# FSIP: 896#

DST #4: 4185'-4212' (LKC "I") Recovered 60' gas in pipe, 80' clean oil, 300' gas, oil and mud cut water (10% gas, 20% oil, 20% mud, 50% water), and 460' slight mud cut water (3% mud, 97% water).

IFP: 70-224# ISIP: 1077#

FFP: 227-399# FSIP: 1069#

DST #5: 4212'-4234' (LKC "J") Recovered 100' gas in pipe, 20' clean oil, 60' oil and mud cut water (10% oil, 20% mud, 70% water), and 500' slightly mud cut water with oil specs (3% mud, 97% water)

IFP: 34-156# ISIP: 1080#

FFP: 151-275# FSIP: 1079#

DST #6: 4236'-4270' (LKC "K") Recovered 1050' slight mud cut water with oil specs (3% mud, 97% water)

IFP: 37-269# ISIP: 1048#

FFP: 277-492# FSIP: 1045#

DST #7: 4282'-4320' (LKC "L") Recovered 1130' slight mud and water cut gassy oil (5%, mud, 10% water, 20% gas, 65% oil) and 120' gas, mud, and oil cut water (10% mud, 10% gas, 30% oil, 50% water)

IFP: 49-342# ISIP: 1082#

FFP: 357-532# FSIP: 1072#

DST #8: 4428'-4452' (Altamont "C") Recovered 5' mud with oil specs.

IFP: 15-16# ISIP: 25#

FFP: 15-16# FSIP: 21#

DST #9: 4453'-4600' (Pawnee-Johnson) Recovered 100' gas in pipe, 110' gassy mud cut oil (5%, mud, 40% gas, 55% oil), and 100' gassy oil cut mud (20% gas, 20% oil, 60% mud)

IFP: 25-66# ISIP: 1060#

FFP: 73-96# FSIP: 1029#

DST #10: 4598'-4634' (Atoka-Morrow) Recovered 3' heavy oil, 120' mud cut water with oil specs (30% mud, 70% water)

IFP: 18-45# ISIP: 961#

FFP: 49-71# FSIP: 822#

ROCK TYPES



Anhy



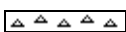
Dol



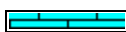
Sltst



Sandylms



Cht



Lmst



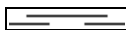
Ss



Shaly ls



Congl



Shale



Carb sh

ACCESSORIES

EVENTS

-  Circ
-  Conn







FOSSIL

-  Brach
-  Bryozoa
-  Crin





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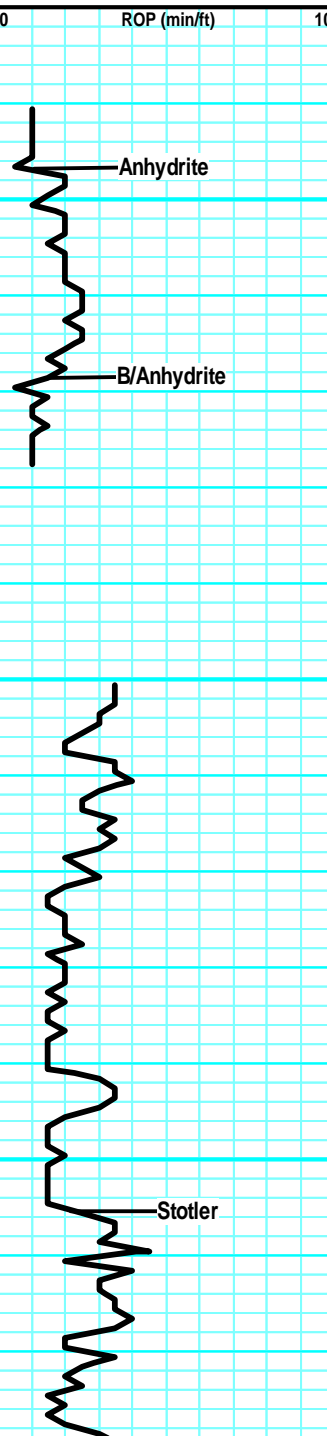

