

Confidentiality Requested:

Yes No

KANSAS CORPORATION COMMISSION 1241344
OIL & GAS CONSERVATION DIVISION

Form ACO-1

August 2013

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 SIOW
- Gas D&A ENHR SIGW
- OG GSW Temp. Abd.
- 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 ENHR Conv. to SWD
- Plug Back Conv. to GSW Conv. to Producer
- Commingled Permit #: _____
- Dual Completion Permit #: _____
- SWD Permit #: _____
- ENHR Permit #: _____
- GSW Permit #: _____

Spud Date or Recompletion Date	Date Reached TD	Completion Date or Recompletion Date
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API No. 15 - _____

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
- Geologist Report Received
- UIC Distribution
- ALT I II III Approved by: _____ Date: _____

1241344

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 <i>(Attach Additional Sheets)</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Log	Formation (Top), Depth and Datum	<input type="checkbox"/> Sample
Samples Sent to Geological Survey	<input type="checkbox"/> Yes <input type="checkbox"/> No	Name	Top	Datum
Cores Taken	<input type="checkbox"/> Yes <input type="checkbox"/> No			
Electric Log Run	<input type="checkbox"/> Yes <input type="checkbox"/> No			
List All E. Logs Run:				

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				

Did you perform a hydraulic fracturing treatment on this well? Yes No *(If No, skip questions 2 and 3)*

Does the volume of the total base fluid of the hydraulic fracturing treatment exceed 350,000 gallons? Yes No *(If No, skip question 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)*

Shots Per Foot	PERFORATION RECORD - Bridge Plugs Set/Type Specify Footage of Each Interval Perforated	Acid, Fracture, Shot, Cement Squeeze Record <i>(Amount and Kind of Material Used)</i>	Depth

TUBING RECORD: Size: _____ Set At: _____ Packer At: _____ Liner Run: Yes No

Date of First, Resumed Production, SWD or ENHR. _____ Producing Method:
 Flowing Pumping Gas Lift Other *(Explain)* _____

Estimated Production Per 24 Hours	Oil Bbls.	Gas Mcf	Water Bbls.	Gas-Oil Ratio	Gravity
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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. <i>(Submit ACO-5)</i> <input type="checkbox"/> Other <i>(Specify)</i> _____ <input type="checkbox"/> Commingled <i>(Submit ACO-4)</i>	PRODUCTION INTERVAL: _____ _____
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Form	ACO1 - Well Completion
Operator	Murfin Drilling Co., Inc.
Well Name	WWWM 'A' 4-4
Doc ID	1241344

All Electric Logs Run

DIL
DUCP
MEL
BHCS
CBL



*acct
Prod-mg*

INVOICE

PO Box 93999
Southlake, TX 76092

Invoice Number: 146621

Invoice Date: Oct 19, 2014

Page: 1

Voice: (817) 546-7282

Fax: (817) 246-3361

Federal Tax I.D.#: 20-8651475

Bill To:
Murfin Drlg. Co., Inc. 250 N. Water STE #300 Wichita, KS 67202

Customer ID	Field Ticket #	Payment Terms	
Murfin	64271	Net 30 Days	
Job Location	Camp Location	Service Date	Due Date
KS1-01	Oakley	Oct 19, 2014	11/18/14

Quantity	Item	Description	Unit Price	Amount
1.00	WELL NAME	WWWM A #404		
170.00	CEMENT MATERIALS	Class A Common	17.90	3,043.00
479.00	CEMENT MATERIALS	Chloride	1.10	526.90
178.50	CEMENT SERVICE	Cubic Feet Charge	2.48	442.68
106.86	CEMENT SERVICE	Ton Mileage Charge	2.75	293.87
1.00	CEMENT SERVICE	Surface	1,512.25	1,512.25
13.00	CEMENT SERVICE	Pump Truck Mileage	7.70	100.10
1.00	CEMENT SERVICE	Manifold Head Rental	275.00	275.00
13.00	CEMENT SERVICE	Light Vehicle Mileage	4.40	57.20
1.00	CEMENT SUPERVISOR	Andrew Forslund		
1.00	OPERATOR ASSISTANT	Shawn Tatro		

