

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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Form	ACO1 - Well Completion
Operator	Larson Engineering, Inc. dba Larson Operating Company
Well Name	Ray 1-8
Doc ID	1288970

Tops

Name	Top	Datum
Anhydrite	2121	+640
B Anhydrite	2152	609
Heebner Sh	3919	-1158
Lansing	3956	-1195
Stark Sh	4218	1457
Marmaton	4336	-1575
Pawnee	4420	-1659
Ft. Scott	4472	-1711
L Cher SH	4497	1736
Mississippi	4560	-1799



CHARGE TO: **LARSON ENGINEERING**
 ADDRESS:
 CITY, STATE, ZIP CODE:

TICKET 29081

SERVICE LOCATIONS: 1. **NESS CITY, KS.** WELL/PROJECT NO.: LEASE: **RAY 1-8** COUNTY/PARISH: **LANE** STATE: **KS** CITY: **DIGHTON, KS.** DATE: **12 NOV 15** OWNER:
 2. TICKET TYPE: SERVICE SALES CONTRACTOR: **HDD DRILLING RIG #** RIG NAME/NO.: SHIPPED VIA: DELIVERED TO: ORDER NO.:
 3. WELL TYPE: **OIL** WELL CATEGORY: **DEVELOPMENT** JOB PURPOSE: **CEMENT SURFACE PIPE** WELL PERMIT NO.: WELL LOCATION: **3E, 1N, 1/2 W, N/E, T20**
 4. REFERRAL LOCATION: INVOICE INSTRUCTIONS:

PRICE REFERENCE	SECONDARY REFERENCE/ PART NUMBER	ACCOUNTING			DESCRIPTION	QTY.		UNIT PRICE		AMOUNT
		LOC	ACCT	DF			U/M			
575					MILEAGE B115	30	M	5	150	150
5763					Pump CHARGE	1	CS	800	800	800
276					FLOCELE	45	lbs	2	25	101
278					CALCIUM CHLORIDE	7	SK	40	70	280
279					GEL	3	SK	25	25	75
290					D-AIR	2	SK	42	20	84
325					STANDARD CEMENT	165	SK	12	25	2021
581					CEMENT SERVICE CHARGE	165	SK	1	50	247
582					MINIMUM DRAYAGE	16205	lbs	24307	TM	250

LEGAL TERMS: Customer hereby acknowledges and agrees to the terms and conditions on the reverse side hereof which include, but are not limited to, **PAYMENT, RELEASE, INDEMNITY, and LIMITED WARRANTY** provisions.

MUST BE SIGNED BY CUSTOMER OR CUSTOMER'S AGENT PRIOR TO START OF WORK OR DELIVERY OF GOODS

X *[Signature]*
 DATE SIGNED: **12 NOV 15** TIME SIGNED: **1:00** A.M. P.M.

REMIT PAYMENT TO:
SWIFT SERVICES, INC.
 P.O. BOX 466
 NESS CITY, KS 67560
 785-798-2300

SURVEY	AGREE	UN-DECIDED	DIS-AGREE	PAGE TOTAL
OUR EQUIPMENT PERFORMED WITHOUT BREAKDOWN?				4009
WE UNDERSTOOD AND MET YOUR NEEDS?				
OUR SERVICE WAS PERFORMED WITHOUT DELAY?				192
WE OPERATED THE EQUIPMENT AND PERFORMED JOB CALCULATIONS SATISFACTORILY?				
ARE YOU SATISFIED WITH OUR SERVICE?	<input type="checkbox"/> YES	<input type="checkbox"/> NO		TOTAL
<input type="checkbox"/> CUSTOMER DID NOT WISH TO RESPOND				4201

CUSTOMER ACCEPTANCE OF MATERIALS AND SERVICES The customer hereby acknowledges receipt of the materials and services listed on this ticket.

SWIFT OPERATOR: *[Signature]* APPROVAL:

Thank You!

JOB LOG

SWIFT Services, Inc.

DATE 12 NOV 15 PAGE NO.

CUSTOMER		WELL NO.		LEASE		JOB TYPE		TICKET NO.	
LARSON ENGINEERING				RAY 1-8		CEMENT SURFACE PIPE		29081	
CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS	
				T	C	TUBING	CASING		
	1530								ON LOCATION
									RTD @ 265
	1708				✓				CIRCULATE
	1717	4	40		✓				MIX 165SX
		3	16		✓		250		DISPLACE CEMENT
	1735								SHUT WELL IN.
									CIRCULATE 20SX TO PIT
	1735								WASH TRUCK
	1800								JOB COMPLETE.
									THANKS #115
									JASON COLE ISAAC



CHARGE TO: Larson Engineering
 ADDRESS _____
 CITY, STATE, ZIP CODE _____

TICKET 29050

SERVICE LOCATIONS 1. <u>Ness City KS</u>	WELL/PROJECT NO. <u># 1-8</u>	LEASE <u>Ray</u>	COUNTY/PARISH <u>Lane</u>	STATE <u>KS</u>	CITY <u>Dighton</u>	DATE <u>11-23-15</u>	OWNER <u>Same</u>	
2.	TICKET TYPE <input checked="" type="checkbox"/> SERVICE <input type="checkbox"/> SALES	CONTRACTOR <u>H.D Drilling</u>	RIG NAME/NO. <u>#3</u>	SHIPPED <u>VIA</u>	DELIVERED TO <u>Location</u>	ORDER NO.		
3.	WELL TYPE <u>Oil</u>	WELL CATEGORY <u>Development</u>	JOB PURPOSE <u>Cement 4 1/2" Longstring</u>	WELL PERMIT NO.		WELL LOCATION <u>Dighton - 3E, 1 1/2 mi Nimb</u>		
4.	REFERRAL LOCATION	INVOICE INSTRUCTIONS						

PRICE REFERENCE	SECONDARY REFERENCE/ PART NUMBER	ACCOUNTING			DESCRIPTION	QTY.		UM		UNIT PRICE	AMOUNT
		LOC	ACCT	DF							
575		1			MILEAGE			40	mi	5 ⁰⁰	200 ⁰⁰
578		1			Pump Charge - Longstring		1		job	1250 ⁰⁰	1250 ⁰⁰
419		1			Rotating Head Rental		4 1/2	in	1 ea	200 ⁰⁰	200 ⁰⁰

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MUST BE SIGNED BY CUSTOMER OR CUSTOMER'S AGENT PRIOR TO START OF WORK OR DELIVERY OF GOODS

X
 DATE SIGNED 11-23-15 TIME SIGNED 0430 A.M. P.M.

REMIT PAYMENT TO:
 SWIFT SERVICES, INC.
 P.O. BOX 466
 NESS CITY, KS 67560
 785-798-2300

SURVEY	AGREE	UN-DECIDED	DIS-AGREE	PAGE TOTAL #1	PRICE	AMOUNT
OUR EQUIPMENT PERFORMED WITHOUT BREAKDOWN?				#1	1650 ⁰⁰	
WE UNDERSTOOD AND MET YOUR NEEDS?				#2	7004 ²⁵	
OUR SERVICE WAS PERFORMED WITHOUT DELAY?				subtotal	8654 ²⁵	
WE OPERATED THE EQUIPMENT AND PERFORMED JOB CALCULATIONS SATISFACTORILY?				Lane TAX 7.5%	498 ⁵⁸	
ARE YOU SATISFIED WITH OUR SERVICE? <input type="checkbox"/> YES <input type="checkbox"/> NO				TOTAL	9152 ⁸³	
<input type="checkbox"/> CUSTOMER DID NOT WISH TO RESPOND						

CUSTOMER ACCEPTANCE OF MATERIALS AND SERVICES The customer hereby acknowledges receipt of the materials and services listed on this ticket.

SWIFT OPERATOR David Kuehn APPROVAL [Signature]

Thank You!



PO Box 466
Ness City, KS 67560
Off: 785-798-2300

TICKET CONTINUATION

TICKET No. 29050

CUSTOMER Larson Engineering WELL Ray #1-8 DATE 11-23-15 PAGE 2 OF 2

PRICE REFERENCE	SECONDARY REFERENCE / PART NUMBER	ACCOUNTING			TIME	DESCRIPTION	QTY		U/M		UNIT PRICE		AMOUNT	
		LOC	ACCT	DF			QTY	U/M	QTY	U/M				
325		1				Standard Cement (EA-2)			175	sk	12	25	2143	75
284		1				Calseal	5	%	8	sk	30	00	240	00
283		1				Salt	10	%	900	lbs	0	20	180	00
292		1				Halad 322	1	%	150	lbs	8	00	1200	00
277		1				Coal Seal (Gilsomite)	7	lb	1250	lbs	0	75	937	50
276		1				Flocek	1/4	lb	50	lbs	2	25	112	50
290		1				D-Air			2	gal	42	00	84	00
221		1				Liquid KCl			2	gal	25	00	50	00
280		1				Flochecks 21			500	gal	3	00	1500	00
581		1				SERVICE CHARGE					175	00	262	50
583		1				MILEAGE CHARGE	TOTAL WEIGHT	LOADED MILES	TON MILES		392	00	294	00
							14600	40						
CONTINUATION TOTAL												7004.25		

JOB LOG

SWIFT Services, Inc.