- Foram
- Fossil
- Gastro
- Oolite
- Ostra
- Fuss
- Oolcast

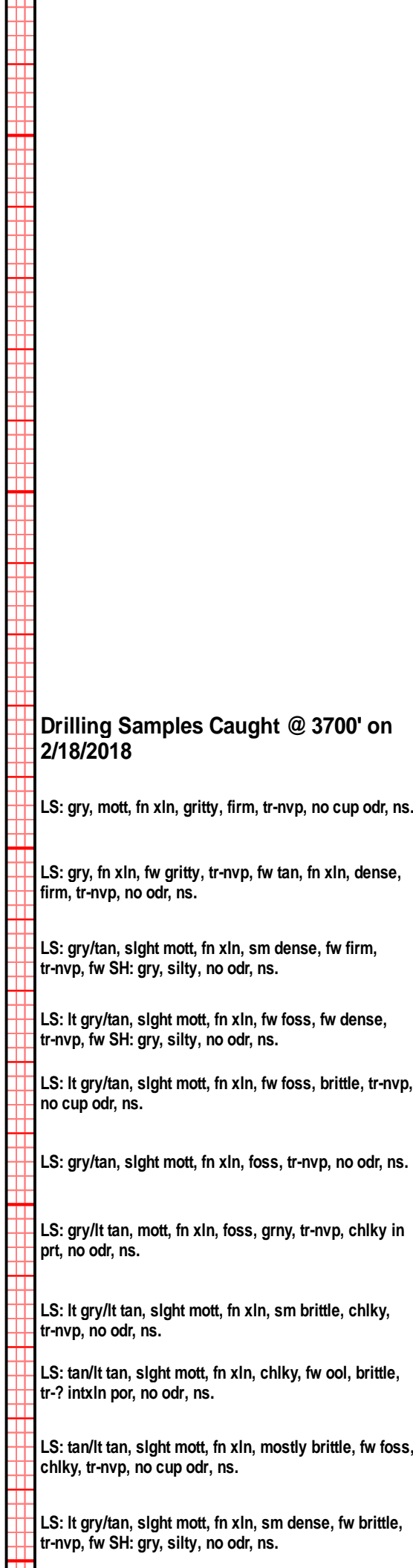
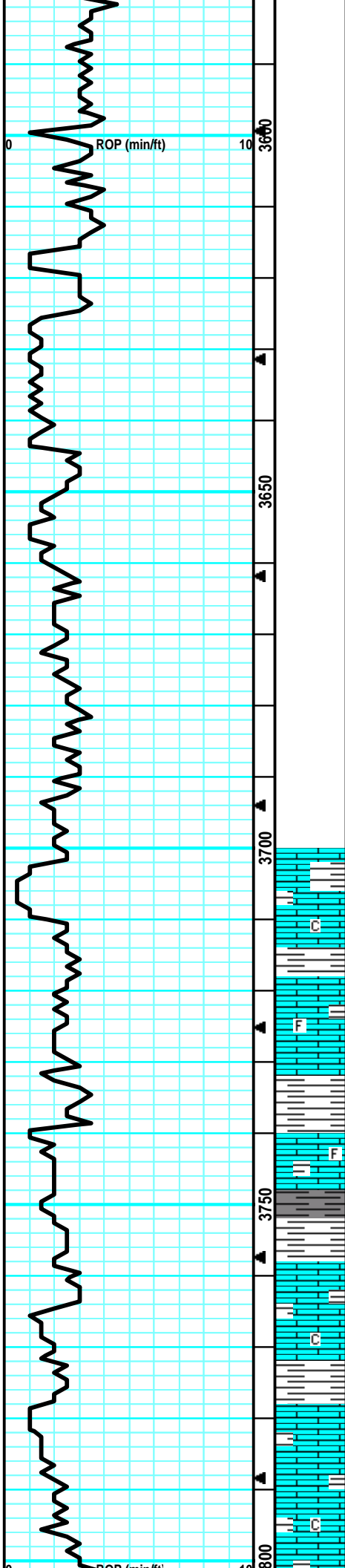
MINERAL

-  Calc
-  Chtdk
-  Chtlt
-  Glau
-  Pyr
-  Sil

TEXTURE

-  Chalky
-  Crsxn
-  Finexln
-  Microxln

Drilling Time ROP (min/ft)	Depth	Lithology	CFS Point	Oil Shows	Geological Descriptions	Remarks
	0 10 3450 3500 3550				<p>Morning Report/Activity</p> <p>Feb. 14, 2018: Rig Up and Spud @ 3:15pm 2/15/18: Drlg @ 621' 2/16/18: Drlg @ 2314' 2/17/18: Drlg @ 3067' 2/18/18: Drlg @ 3613' 2/19/18: Test (DST #1, Oread) 2/20/18: Test (DST #2, LKC "C") 2/21/18: Test (DST #3, LKC "E/F") 2/22/18: Test (DST #4, LKC "I", DST #5, LKC "J") 2/23/18: Drlg @ 4248' (DST #6, LKC "K") 2/24/18: Test (DST #7, LKC "L") 2/25/18: Test (DST #8, Alt "C") 2/26/18: Drlg @ 4530' (DST #9, Paw-Johnson) 2/27/18: Test (DST #10, Atoka-Morrow) 2/28/18: Drlg @ 4728' 3/1/18: RTD @ 4750' (Ran Logs and Casing)</p> <p>Drilling Time begins @ 3500' on 2/18/2018</p>	<p>Mud Report #1 0' 2/14/18</p> <p>Survey = 1/2 Degree @ 221'</p> <p>Anhydrite @ 2347' (+614)</p> <hr/> <p>B/Anhydrite @ 2369' (+592)</p> <p>Mud Report #2 2391' 2/16/18 Wt Vis pH 9.6 33 7.0 Filt Chl LCM n/c 29K 2#</p> <hr/> <p>Mud Report #3 3153' 2/17/18 Wt Vis pH 9.6 31 7.0 Filt Chl LCM n/c 25K 2#</p>
						<p>Stotler @ 3555' (-594)</p>



Mud Report #4
 3671' 2/18/18
 Wt Vis pH
 8.7 68 11.0
 Filt Chl LCM
 6.4 2K 3#

Drilling Samples Caught @ 3700' on 2/18/2018

LS: gry, mott, fn xln, gritty, firm, tr-nvp, no cup odr, ns.

LS: gry, fn xln, fw gritty, tr-nvp, fw tan, fn xln, dense, firm, tr-nvp, no odr, ns.

LS: gry/tan, slight mott, fn xln, sm dense, fw firm, tr-nvp, fw SH: gry, silty, no odr, ns.

LS: lt gry/tan, slight mott, fn xln, fw foss, fw dense, tr-nvp, fw SH: gry, silty, no odr, ns.

LS: lt gry/tan, slight mott, fn xln, fw foss, brittle, tr-nvp, no cup odr, ns.