ALL PRICES ARE NET, PAYABLE 30 DAYS FOLLOWING DATE OF INVOICE. 1 1/2% CHARGED THEREAFTER. IF ACCOUNT IS CURRENT, TAKE DISCOUNT OF

\$ 2,187.84 ✓ *ok*

ONLY IF PAID ON OR BEFORE Nov 18, 2014 *35%*

Subtotal	6,251.00
Sales Tax	273.10
Total Invoice Amount	6,524.10
Payment/Credit Applied	
TOTAL	6,524.10

- 2187.84

4336.26

over

ALLIED OIL & GAS SERVICES, LLC 064277

Federal Tax I.D. # 20-8651475

REMIT TO P.O. BOX 93999
SOUTHLAKE, TEXAS 76092

SERVICE POINT:
Oakley

DATE <u>10-19-14</u>	SEC. <u>4</u>	TWP. <u>13</u>	RANGE <u>32</u>	CALLED OUT	ON LOCATION <u>2:00 PM</u>	JOB START <u>5:00 AM</u>	JOB FINISH <u>5:30 PM</u>
LEASE <u>WWM #</u>	WELL # <u>4-4</u>	LOCATION <u>Oakley 11s 1w 34s</u>			COUNTY <u>Logan</u>	STATE <u>KS</u>	
OLD OR <input checked="" type="radio"/> NEW (Circle one)				<u>W into</u>			

CONTRACTOR <u>Murfin 4</u>	OWNER <u>same</u>
TYPE OF JOB <u>Surface</u>	CEMENT
HOLE SIZE <u>12 1/4</u> T.D. <u>223'</u>	AMOUNT ORDERED <u>120 sks com 38cc</u>
CASING SIZE <u>8 7/8</u> DEPTH <u>223'</u>	
TUBING SIZE DEPTH	
DRILL PIPE DEPTH	
TOOL DEPTH	
PRES. MAX MINIMUM	COMMON <u>120 sks @ 17.98 3013.00</u>
MEAS. LINE SHOE JOINT	POZMIX @
CEMENT LBFT IN CSG. <u>15'</u>	GEL @
PERFS.	CHLORIDE <u>479# @ 1.10 526.90</u>
DISPLACEMENT <u>13.24 BBL</u>	ASC @

EQUIPMENT		
PUMP TRUCK CEMENTER <u>Andrew Korstund</u>	# <u>422</u>	HELPER <u>Juan (TWS)</u>
BULK TRUCK	# <u>818</u>	DRIVER <u>Shawn Tatro</u>
BULK TRUCK	#	DRIVER
		Materico Total @ <u>3369.90</u>
		<u>(1,249.46 / 35%)</u>
		HANDLING <u>128.5 cu/ft @ 2.48 442.68</u>
		MILEAGE <u>2.25 to 4 mile 8.22 total 293.86</u>

REMARKS:

Cement did circulate.

Thank you

CHARGE TO: Murfin

STREET _____

CITY _____ STATE _____ ZIP _____

To: Allied Oil & Gas Services, LLC.
You are hereby requested to rent cementing equipment and furnish cementer and helper(s) to assist owner or contractor to do work as is listed. The above work was done to satisfaction and supervision of owner agent or contractor. I have read and understand the "GENERAL TERMS AND CONDITIONS" listed on the reverse side.