DATE 11-23-15 PAGE NO. 1

CUSTOMER Larson Engineering WELL NO. #1-8 LEASE Ray JOB TYPE Cement 4 1/2" Longstring TICKET NO. 29050

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
	0830							On Location 4 1/2" 11.6"
								RTD- 4625 LTD- 4624 TP- 4624 Set- 4622 SS- 42.22 P.C- 2087
	0850							Start 4 1/2" 11.6" casing in well
	1045							Drop Ball Circulate * Rotate *
	1145	6 1/2	15		✓	350	Pump 15 bbl 16CL Flush	
		6 1/2	12		✓	350	Pump 500 gal Flocheck 2l	
		6 1/2	5		✓	350	Pump 5 bbl 16CL Flush	
			7 1/2				Plug RH (30 sks)	
	1155	4 1/2	36 1/2		✓	250	mix 145 sks EA-2 w/ 7" Gibsonite @ 153ppg	
							wash out Pump + Lines Release Latch Down Plug	
	1215	6 1/2	0		✓	100	Start Displacement	
		6 1/2	55		✓	300	Lift Pressure	
		6 1/2	69		✓	750	Max Lift Pressure	
	1225	6 1/2	71		✓	1600	hand latch Down Plug	
							Release Pressure * Plug Hold *	
							wash up truck	
	1300						Job Complete	
							Thank You Dave Flint Isaac	



CHARGE TO: **LARSON ENGINEERING**
 ADDRESS:
 CITY, STATE, ZIP CODE:

TICKET 29086

PAGE 1 OF

SERVICE LOCATIONS: 1. **NESS CITY, KS**
 WELL/PROJECT NO.:
 LEASE: **RAY 1-8**
 COUNTY/PARISH: **LANE**
 STATE: **KS**
 CITY: **DIGHTON, KS**
 DATE: **24 NOV 15**
 OWNER:
 TICKET TYPE: SERVICE SALES
 CONTRACTOR: **Co. R16**
 RIG NAME/NO.:
 SHIPPED VIA:
 DELIVERED TO:
 ORDER NO.:
 WELL TYPE: **OIL**
 WELL CATEGORY: **DEVELOPMENT**
 JOB PURPOSE: **CEMENT PORT COLLAR**
 WELL PERMIT NO.:
 WELL LOCATION: **1N 12W, N12T0**
 REFERRAL LOCATION:
 INVOICE INSTRUCTIONS:

PRICE REFERENCE	SECONDARY REFERENCE/ PART NUMBER	ACCOUNTING			DESCRIPTION	QTY.		U/M		UNIT PRICE	AMOUNT
		LOC	ACCT	DF							
575					MILEAGE #115	30	mi			5.00	150.00
576D					Pump CHARGE					1250.00	1250.00
276					FLOCELE	70	lbs			2.25	157.50
290					D-AIR	3	gal			42.00	126.00
330					SMD CEMENT	280	sk			15.75	4410.00
581					CEMENT SERVICE CHARGE	300	sk			1.50	450.00
583					DRAYAGE	29875	lb.	448.12	Tim	7.5	3361.09

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X
 DATE SIGNED: **24 NOV 15** TIME SIGNED: **1430** A.M. P.M.

REMIT PAYMENT TO:
 SWIFT SERVICES, INC.
 P.O. BOX 466
 NESS CITY, KS 67560
 785-798-2300

SURVEY	AGREE	UN-DECIDED	DIS-AGREE	PAGE TOTAL
OUR EQUIPMENT PERFORMED WITHOUT BREAKDOWN?				6879.59
WE UNDERSTOOD AND MET YOUR NEEDS?				
OUR SERVICE WAS PERFORMED WITHOUT DELAY?				
WE OPERATED THE EQUIPMENT AND PERFORMED JOB CALCULATIONS SATISFACTORILY?				
ARE YOU SATISFIED WITH OUR SERVICE? <input type="checkbox"/> YES <input type="checkbox"/> NO				
<input type="checkbox"/> CUSTOMER DID NOT WISH TO RESPOND				
				Lane TAX 7.5% 352.01
				TOTAL 7231.60

CUSTOMER ACCEPTANCE OF MATERIALS AND SERVICES The customer hereby acknowledges receipt of the materials and services listed on this ticket.

SWIFT OPERATOR: *[Signature]* APPROVAL:

Thank You!

JOB LOG

SWIFT Services, Inc.

DATE 24 Nov 15 PAGE NO.

CUSTOMER LARSON ENGINEERING

WELL NO.

LEASE RAY 1-8

JOB TYPE CEMENT PORT COLLAR

TICKET NO. 29086

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
	1230							ON LOCATION
								PORT COLLAR @ 2083
	1254						1000	TEST - HELD
	1257							OPEN PORT COLLAR
	1259	4	100				700	MIX 100SX @ 11.2
		4	19				700	MIX 50SX @ 12.5
		4	15 1/2				600	MIX 50SX @ 13.5
		3	7				400	DISPLACE CEMENT TO SURFACE CIRCULATE CEMENT TO SURFACE.
	1235						1000	RE CLOSE PORT COLLAR - TEST - HELD
								RUN 5 JTS.
	1347	3	22				400	REVERSE CLEAN
	1350							WASH TRUCK
								280SX SMD USED.
	1430							JOB COMPLETE.
								THANKS B115
								JASON COLE PRESTON



DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.18 @ 10:55:15

End Date: 2015.11.18 @ 16:39:00

Job Ticket #: 64487 DST #: 1

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

Printed: 2015.11.23 @ 10:56:41



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

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

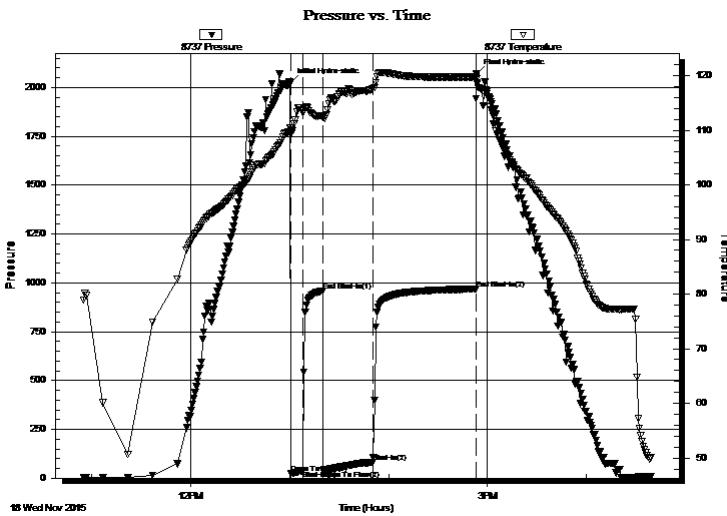
8-18s-28w Lane, KS
Ray #1-8
 Job Ticket: 64487 **DST#: 1**
 Test Start: 2015.11.18 @ 10:55:15

GENERAL INFORMATION:

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

Serial #: 8737 Outside
 Press@RunDepth: 80.94 psig @ 4201.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2015.11.18 End Date: 2015.11.18 Last Calib.: 2015.11.18
 Start Time: 10:55:15 End Time: 16:39:00 Time On Btm: 2015.11.18 @ 13:00:45
 Time Off Btm: 2015.11.18 @ 14:53:30

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



PRESSURE SUMMARY

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

Recovery

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

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64487

DST#: 1

ATTN: Vern Schrag

Test Start: 2015.11.18 @ 10:55:15

Tool Information

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

Tool Comments:

Tool Description

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

Total Tool Length: 48.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64487

DST#: 1

ATTN: Vern Schrag

Test Start: 2015.11.18 @ 10:55:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

deg API

Mud Weight: 9.00 lb/gal

Cushion Length: ft

Water Salinity: ppm

Viscosity: 50.00 sec/qt

Cushion Volume: bbl

Water Loss: 6.73 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure: psig

Salinity: 2300.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

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

Total Length: 131.00 ft Total Volume: 0.708 bbl

Num Fluid Samples: 0

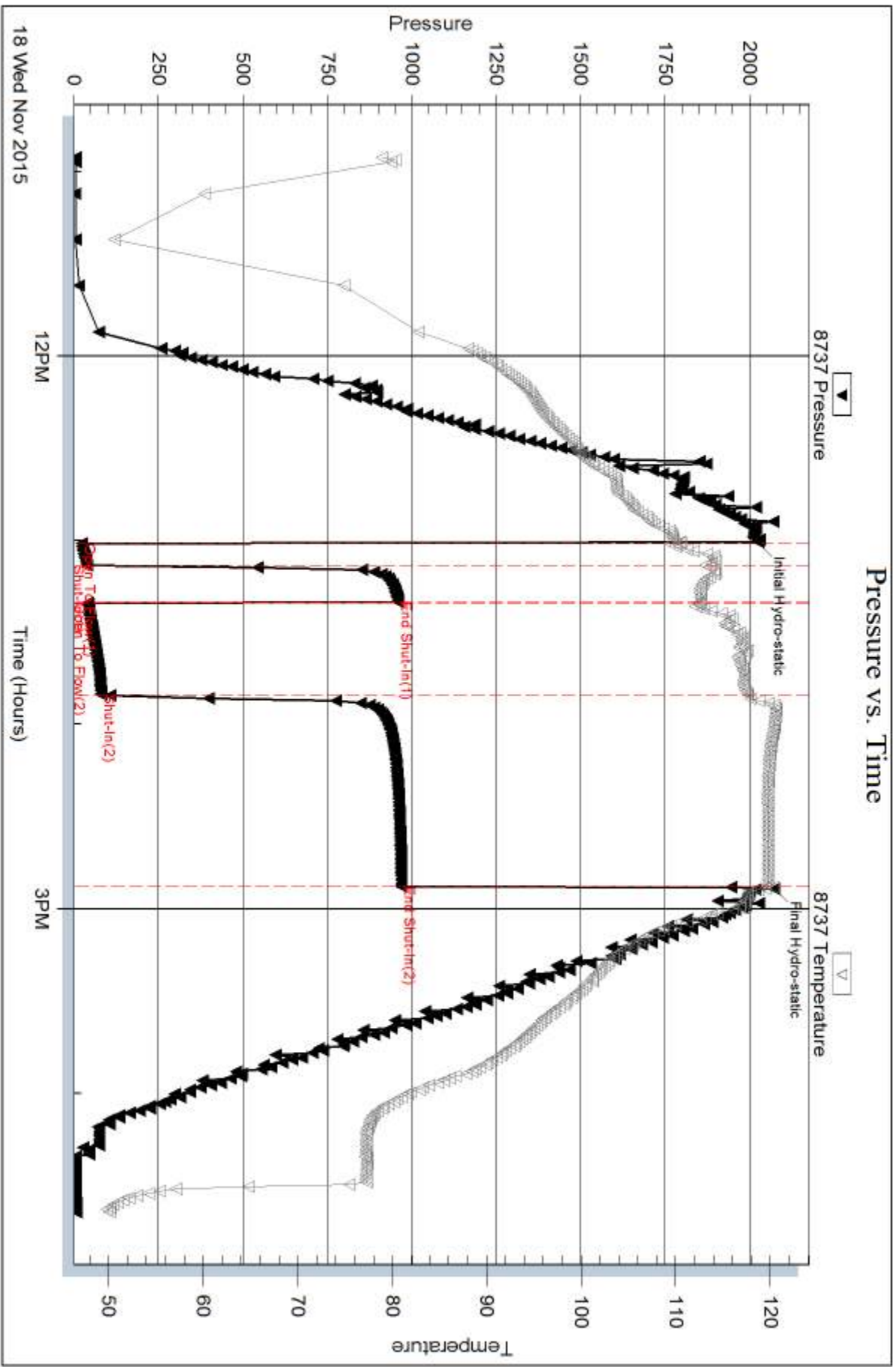
Num Gas Bombs: 0

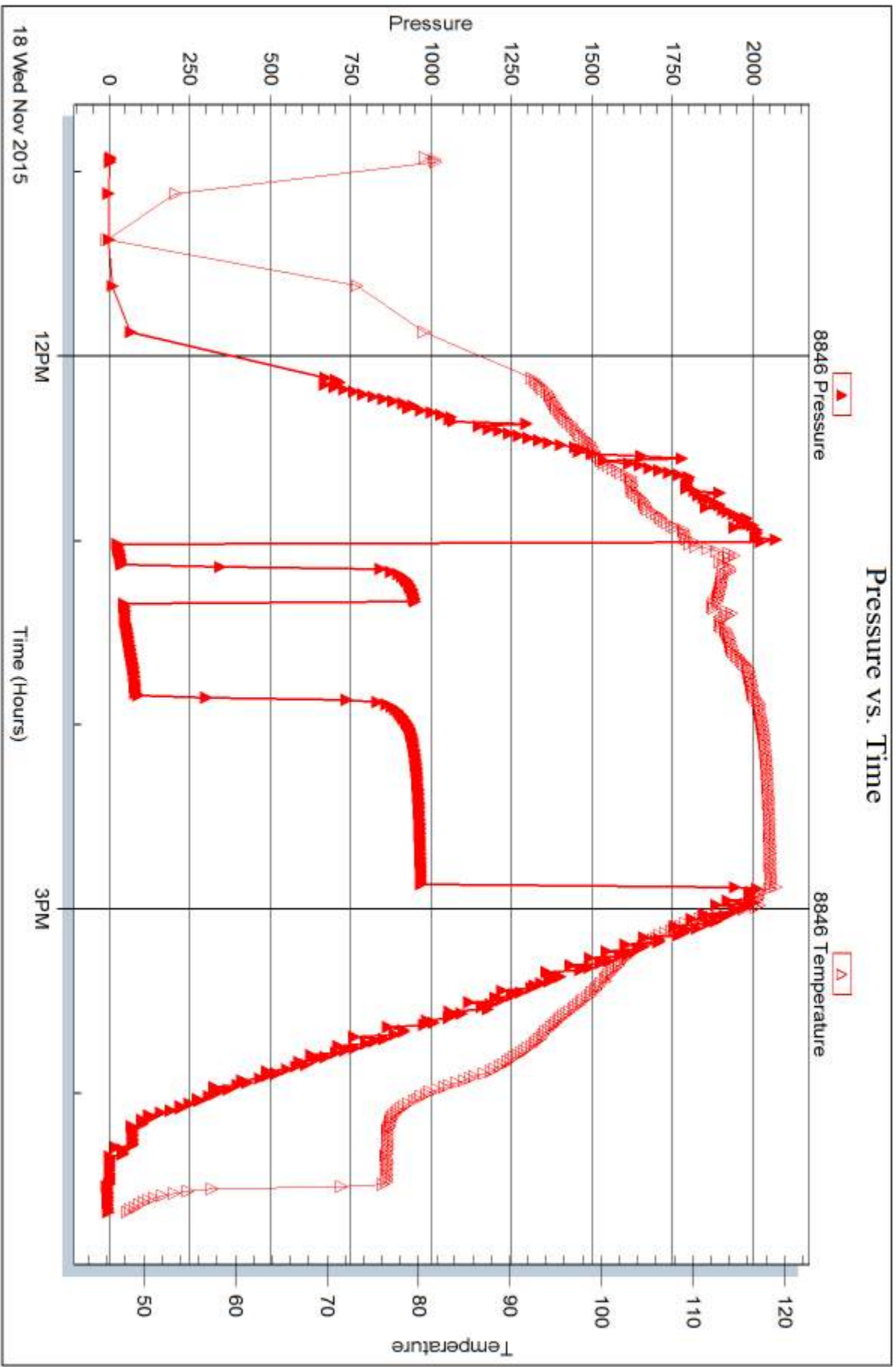
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.19 @ 05:38:15

End Date: 2015.11.19 @ 10:30:15

Job Ticket #: 64488 DST #: 2

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

Printed: 2015.11.23 @ 10:56:24



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

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

8-18s-28w Lane, KS

Ray #1-8

Job Ticket: 64488

DST#: 2

Test Start: 2015.11.19 @ 05:38:15

GENERAL INFORMATION:

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

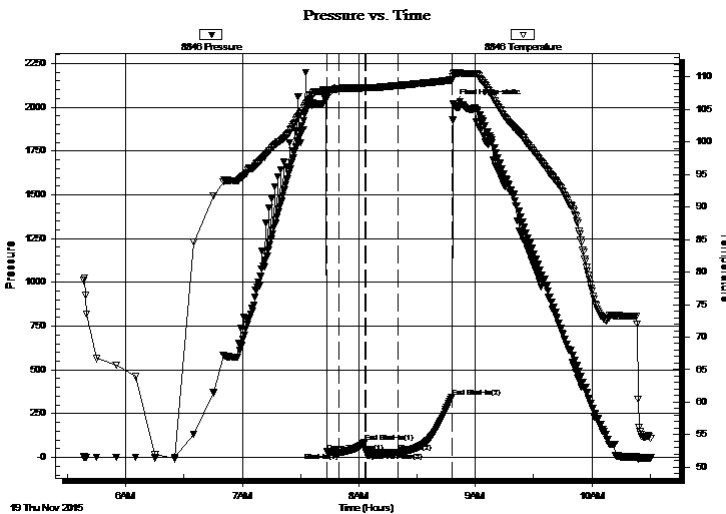
Serial #: 8846

Inside

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

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

PRESSURE SUMMARY



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

Recovery

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

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64488

DST#: 2

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 05:38:15

Tool Information

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

Tool Comments:

Tool Description

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

Total Tool Length: 48.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64488

DST#: 2

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 05:38:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 64.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 6.35 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2500.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

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

Total Length: 2.00 ft Total Volume: 0.010 bbl

Num Fluid Samples: 0

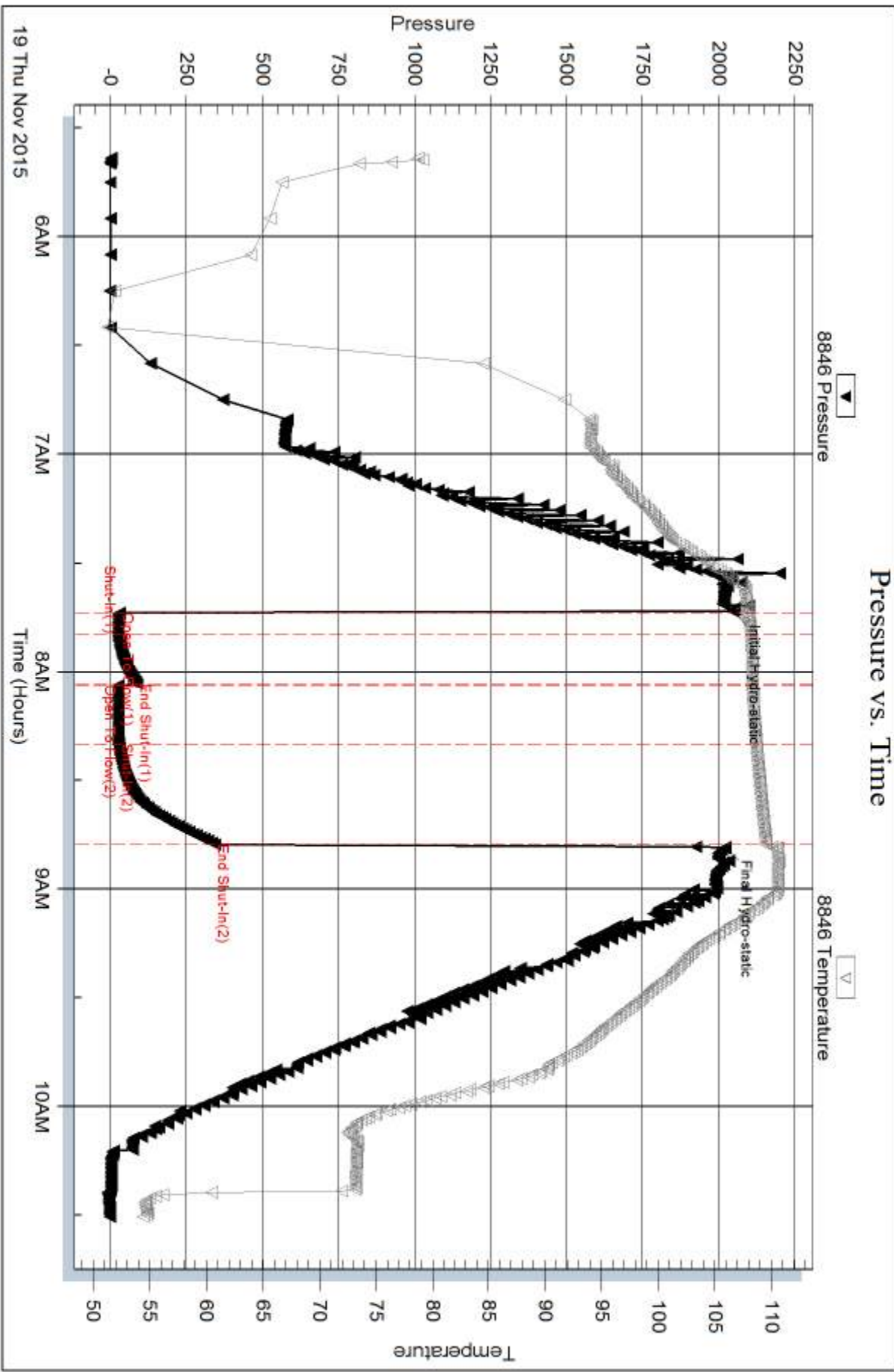
Num Gas Bombs: 0

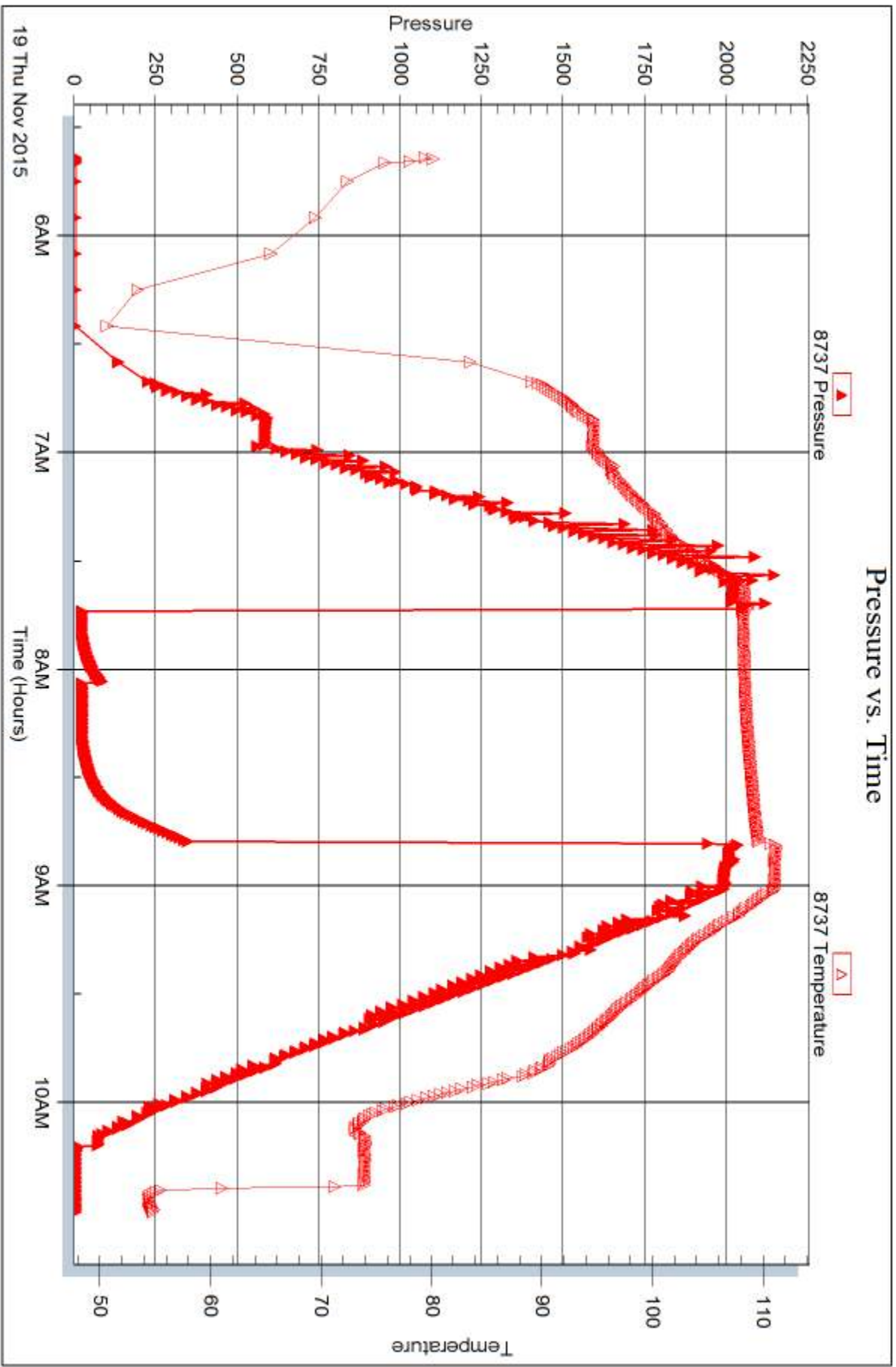
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.19 @ 20:08:15

End Date: 2015.11.20 @ 01:43:00

Job Ticket #: 64489 DST #: 3

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

Printed: 2015.11.23 @ 10:56:07



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64489

DST#: 3

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 20:08:15

GENERAL INFORMATION:

Formation: **LKC L**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 21:49:30

Time Test Ended: 01:43:00

Test Type: Conventional Bottom Hole (Reset)

Tester: Mike Roberts

Unit No: 65

Interval: 4260.00 ft (KB) To 4270.00 ft (KB) (TVD)

Reference Elevations: 2761.00 ft (KB)

Total Depth: 4270.00 ft (KB) (TVD)

2752.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

Serial #: 8846

Inside

Press@RunDepth: 362.63 psig @ 4265.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2015.11.19