LS: gry/tan, slight mott, fn xln, foss, tr-nvp, no odr, ns.

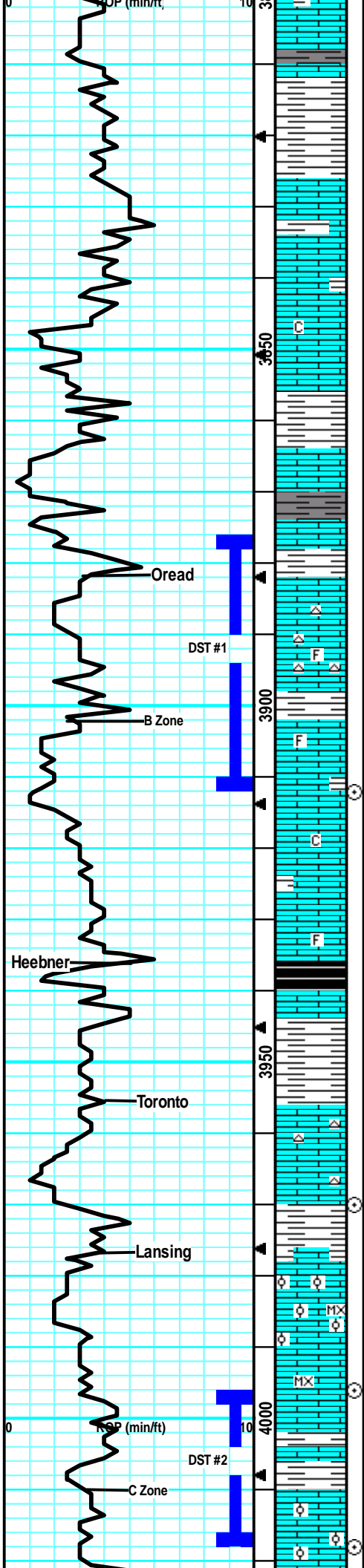
LS: gry/lt tan, mott, fn xln, foss, grny, tr-nvp, chlky in prt, no odr, ns.

LS: lt gry/lt tan, slight mott, fn xln, sm brittle, chlky, tr-nvp, no odr, ns.

LS: tan/lt tan, slight mott, fn xln, chlky, fw ool, brittle, tr-? intxln por, no odr, ns.

LS: tan/lt tan, slight mott, fn xln, mostly brittle, fw foss, chlky, tr-nvp, no cup odr, ns.

LS: lt gry/tan, slight mott, fn xln, sm dense, fw brittle, tr-nvp, fw SH: gry, silty, no odr, ns.



LS: tan/lt tan, slight mott, fn xln, brittl in prt, fw tr-nvp, fw pcs w/ drk min stns, no fluor, no odr, ns.

LS: lt gry/tan, fn xln, soft, brittle, sm v chlky, gritty, no odr, ns.

LS: gry/tan, slight mott, fn xln, slub-chlky, brittle, scat pr vuggy por, no odr, ns.

LS: lt tan, slight mott, fn xln, brittle, sm pr intxln por in sm, svrl pcs of chlky, no odr, ns.

LS: tan/lt tan, slight mott, fn xln, brittle, chlky, fw pcs w/ pr por, fw w/ drk min stns, no odr, ns.

LS: tan/lt brn, sing, fn xln, sm firm, pr pnpt intxln por, no odr, ns.

LS: tan, sing, fn xln, fw pcs w/ pnpt in xln por, 1 pcs w/ pr frac por on edge, pos light brn stn, wk-? fluor, no odr, nsfo.

LS: tan/lt tan, sing, fn xln, mostly dense, firm, fw flakey, tr-nvp, no odr, ns.

LS: tan/lt tan, slight mott, fn xln, fr intxln por in svrl pcs w/ fw scat vugs, gd sat sptd stns, fo in vug por w/ gas bub cling to shpr, fw cup odr, fr sfo.

LS: gry/tan, mott, fn xln, fw foss, mostly flakey/mealy, 1-2 pcs of sho from above, fw Chert: wht, foss, sharp, no odr, ns.

LS: lt gry/lt tan, slight mott, fn xln, fw foss frags, v chlky, soft, fr intxln por, no odr, ns.

LS: lt tan/lt gry, slight mott, fn xln, v chlky, soft, no odr, ns.

LS: gry/tan, mott, fn xln, chlky, sm brittle, sptd drk brn spcs, nsfo, no fluor, no odr.

LS: gry/tan, mott, fn xln, sm brittl, sub-chlky in prt, fw pcs w/ drk brn spcs, nsfo, no flour, pos drk min stns or ddo, no odr.

LS: gry/tan, slight mott, fn xln, fw foss frags, fw flakey, tr-nvp, lrg inflix blk SH: carb, no odr, ns.

SH: gry/grn, silty, soft, fw LS: tan/gry, fn xln, tr-nvp, no odr, ns.

LS: crm/lt tan, sing, fn xln, chlky, brittle, tr-pr intxln por in fw, sm Chert: wht/opaq, no odr, ns.

LS: lt tan, sing, fn xln, brittle, sub-chlky, tr-nvp, fw Chert: wht/opaq, foss, sharp, no odr, ns.

LS: gry/tan, sing, fn xln, dense, fw firm, tr-nvp, fw SH: gry/brn, silty, no odr, ns.

LS: tan, sing, fn xln, sm v ool, v chlky, tr-pr intool por, fw Chert: wht/opaq, foss, no odr, ns.