PRINTED NAME Kelly Wilson

SIGNATURE Kelly Wilson

SERVICE	
DEPTH OF JOB <u>223'</u>	
PUMP TRUCK CHARGE	<u>1512.25</u>
EXTRA FOOTAGE @	
MILEAGE <u>12 miles @ 2.70</u>	<u>108.10</u>
MANIFOLD head @	<u>225.00</u>
Light Vehicle @ <u>4.40</u>	<u>57.20</u>
	<u>(938.38 / 35%)</u>
	TOTAL <u>2,681.09</u>

PLUG & FLOAT EQUIPMENT	
_____ @	
_____ @	
_____ @	
_____ @	
_____ @	
	TOTAL _____

SALES TAX (If Any) _____

TOTAL CHARGES 6,250.99

DISCOUNT 2,181.84 (35%) IF PAID IN 30 DAYS

4,063.14 Net.



P. O. Box 466
Ness City, KS 67560
Off: 785-798-2300



Invoice

DATE	INVOICE #
10/30/2014	27895

BILL TO
Murfin Drilling Co Inc PO Box 661 Colby, KS 67701-0661

• Acidizing
 USED FOR LC 103 • Cement
 APPROVED R J [Signature] • Tool Rental

TERMS	Well No.	Lease	County	Contractor	Well Type	Well Category	Job Purpose	Operator
Net 30	#4-4	WWWM A	Logan	Company Tools	Oil	Development	Cement LongStri...	Blaine
PRICE REF.	DESCRIPTION				QTY	UM	UNIT PRICE	AMOUNT
575D	Mileage - 1 Way				80	Miles	6.00	480.00
578D-L	Pump Charge - Long String				1	Job	1,500.00	1,500.00
403-5	5 1/2" Cement Basket				2	Each	300.00	600.00T
404-5	5 1/2" Port Collar				1	Each	2,900.00	2,900.00T
406-5	5 1/2" Latch Down Plug & Baffle				1	Each	275.00	275.00T
407-5	5 1/2" Insert Float Shoe With Auto Fill				1	Each	375.00	375.00T
409-5	5 1/2" Turbolizer				15	Each	90.00	1,350.00T
413-5	5 1/2" Roto Wall Scratcher				10	Each	40.00	400.00T
325	Standard Cement				225	Sacks	14.50	3,262.50T
284	Calseal				11	Sack(s)	35.00	385.00T
283	Salt				1,150	Lb(s)	0.20	230.00T
285	CFR-1				150	Lb(s)	4.50	675.00T
276	Flocele				50	Lb(s)	2.50	125.00T
280	Flocheck 21				500	Gallon(s)	3.00	1,500.00T
221	Liquid KCL (Clayfix)				4	Gallon(s)	25.00	100.00T
290	D-Air				3	Gallon(s)	42.00	126.00T
581D	Service Charge Cement				225	Sacks	2.00	450.00
583D	Drayage				944	Ton Miles	1.00	944.00
	Subtotal							15,677.50
	Sales Tax Logan County						7.65%	941.22
We Appreciate Your Business!						Total		\$16,618.72



CHARGE TO: Martin Dalling
 ADDRESS: _____
 CITY, STATE, ZIP CODE: _____

TICKET 27895

PAGE 1 OF 2

SERVICE LOCATIONS: KS WELL/PROJECT NO: 4-4 LEASE: Winn "A" COUNTY/PARISH: Logan STATE: KS CITY: Osage DATE: 30 Oct 14 OWNER: _____

TICKET TYPE: SERVICE SALES CONTRACTOR: _____ RIG NAME/NO: 4 SHIPPED VIA: CT DELIVERED TO: location ORDER NO.: _____

WELL TYPE: oil WELL CATEGORY: CO TERS JOB PURPOSE: Development cement long string WELL PERMIT NO.: _____ WELL LOCATION: 4-13-32