End Date:

2015.11.20

Last Calib.:

2015.11.20

Start Time: 20:08:15

End Time:

01:43:00

Time On Btm:

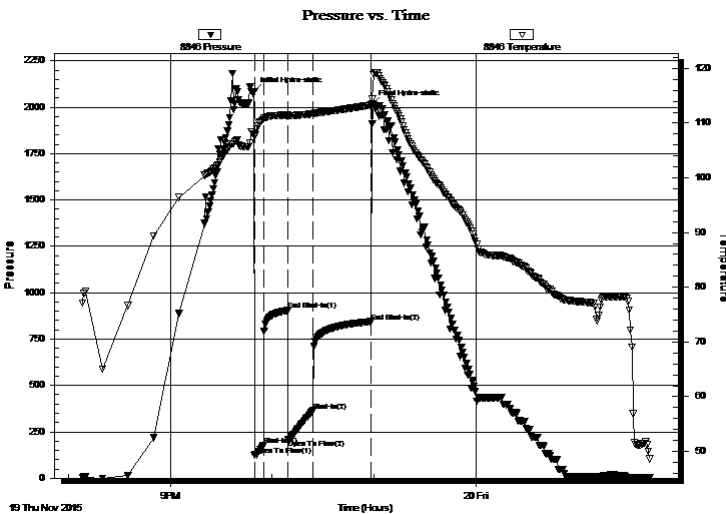
2015.11.19 @ 21:49:15

Time Off Btm:

2015.11.19 @ 22:58:45

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

PRESSURE SUMMARY



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

Recovery

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

* Recovery from multiple tests

Gas Rates

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

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64489

DST#: 3

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 20:08:15

Tool Information

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

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

Total Tool Length: 38.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64489

DST#: 3

ATTN: Vern Schrag

Test Start: 2015.11.19 @ 20:08:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

31 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 52.00 sec/qt

Cushion Volume:

bbf

Water Loss: 6.37 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 2000.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

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

Total Length: 811.00 ft Total Volume: 10.247 bbl

Num Fluid Samples: 0

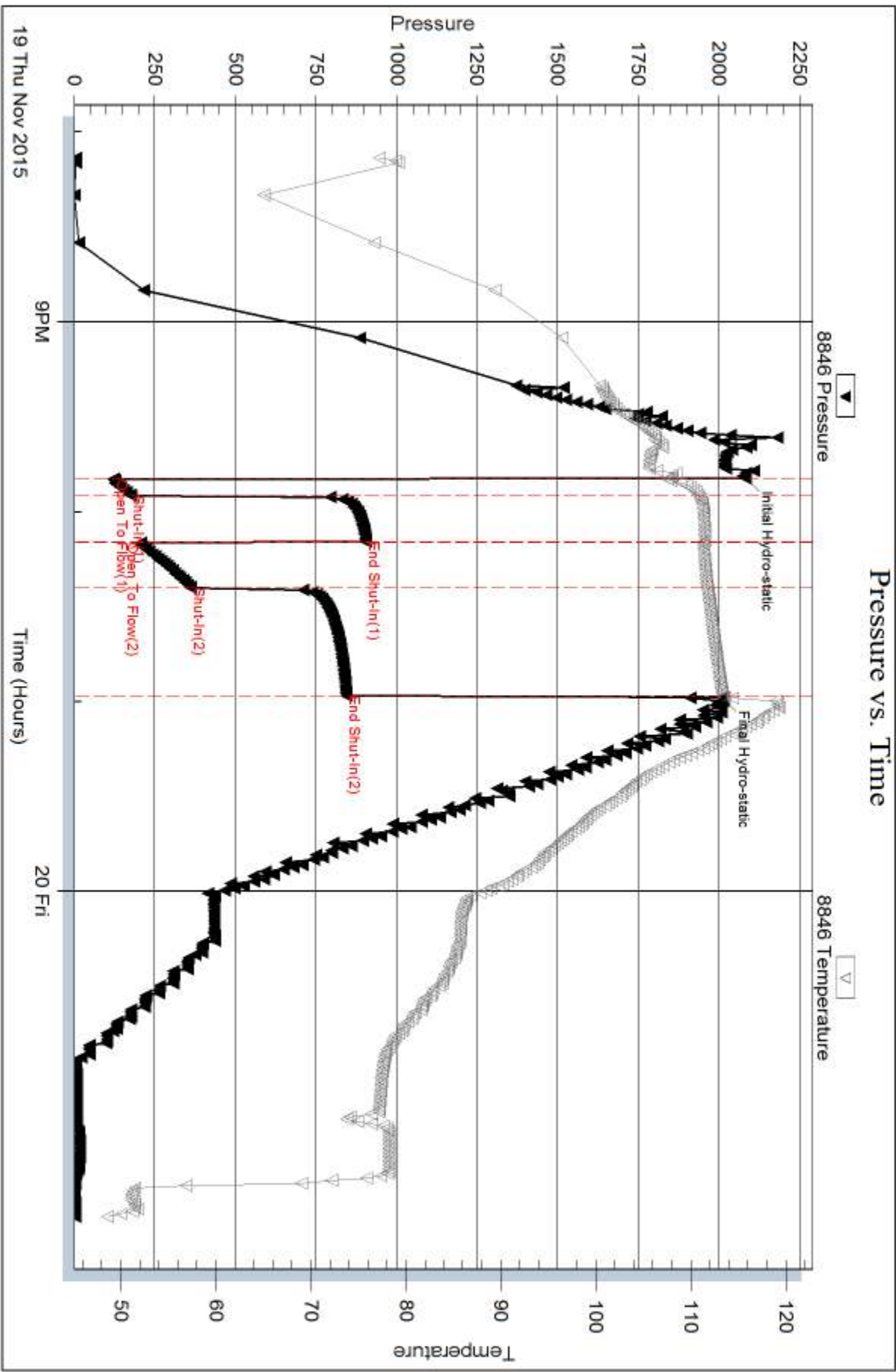
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

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





DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.21 @ 02:28:15

End Date: 2015.11.21 @ 08:28:45

Job Ticket #: 64490 DST #: 4

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

Printed: 2015.11.23 @ 10:55:53



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64490

DST#: 4

ATTN: Vern Schrag

Test Start: 2015.11.21 @ 02:28:15

GENERAL INFORMATION:

Formation: **Marmaton**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 04:39:30

Time Test Ended: 08:28:45

Test Type: Conventional Bottom Hole (Reset)

Tester: Mike Roberts

Unit No: 65

Interval: 4292.00 ft (KB) To 4405.00 ft (KB) (TVD)

Reference Elevations: 2761.00 ft (KB)

Total Depth: 4405.00 ft (KB) (TVD)

2752.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 9.00 ft

Serial #: 8846

Inside

Press@RunDepth: 590.90 psig @ 4294.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2015.11.21

End Date:

2015.11.21

Last Calib.: 2015.11.21

Start Time: 02:28:15

End Time:

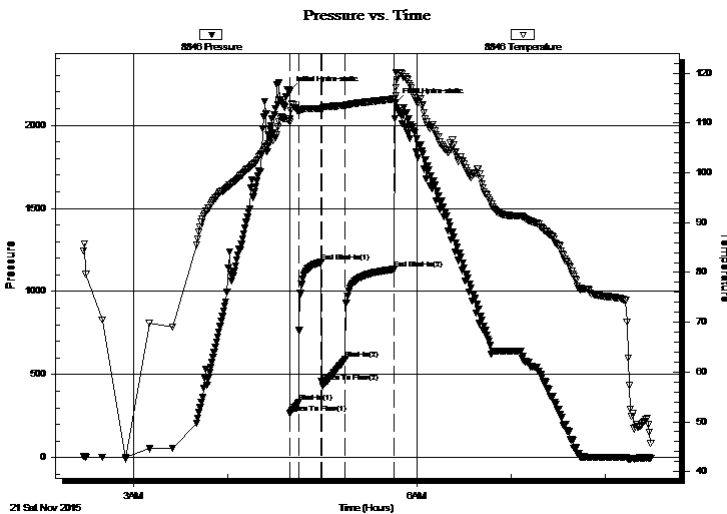
08:28:45

Time On Btm: 2015.11.21 @ 04:39:15

Time Off Btm: 2015.11.21 @ 05:47:00

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

PRESSURE SUMMARY



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

Recovery

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

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane, KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64490

DST#: 4

ATTN: Vern Schrag

Test Start: 2015.11.21 @ 02:28:15

Tool Information

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

Tool Comments:

Tool Description

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64490

DST#: 4

ATTN: Vern Schrag

Test Start: 2015.11.21 @ 02:28:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

28000 ppm

Viscosity: 73.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.17 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3900.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

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

Total Length: 1054.00 ft Total Volume: 13.655 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