LS: tan/lt tan, sing, micro-fn xln, dense, sm firm, tr-nvp, no cup odr, ns.

LS: tan, sing, micro-fn xln, dense, firm, tr-nvp, no odr, ns.

LS: tan, sing, fn xln, mostly dense, sm firm, sub-chlky in prt, tr-nvp, sm SH: gry, silty, no odr, ns.

SH: drk gry/grn, silty, soft, sm muddly like, ns.

LS: tan, sing, fn xln, fw ool, brittle, gd intxln & fr vuggy por w/ 2nd rxln, sat brn stns, gas bub cling to rx chp, gd fluor/cut, fr sfo brk in svrl pcs, strg cup odr. 60" Smpl even strgr odr and more ool, less show rx, and less sfo.

LS: lt gry, sing, fn xln, dense, sub-chlky in prt, firm

DST #1: 3876'-3912' (Oread) Recovered 100' water cut oil (85% oil, 15% water), 300' oil and mud cut water (15% oil, 20% mud, 65% water), and 1,120' slight mud cut water with oil specs (97% water, 3% mud). Chlorides 26,000/ppm IFP: 106-361# ISIP: 1116# FFP: 392-677# FSIP: 1110#

Pipe Strap = 1.17 Long

Survey = 1/4 Degree @ 3912'

CFS @ 3912' (30"/60")

Mud Report #5	3912'	2/19/18
Wt	Vis	pH
9.1	69	11.0
Filt	Chl	LCM
6.4	2.3K	3#

Heebner @ 3936' (-975)

Toronto @ 3956' (-995)

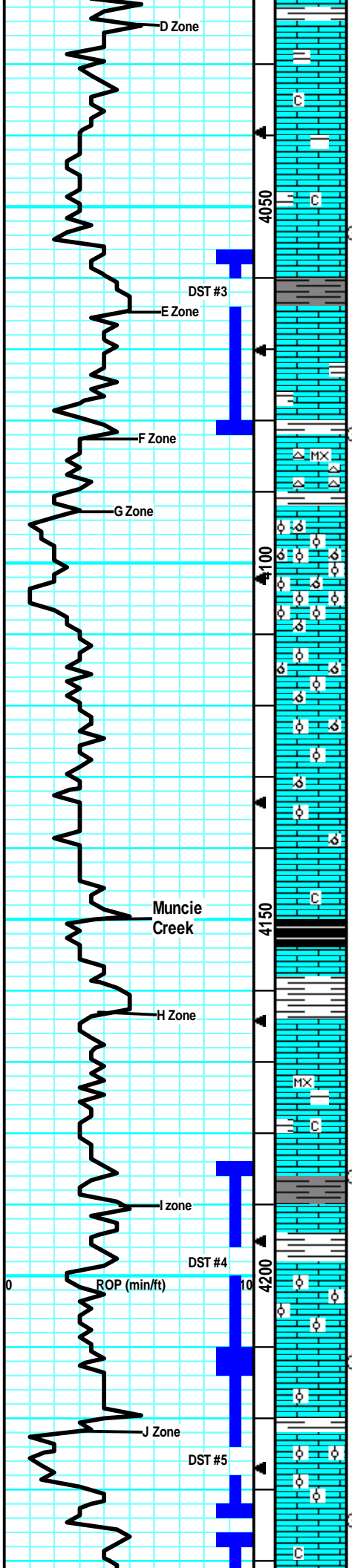
CFS @ 3970' (30"/60")

Lansing @ 3977' (-1016)

CFS @ 3996' (30"/60")

DST #2: 3996'-4018' (LKC "C") Recovered 10' clean oil and 130' slight oil and water cut mud (3% oil, 22% water, 75% mud). IFP: 30-55# ISIP: 831# FFP: 68-90# FSIP: 809#

CFS @ 4018'



LS: lt gry, sing, fn xln, dense, sub-chlky in prt, mlt, tr-nvp, no cup odr, 1-2 w/ sho most likely from above.

LS: tan/lt gry, sing, fn xln, mostly dense, sub-chlky, tr-nvp, fw pcs pur chl, no odr, ns.

LS: tan/lt gry, sing, fn xln, sm dense, fw brittle, sub-chlky in prt, 2-3 pcs w/ pr intxln por on surf, lght brn patchy stns, wk-? fluor, nsfo, no cup odr.

LS: tan/lt gry, sing, fn xln, sm pr intxln por, brittle, v chlky, no odr, ns.

LS: lt gry, sing, fn xln, many flakey, sub-chlky, tr-nvp, no cup odr, ns.

LS: tan/lt gry, fn xln, sub-chlky, pr ppt intxln por in sm, 2 pcs w/ pos frac edge por, spttd lght brn stns, dul yel fluor, ssfo, wk cup odr, fw SH: drk gry.

LS: tan, sing, fn xln, mostly dense, sub-chlky in prt, tr-pr ppt intxln por in fw, no odr, ns.

LS: tan, sing, fn xln, dense, sub-chlky in prt, tr-nvp, no odr, ns.

LS: tan, sing, micro-fn xln, dense, fw firm, tr-nvp, fw Chert: wht/opaq, svrl SH: gry/brn, silty, no odr, ns.

LS: tan/lt brn, mott, fn xln, sm v ool, sm v gd oolcast por, no cup odr, ns.

LS: tan/lt brn, mott, fn xln, profus ool, sm v gd oolcast por, svrl SH: gry/brn, silty, no odr, ns.

LS: tan/lt gry, slight mott, fn xln, sm ool, many dense, tr-nvp, no cup odr, ns.

LS: lt tan, sing, fn xln, brittle, sub-chlky, fw ool, tr-nvp, fw pcs pur chl, no odr, ns.

LS: crm/lt tan, sing, fn xln, mostly brittle, sub-chlky, tr-nvp, svrl pcs pur chl, no odr, ns.

LS: lt gry/lt tan, slight mott, fn xln, dense, sm flakey, sub-chlky, tr-nvp, no cup odr, ns.

LS: tan/lt brn, mott in prt, fn xln, flakey, firm, sm spttd brn stns, no fluor, sm SH: blk, silty, nsfo, no cup odr.

LS tan, slight mott, fn xln, brittle, sub-chlky, fw pcs w/ tr-pr ppt intxln por, no cup odr, ns.

LS: lt tan/lt gry, sing, micro-fn xln, mostly dense, brittle, sub-chlky, tr-nvp, fw pcs pur chl, no odr, ns.

LS: gry/lt tan, slight mott, fn xln, sub-chlky, tr-nvp, fw pcs pur chl, no odr, ns.

LS: gry/lt brn, slight mott, fn xln, many firm, sm flakey/mealy, tr-nvp, fw SH: drk gry, silty, no odr, ns.

LS: tan/gry, sing, fn xln, fw flakey/mealy, 2 pcs w/ gd vuggy por, sat stns w/ 2nd rxln in vugs, gd cup odr, gd sfo.

LS: tan, mott, fn xln, sm v ool/foss, gd vuggy/intool por, hvy sat stns in por, strg cup odr, v gd sho fo in abund of pcs.

LS: tan/lt brn, fn xln, mostly firm, flakey, tr-nvp, 2 pcs of sho from above, no odr.

LS: tan, mott, fn xln, profus ool, brittle, gd oolcast por, drk hvy stns in por, gd sho fo on brk, gd cup odr, dul yel fluor, sm fo float in tray.

30" Smpl had most intool por, w/ pr stn, gd sfo on brk, strng odr.

LS: lt gry/tan, slight mott, fn xln, fw brittle, sm scat ppr ppt intxln por, fw pcs w/ spttd lght brn stns, nsfo, faint cup odr.

CFS @ 4018' (30"/60")

Mud Report #6
4018' 2/20/18
Wt Vis pH
9.1 57 11.0
Filt Chl LCM
6.8 4K 2#

CFS @ 4054' (30"/60")

DST #3: 4056'-4082' (LKC "E/F") Recovered 30' water cut mud with oil spots (20% water, 80% mud).
IFP: 29-30# ISIP: 897#
FFP: 36-40# FSIP: 896#

CFS @ 4082' (30"/60")

Mud Report #7
4082' 2/21/18
Wt Vis pH
9.2 51 11.0
Filt Chl LCM
7.2 3.8K 2#

Muncie Creek @ 4150' (-1189)

DST #4: 4185'-4212' (LKC "I") Recovered 60' gas in pipe, 80' clean oil, 300' gas, oil and mud cut water (10% gas, 20% oil, 20% mud, 50% water), and 460' slight mud cut water (3% mud, 97% water).
IFP: 70-224# ISIP: 1077#
FFP: 227-399# FSIP: 1069#

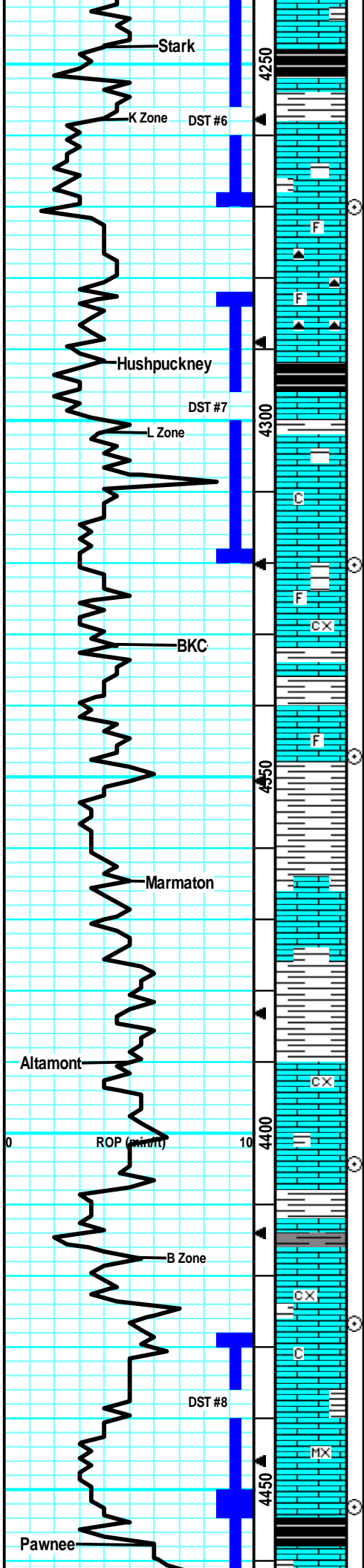
CFS @ 4186' (30"/60")

Mud Report #8
4217' 2/22/18
Wt Vis pH
9.2 54 11.0
Filt Chl LCM
6.4 4.5K 2#

CFS @ 4212' (30"/60")

DST #5: 4212'-4234' (LKC "J") Recovered 100' gas in pipe, 20' clean oil, 60' oil and mud cut water (10% oil, 20% mud, 70% water), and 500' slightly mud cut water with oil specs (3% mud, 97% water)
IFP: 34-156# ISIP: 1080#
FFP: 151-275# FSIP: 1079#

CFS @ 4234' (30"/60")



LS: gry/lt brn, slight mott, fn xln, firm, fw flakey, v fw scat vup por on edges, 2 pcs w/ drk tarry stns on surf, nsfo, faint cup odr, fw SH: blk, silty, carb.