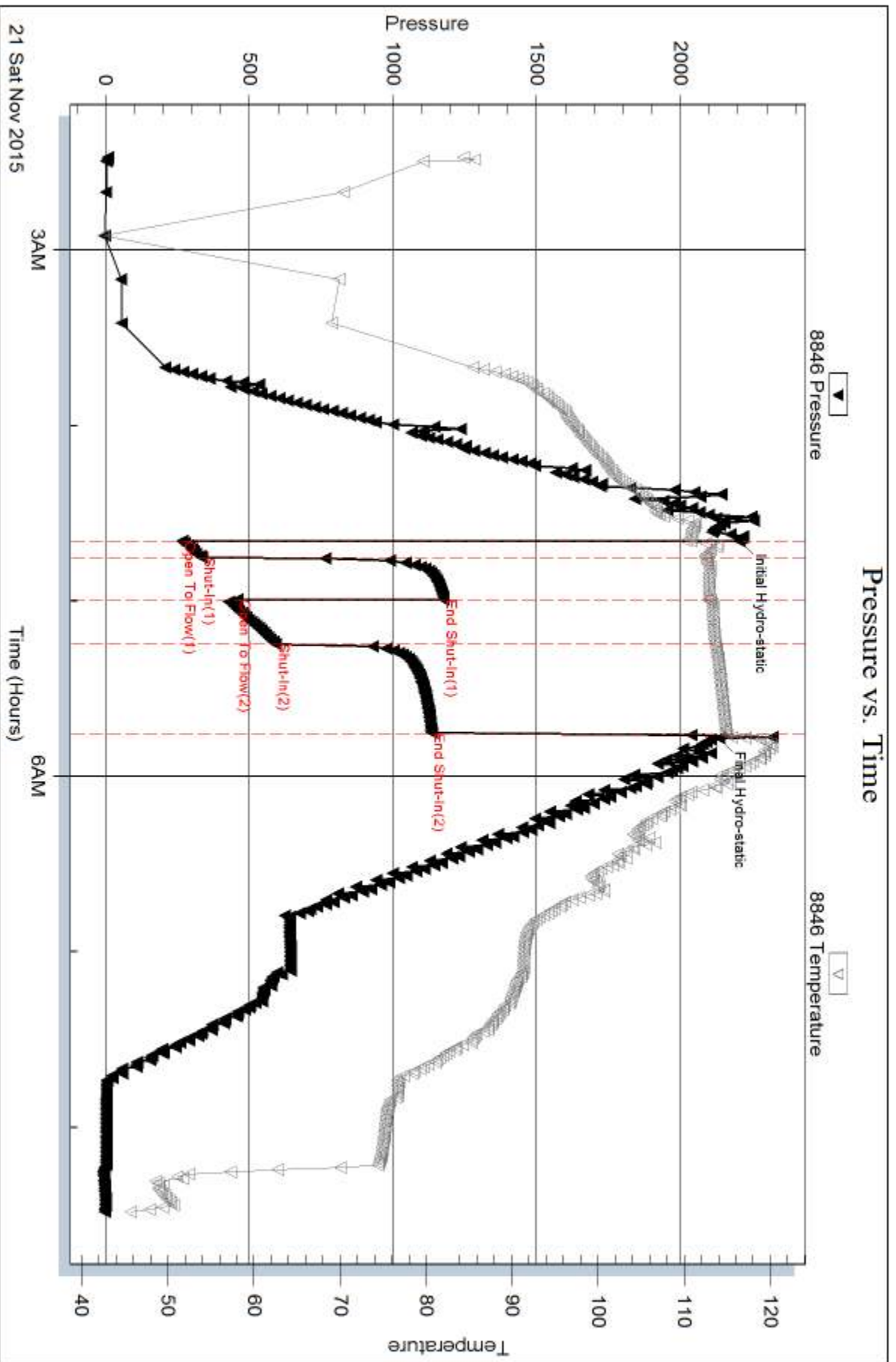
Serial #:

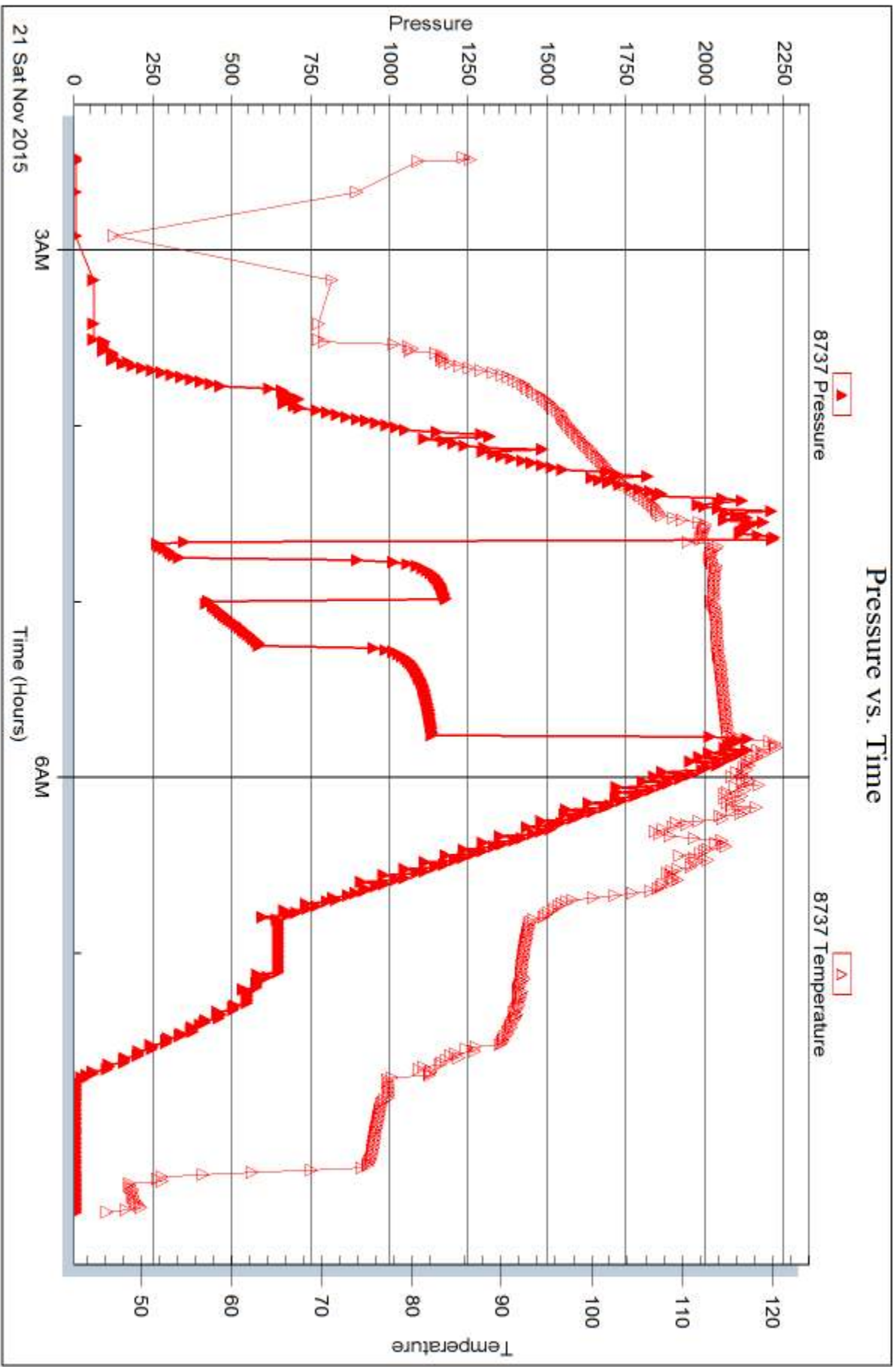
Laboratory Name:

Laboratory Location:

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

Pressure vs. Time







DRILL STEM TEST REPORT

Prepared For: **Larson Engineering**

562 W. State Rd 4
Olmitz KS 67564

ATTN: Vern Schrag

Ray #1-8

8-18s-28w Lane,KS

Start Date: 2015.11.22 @ 02:33:15

End Date: 2015.11.22 @ 08:13:15

Job Ticket #: 64491 DST #: 5

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

Printed: 2015.11.23 @ 10:55:38



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

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

8-18s-28w Lane,KS

Ray #1-8

Job Ticket: 64491

DST#: 5

Test Start: 2015.11.22 @ 02:33:15

GENERAL INFORMATION:

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

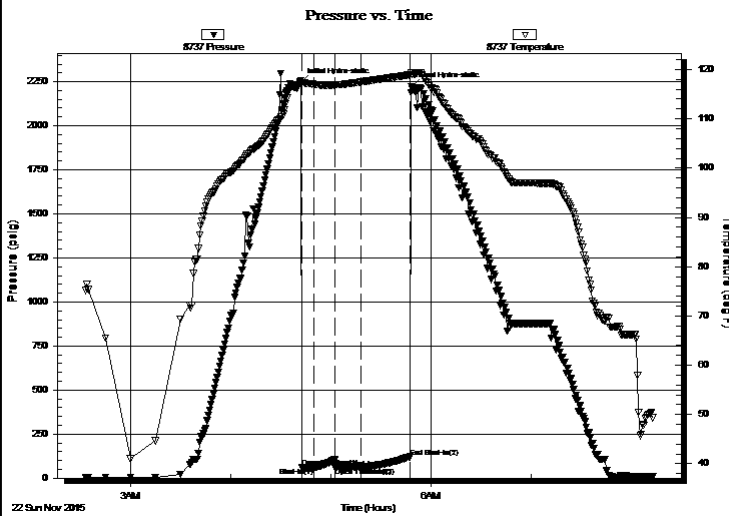
Serial #: 8737

Outside

Press@RunDepth: 60.24 psig @ 4468.00 ft (KB)
 Start Date: 2015.11.22 End Date: 2015.11.22
 Start Time: 02:33:15 End Time: 08:13:15

Capacity: 8000.00 psig
 Last Calib.: 2015.11.22
 Time On Btm: 2015.11.22 @ 04:42:15
 Time Off Btm: 2015.11.22 @ 05:48:30

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



PRESSURE SUMMARY

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

Recovery

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

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64491

DST#: 5

ATTN: Vern Schrag

Test Start: 2015.11.22 @ 02:33:15

Tool Information

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

Tool Comments:

Tool Description

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Larson Engineering

8-18s-28w Lane,KS

562 W. State Rd 4
Olmitz KS 67564

Ray #1-8

Job Ticket: 64491

DST#: 5

ATTN: Vern Schrag

Test Start: 2015.11.22 @ 02:33:15

Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 63.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.58 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 3400.00 ppm

Filter Cake: 1.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	mud 100%m	0.025

Total Length: 5.00 ft Total Volume: 0.025 bbl

Num Fluid Samples: 0

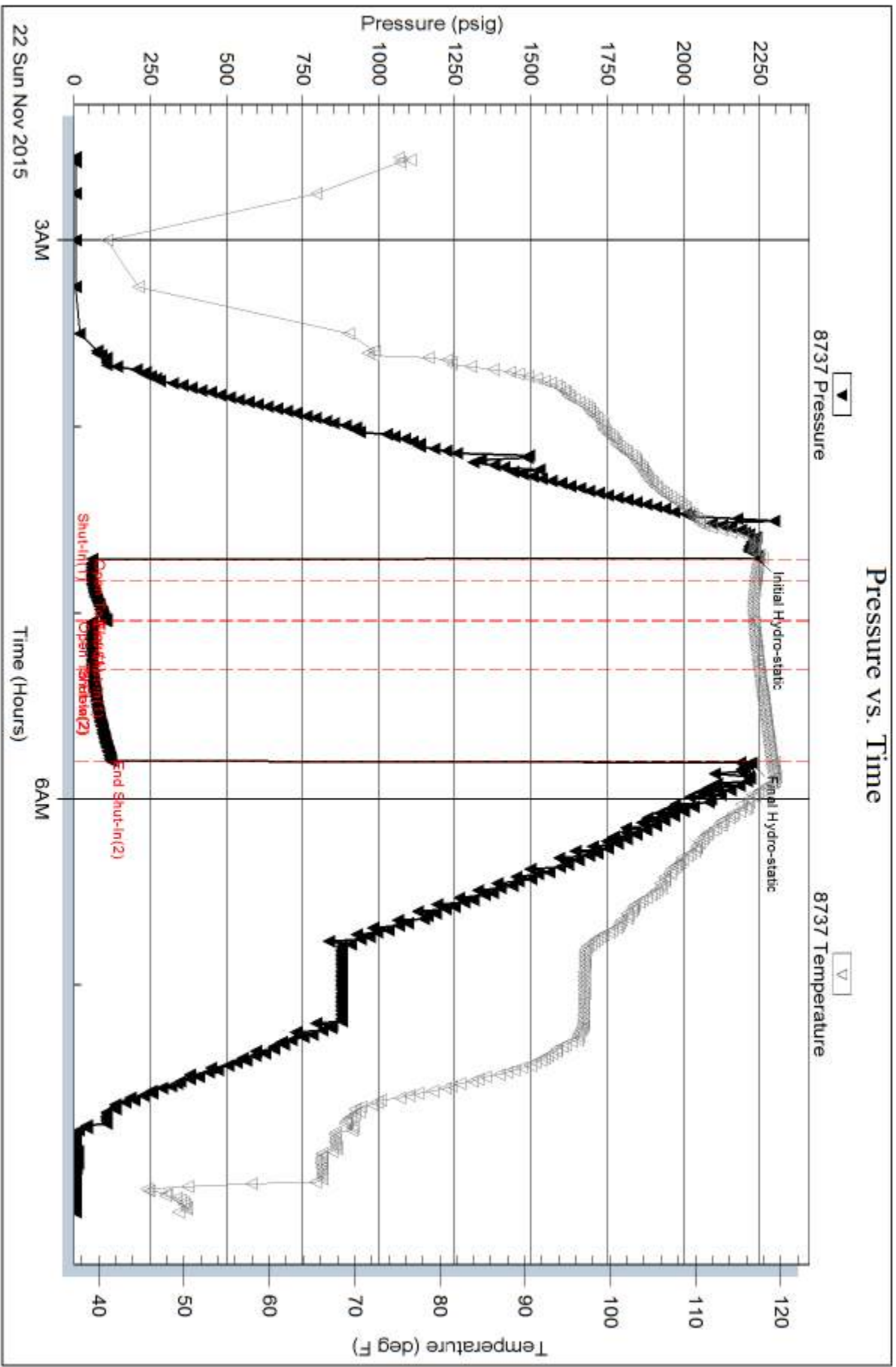
Num Gas Bombs: 0

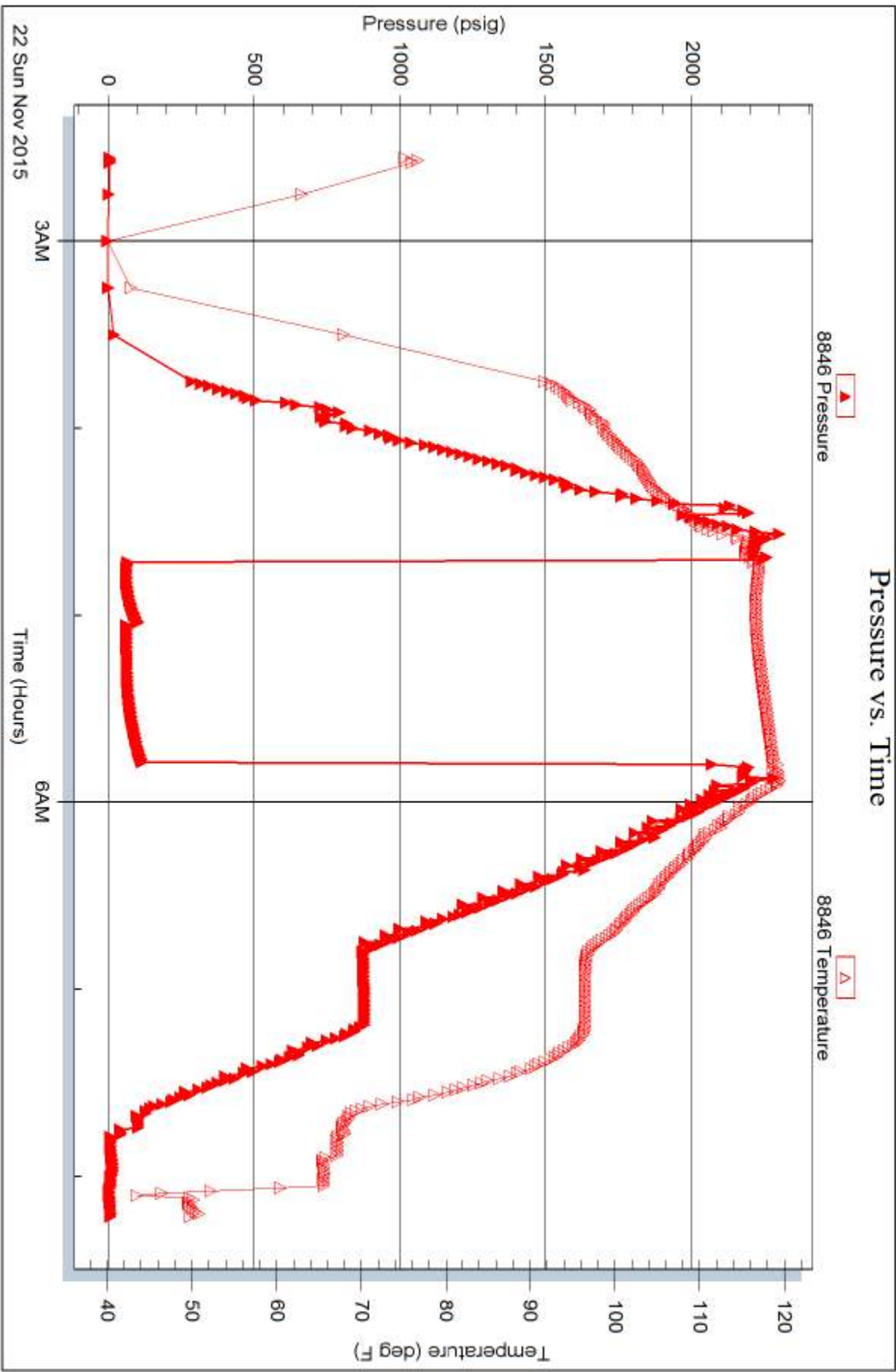
Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:







TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64487**

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

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

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

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

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

Approved By Vern Schrage Our Representative Mike Roberts
 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. **64488**

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

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

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

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

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

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64489**

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

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

Rec	Feet of	%gas	%oil	%water	%mud
439	glo	20	80		
248	gcmo	10	75	15	
62	ocgm	20	10	70	
62	ocm		20	80	
Ø	GIP = 806'				
Rec Total	811	BHT	113	Gravity	31

- (A) Initial Hydrostatic 2083
- (B) First Initial Flow 122
- (C) First Final Flow 175
- (D) Initial Shut-In 904
- (E) Second Initial Flow 207
- (F) Second Final Flow 362
- (G) Final Shut-In 843
- (H) Final Hydrostatic 2011

- Test \$1150.00/-
- Jars \$250.00/-
- Safety Joint \$75.00/-
- Circ Sub NC
- Hourly Standby
- Mileage 56 RT \$56.00/-
- Sampler
- Straddle
- Shale Packer
- Extra Packer
- Extra Recorder
- Day Standby
- Accessibility
- Sub Total \$1531.00/-

API RW — @ — ° F Chlorides — ppm
 T-On Location 19:15
 T-Started 20:08
 T-Open 21:48
 T-Pulled 22:53
 T-Out 01:43
 Comments _____
 Ruined Shale Packer
 Ruined Packer
 Extra Copies
 Sub Total 0
 Total 1531
 MP/DST Disc't _____

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

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64490**

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

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

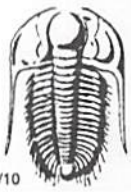
Rec	Feet of	%gas	%oil	%water	%mud
<u>186</u>	<u>gcm</u>	<u>2</u>		<u>98</u>	
<u>186</u>	<u>gcwom</u>	<u>3</u>	<u>22</u>	<u>5</u>	<u>70</u>
<u>558</u>	<u>gcwom</u>	<u>3</u>	<u>17</u>	<u>50</u>	<u>30</u>
<u>124</u>	<u>gcwm (Collars)</u>	<u>3</u>		<u>15</u>	<u>82</u>

Rec Total 1054 BHT 115 Gravity — API RW .342 @ 72 °F Chlorides 28000 ppm
 (A) Initial Hydrostatic 2205 Test 1150 T-On Location 01:16
 (B) First Initial Flow 266 Jars 250 T-Started 02:28
 (C) First Final Flow 334 Safety Joint 75 T-Open 04:40
 (D) Initial Shut-In 1175 Circ Sub NC T-Pulled 05:45
 (E) Second Initial Flow 456 Hourly Standby _____ T-Out 08:28
 (F) Second Final Flow 590 Mileage 56 RT Comments _____
 (G) Final Shut-In 1132 Sampler _____
 (H) Final Hydrostatic 2134 Straddle _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1531

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

Approved By Vern Schrag Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. **64491**

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

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

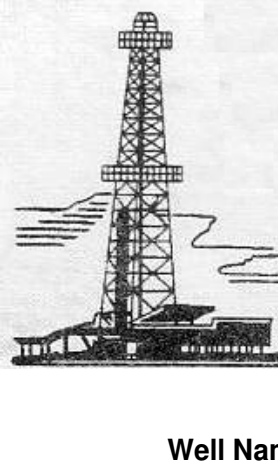
Rec	Feet of	%gas	%oil	%water	%mud
<u>5</u>	<u>MUD</u>			<u>100</u>	
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

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

Approved By Vern C. Schrag Our Representative Mike Rohlf
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WELLSITE GEOLOGIST'S REPORT

VERNON C. SCHRAG
CONSULTANT GEOLOGIST



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

Well Name: RAY #1-8
 Location: SE NW SW SE SEC. 8-18S-28W
 Licence Number: API: 15-101-22574
 Spud Date: November 12, 2015
 Surface Coordinates: 753' FSL & 2001' FEL

Region: Lane Co., KS
 Drilling Completed: November 22, 2015

Bottom Hole Coordinates:
 Ground Elevation (ft): 2752' K.B. Elevation (ft): 2761'
 Logged Interval (ft): 3800' To: RTD Total Depth (ft): 4625'
 Formation: Mississippi
 Type of Drilling Fluid: Chemical Premix (Displaced)

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

OPERATOR:

Company: Larson Engineering Inc.
 Address: 562 West State Road 4
 Olinitz, KS 67564-8561

DRILLING CONTRACTOR:

H. D. Drilling, LLC, Rig #3 (Co. Tools)

DP 4.5" XH (16.6#); DC 6-1/4" x 2-3/8" x 558', Kelly 41.00', Tool Joint 5.5" ; Bit: JZ-HA20Q, 7-7/8", standard jets 15-15-15; rpm 80, WOB 35k; Kelly Bushing 9' above ground level; LeWayne "Lew" Tresner (tool pusher).

CASING:

Ran 6 jts new Midwestern Pipeworks 8-5/8" 20# R3 STC 8rd csg. Tallied 253.60', set @ 265.10' KB.

Install 4-1/2" production casing @ 4625'.

CIRCULATION SYSTEM:

Continental EMSCO D-300, duplex, 6 x 14, 60-62 spm, Chemical, premix, earth pits, displaced 3515', Mud-Co./Service Mud, Inc., Jason Whiting.

OPEN HOLE LOGS:

DN, DI (SP), ML, No Sonic; 5" detail LTD-3600; 2" DI to surface casing; Weatherford Open Hole Services, Liberal, KS, Adam Sill, LTD 4624, RTD 4625.

DRILL STEM TEST #1:

LKC "J": Interval: 4186-4206 (20'); Blow: weak incr 1" IFP, no RB, weak incr 3" FFP, no RB; Times: 5-15-30-60; Recovery: 131' TF; Grindouts: 7' oil spotted mud, 124' muddy water (50%M, 50%W, chlorides 28k); Pressures: HP: 2024-2073, SIP: 958-968, FP: 23-39, 41-80; BHT: 120 deg F; Trilobite Testing, Inc., Scott City, KS, Mike Roberts.

DRILL STEM TEST #2:

LKC "K": Interval: 4222-4242 (20'); Blow: weak surf IFP, no RB, no blow 2nd Open; Times: 5-15-15-30; Recovery: 2' mud w/oil spots; Pressures: HP: 2047-2022, SIP: 88-344, FP: 32-26, 27-28; BHT: 121 deg F; Trilobite Testing, Inc., Scott City, KS, Mike Roberts.

DRILL STEM TEST #3:

LKC "L": Interval: 4260-4270 (10'); Blow: BOB 3 min IFP, 6" RB, BOB 1 min FFP, 4" RB; Times: 5-15-15-30; Recovery: 806' GIP, 811' TF; Grindouts: 439' GCO (20%G, 80%O, 31 grav.), 248' GCMO (10%G, 75%O, 15%M), 62' OCGM (20%G, 10%O, 70%M), 62' OCM (20%O, 80%M); Pressures: HP: 2083-2011, SIP: 904-843, FP: 122-175, 207-362; BHT: 113 deg. F; Trilobite Testing, Inc., Scott City, KS, Mike Roberts.

DRILL STEM TEST #4:

Marmaton: Interval: 4292-4405 (113'); Blow: BOB 1 min IFP, no RB, BOB 4 min died down to 6" FFP, no RB; Times: 5-15-15-30; Recovery: 1054' TF; Grindouts: 186' SGCM (2%G, 98%M), 186' GWOCM (3%G, 22%O, 5%W, 70%M), 558' GOMCW (3%G, 17%O, 50%W, 30%M), 124' WM (15%W, 82%M); Pressures: HP: 2205-2134, SIP: 1175-1132, FP: 266-334, 456-590; Trilobite Testing, Inc., Scott City, KS, Mike Roberts.

DRILL STEM TEST #5:

Ft. Scott thru Cherokee Lime: Interval: 4466-4555 (89'); Blow: weak surf. IFP, no RB, blow died second open; Times: 5-15-15-30; Recovery: 5' mud, no show; Pressures: HP: 2242-2221; SIP: 105-119, FP: 59-58, 59-60; BHT: 117; Trilobite Testing, Inc., Scott City, KS, Mike Roberts.

REMARKS:

It was determined that production casing should be run for further testing.