LS: gry, slight mott, fn xln, sm firm, fr intxn por in svrl pcs w/ scat vugs, sat drk brn stns, gd cup odr, gd fluor, gsfo in svrl pcs, sm fo clng to rx chp.

30" Smpl: less pcs of sho rx, only 5-6 pcs w/ show, many dense flakey, tr-nvp, fr cup odr, fr sfo.

LS: tan, slight mott, fn xln, fw fos frags, many brittle, sub-chlky in prt, tr-nvp, faint cup odr, 2 pcs w/ sho like disc above.

LS: tan/lt gry, slight mott, fn xln, fw foss, mostly dense, sub-chlky, tr-nvp, fw Chert: gry, foss, no odr, ns.

SH: blk, silty, soft, carb.

LS: tan, slight mott, fn xln, gd intxn por on edges, slight vuggy, sm gd rhm 2nd rxln, sat drk brn/blk stns, gd cup odr, dul yel fluor, ssfo in 6-8 pcs.

LS: gry/tan, slight mott, fn xln, mostly dense, fw foss, tr-nvp, faint? cup odr, ns.

LS: lt tan, sing, fn xln, mostly dense, 2 pcs w/ pr ppt intxn por on frac edges, lght brn stns, wk fluor, faint? cup odr, vssfo.

LS: gry/lt tan, slight mott, fn xln, fw foss, mostly dense, sm firm, tr-nvp, no cup odr, ns.

LS: lt gry/tan, slight mott, fn-crs xln, dense, sm firm, tr-? ppt intxn por in fw pcs, no cup odr, ns.

LS: lt gry/lt tan, slight mott, fn xln, fw foss, sm brittle, sub-chlky, tr-nvp, no cup odr, ns.

LS: lt tan, sing, fn xln, tr-nvp, abund SH: gry/brn, silty, fw SltStn: gry/blu, gritty, friable, no cup odr, ns.

SH: gry/brn/grn, silty, sm soft, fissile, fw SltStn: gry/brn, gritty, firable, sm firm, no cup odr, ns.

SH: gry/blue/grn, silty, soft, fissile, fw waxy, fw LS: lt tan/lt gry, sing, micro-fn xln, dense, brittle, tr-nvp, no odr, ns.

SH: gry/brn/grn, silty, soft, fw fissile, sm muddy, fw LS: tan/lt gry, fn xln, dense, firm, tr-nvp, no odr, ns.

SH: gry/brn/blu, silty, soft, fw fissile, fw LS: gry/tan, slight mott, fn xln, dense, firm, tr-nvp, no cup odr, ns.

LS: tan/gry, slight mott, fn-crs xln, firm, sm flakey, fw hard, tr-nvp, abund SH: gry/brn, silty, no odr, ns.

LS: tan/gry, slight mott, fn xln, many dense, sm firm, sub-chlky in prt, tr-nvp, abund SH: gry/brn/grn, silty, no cup odr, ns.

SH: gry/brn, silty, soft, sm muddy like, fw LS: gry/tan, slight mott, fn xln, dense, sm firm, sub-chlky, tr-nvp, no cup odr, ns.

LS: tan/lt tan, sing, fn xln, mostly dense, sm brittle, sub-chlky, tr-nvp, abund SH: gry/brn, silty, no odr, ns.

LS: tan/lt gry, sing, fn-crs xln, mostly dense, sm firm, sub-chlky in prt, tr-nvp, no cup odr, ns.

LS: tan/lt gry, sing, fn xln, dense, sm firm, fw flakey, sub-chlky in prt, tr-nvp, no odr, ns.

LS: gry, sing, fn xln, mostly dense, sub-chlky in prt, fw flakey, tr-nvp, no cup odr, ns.

LS: tan, sing, micro-fn xln, mostly dense, sm firm, scat por intxn por on edge w/ lmtd vugs, sat stns in por, dul yel fluor, strm cut, ssfo, wk cup odr.

SH: blk/gry/blu, silty, soft, mostly carb, fw LS: lt tan/gry, slight mott, fn xln, sub-chlky, tr-nvp, no cup odr, ns.

Stark @ 4248' (-1287)

DST #6: 4236'-4270' (LKC "K") Recovered 1050' slight mud cut water with oil specs (3% mud, 97% water)
IFP: 37-269# ISIP: 1048#
FFP: 277-492# FSIP: 1045#

CFS @ 4270' (30"/60")

Mud Report #9			
Wt	Vis	pH	
4270'	2/23/18		
9.2	54	10.5	
Filt	Chl	LCM	
7.2	4K	2#	

Hushpuckney @ 4292' (-1331)

DST #7: 4282'-4320' (LKC "L") Recovered 1130' slight mud and water cut gassy oil (5% mud, 10% water, 20% gas, 65% oil) and 120' gas, mud, and oil cut water (10% mud, 10% gas, 30% oil, 50% water)
IFP: 49-342# ISIP: 1082#
FFP: 357-532# FSIP: 1072#

CFS @ 4320' (30"/60")

BKC @ 4332' (-1371)

Mud Report #10			
Wt	Vis	pH	
4320'	2/24/18		
9.3	53	11.0	
Filt	Chl	LCM	
7.6	4.6K	2#	

CFS @ 4347' (30"/60")

Marmaton @ 4364' (-1403)

Altamont @ 4390' (-1429)

CFS @ 4404' (30"/60")

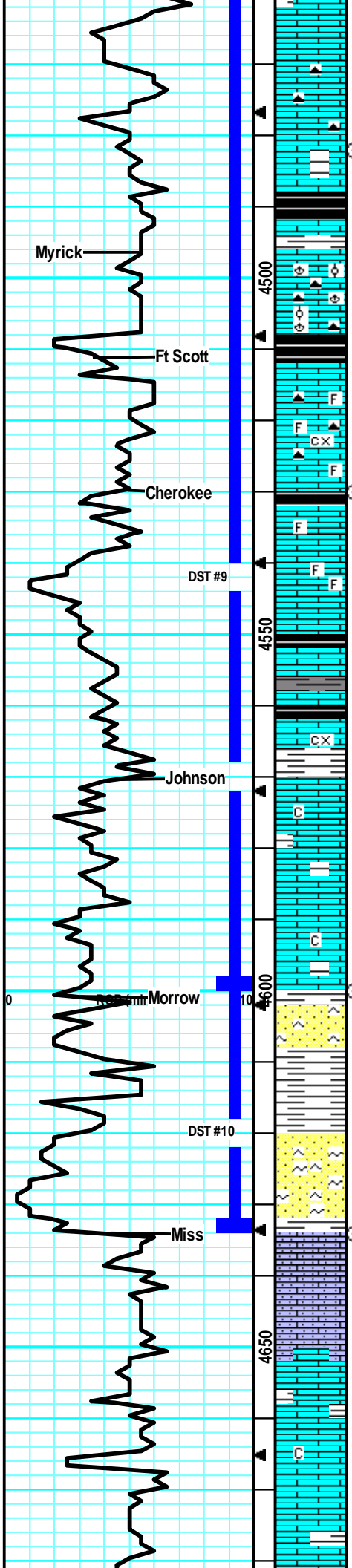
Mud Report #11			
Wt	Vis	pH	
4452'	2/25/18		
9.2	51	11.0	
Filt	Chl	LCM	
6.4	5.5K	2#	

CFS @ 4426' (30"/60")

DST #8: 4428'-4452' (Altamont "C") Recovered 5' mud with oil specs.
IFP: 15-16# ISIP: 25#
FFP: 15-16# FSIP: 21#

CFS @ 4452' (30"/60")

Pawnee @ 4458' (-1497)



LS: lt tan, sing, fn xln, sub-chlky, tr-nvp, 2 pcs w/ tr-pr ppt intxln por, w/ spttd salt/pep stan, wk fluor, vssfo only on brk, no cup odr.

LS: gry/tan, slight mott, fn xln, dense, firm, fw flakey, tr-nvp, fw Chert: tan/gry, foss, sharp, no cup odr, ns.

SH: blk, silty, mostly carb, fw LS: gry/tan, slight mott, fn xln, dense, firm, tr-nvp, no cup odr, ns.

LS: tan/gry, fn xln, sm flakey/mealy, fw pcs w/ tr-pr pptintxln por, patchy brn stns, wk fluor, strm cut on brk, vvso on brk in 4-5 pcs, fw Cher: gry, foss, ? cup odr.

LS: tan/lt brn, mott, fn xln, foss, brach/ool, sm firm, tr-nvp, fw Chert: gry/brn, foss, sharp, sm SH: blk, silty, mostly carb, no cup odr, ns.

SH: blk, silty, soft, mostly carb, sm LS: tan/lt tan, mott, fn xln, ool/foss, sub-chlky, fw brittle, tr-nvp, no cup odr, ns.

LS: gry/lt brn, mott, fn-crs xln, svrl fross, firm, fw flakey, tr-nvp, sm Chert: gry/brn, foss, sharp, no cup odr, ns.

LS: gry, slight mott, fn xln, foss in prt, fw flakey, tr-nvp, fw SH: drk gry/blk, silty, carb, no odr, ns.

LS: gry, mott, fn xln, many flakey/mealy, sub-chlky, foss, tr-nvp, no cup odr, ns.

LS: gry/lt brn, slight mott, fn xln, many flakey/mealy, firm, tr-nvp, fw SH: gry/grn, silty, no cup odr, ns.

LS: gry, slight mott, fn-crs xln, flakey/mealy, firm, tr-nvp, svrl SH: gry/brn/grn, silty, no odr, ns.

LS: tan/lt gry, slight mott, fn xln, mostly dense, pr intxln por w/ patchy brn stns, v fw scat vugs sat, ssfo, fw gas bubs on brk, faint cup odr.

LS: gry/tan, slight mott, fn xln, dense, tr-nvp, fw pcs w/ fr intxln por, brittle, fr sfo on brk w/ gas bub, gd fluor/cut, faint-? cup odr.

LS: tan/lt tan, fn xln, sub-chlky, pr intxln por in sm, drk hvy tarry like stns in por, no lively oil, faint-? cup odr, no fluor.

60" Smp: tan/lt tan, fn xln, sub-chlky, sm dense, firm, tr-nvp, no cup odr, ns.

4620' Smp: LS: vuggy, stnd, with gd vuggy por, ssfo, SS: gry/drk gry, fn grn, well sort, sub-rnd qtz grns, friable, fr intgrn por, FO floating in try, rx well sat, grt sfo on brk, fr cup odr.

SH: gry/grn/brn, silty, soft, fw fissile, svrl SS: gry, fn grn sub-rnd, well cem, fr-tight intgrn por, sat rx w/ oil, gd sfo on cursh, gld fluor, strm cut, fr cup odr.

SH: gry/grn/brn, silt, soft, fw SS: crm/lt gry, pr sort, fn-crs grns, sub-ang, limey, friable, sm arg, fw with fr intgrn por, no cup odr, ns.

SH: gry/brn/blu, silty, soft, fw SS: lt gry/grn, pr sort, fn-crs grn, sub-rnd, arg, glauc, friable, tr-nvp, no cup odr, ns.

LS: crm/lt tan, sandy/gritty, chlky, brittle, friable, tr-nvp, fw SH: gry/blu, silty, soft, no cup odr, ns.

LS: crm/lt tan, sing, fn xln, sandy/gritty, brittle, sub-chlky, tr-nvp, no cup odr, ns.

LS: lt tan/lt gry, sing, fn xln, mostly dense, sm brittle, fw flakey/mealy, tr-nvp, no cup odr, ns.

LS: lt tan/lt gry, sing, fn xln, dense, firm, fw pcs w/ frac edge por, no cup odr, ns

LS: lt gry/lt tan, sing, fn xln, dense, firm, sub-chlky in prt, tr-nvp, no cup odr, ns.

CFS @ 4482'
(30"/60")

Myrick @ 4496' (-1535)

Ft Scott @ 4511' (-1550)

CFS @ 4530'
(30"/60")

Cherokee @ 4530' (-1569)

Mud Report #13
4634' 2/27/18

Wt	Vis	pH
9.4	58	10.0
Fit	Chl	LCM
8.8	6.2K	2#

Johnson @ 4570' (-1609)

DST #9: 4453'-4600' (Pawnee-Johnson) Recovered 100' gas in pipe, 110' gassy mud cut oil (5% mud, 40% gas, 55% oil), and 100' gassy oil cut mud (20% gas, 20% oil, 60% mud)
IFP: 25-66# ISIP: 1060#
FFP: 73-96# FSIP: 1029#

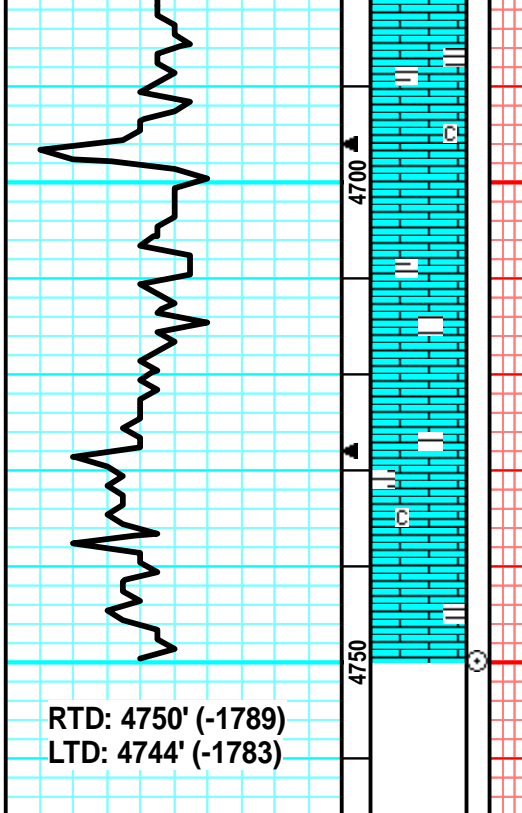
CFS @ 4600'
(30"/60")

Morrow @ 4601' (-1640)

DST #10: 4598'-4634' (Atoka-Morrow) Recovered 3' heavy oil, 120' mud cut water with oil specs (30% mud, 70% water)
IFP: 18-45# ISIP: 961#
FFP: 49-71# FSIP: 822#

CFS @ 4634'
(30"/60")

Miss @ 4734' (-1673)



LS: gry/lt tan, sing, fn xln, mostly dense, many firm, fw sub-chlky, tr-nvp, no cup odr, ns.

LS: tan/gry, slight mott, fn xln, dense, firm, tr-nvp, fw SH: drk gry/blk, silty, v soft, no cup odr, ns.

LS: lt tan/gry, slight mott, fn xln, dense, firm, tr-nvp, fw SH: drk gry, silty, soft, no odr, ns.

LS: lt gry/lt tan, sing, fn xln, mostly dense, firm, tr-nvp, fw pcs of pur chlky, no odr, ns.

LS: crm/lt tan, sing, micro-fn xln, dense, sm brittle, sub-chlky, tr-nvp, fw pcs pur chl, no cup odr, ns.

LS: lt gry/lt tan, sing, micro-fn xln, dense, sm firm, sub-chlky in prt, fw pcs pur chl, no cup odr, ns.

LS: lt brn/tan, slight mott, fn xln, many firm, many flakey/mealy, chlky, tr-nvp, fw pur chl, no cup odr, ns.

Mud Report #14
 4570' 2/28/18
 Wt Vis pH
 9.2 58 10.5
 Filt Chi LCM
 7.2 5.5K 3#

CFS @ 4750'
 (30"/60")

Survey = 3/4 Degree @ 4750'

RTD: 4750' (-1789)
 LTD: 4744' (-1783)