REFERRAL LOCATION: _____ INVOICE INSTRUCTIONS: _____

PRICE REFERENCE	SECONDARY REFERENCE/ PART NUMBER	ACCOUNTING			DESCRIPTION	MILEAGE	QTY.	UM	QTY.	UM	UNIT PRICE	AMOUNT
		LOC	ACCT	DF								
515					TRK 114		80 mi				6.00	480.00
578					Pump Charge		1 ea				1500.00	1500.00
403					Cement Bucket		5 1/2 in		2 ea		300.00	600.00
404					Pont collar		5 1/2 in		1 ea		2900.00	2900.00
406					Latex down plug & bottle		5 1/2 in		1 ea		275.00	275.00
407					Insert flat shoe w/ Auto File		5 1/2 in		1 ea		375.00	375.00
409					Turbolizer		5 1/2 in		15 ea		90.00	1350.00
413					Robt Wall Scratcher		5 1/2 in		10 ea		40.00	400.00
415					Insert flat collar w/ FIT cap		5 1/2 in				400.00	400.00

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

DATE SIGNED: _____ TIME SIGNED: _____

SWIFT OPERATOR: _____ APPROVAL: APU

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

SURVEY

OUR EQUIPMENT PERFORMED WITHOUT BREAKDOWN? YES NO

WE UNDERSTOOD AND MET YOUR NEEDS? YES NO

OUR SERVICE WAS PERFORMED WITHOUT DELAY? YES NO

WE OPERATED THE EQUIPMENT AND PERFORMED JOB CALCULATIONS SATISFACTORILY? YES NO

ARE YOU SATISFIED WITH OUR SERVICE? YES NO

CUSTOMER DID NOT WISH TO RESPOND

PAGE TOTAL: 1 TOTAL: 16,618.72

Logan
 FAX 785-798-2300
 941.22

567611
 15,677.50

Thank You!



PO Box 466
Ness City, KS 67560
Off: 785.798.2300

TICKET CONTINUATION

TICKET No. 27895

CUSTOMER: *Mufin Drilling*

WELL: *WUWUW 14" 4-4*

DATE: *30 OCT 14* PAGE: *21* OF: *2*

PRICE REFERENCE	SECONDARY REFERENCE/ PART NUMBER	ACCOUNTING			TIME	DESCRIPTION	WELL		UNIT PRICE	AMOUNT	
		LOC	ACCT	DE			QTY	U/M			QTY
385						STANDARD cement			14.50	3262.50	
284						<i>ceaseal</i>	235	sk	35.00	385.00	
283						<i>seal</i>	1100	lb	0.20	230.00	
285						CFR-1	150	lb	4.50	675.00	
276						<i>Flocels</i>	50	lb	2.50	125.00	
280						<i>Flocels 21</i>	500	gal	3.00	1500.00	
281						<i>KCL Liquid</i>	4	gal	25.00	100.00	
290						<i>D-air</i>	3	gal	42.00	126.00	
581						SERVICE CHARGE			2.00	450.00	
583						MILEAGE CHARGE			1.00	944.00	
							TOTAL WEIGHT				
							23600				
							LOADED MILES				
							80				
							CUBIC FEET				
							2255				
							TON MILES				
							944				
CONTINUATION TOTAL										7797.50	

JOB LOG

SWIFT Services, Inc.

DATE 30 Oct 14 PAGE NO.

CUSTOMER *Murphy Drilling*

WELL NO. 4-4

LEASE *wwwm "A"*

JOB TYPE *Cement long string*

TICKET NO. 27895

CHART NO.	TIME	RATE (BPM)	VOLUME (BBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
								225 sk EA-2 w/ 1/2# flocc 5 1/2 x 15.5# casing 11 jts total pipe 4797 sheet 22' port collar 2525 #52 Bishes #51, 52 Control valves 1-14, 50
	0845							on loc TRK 114
	0920							start 5 1/2 x 15.5# casing in well
	1130							Drop ball - circulate
	1230	4 1/2	5				200	Pump 5 bbl KCL flush
		4 1/2	12				200	Pump 50 gal flocc
		4 1/2	15				200	Pump 15 bbl KCL flush
	1244		6					Plug RH - MH 30sk - 20sk
	1250	4	45				200	Mix EA-2 cement 175sk @ 15.3ppg
	1259							Drop latch down plug wash out pump & line
	1308	6					200	Displace plug (KCL H ₂ O first 20 bbl)
		6	108				950	
	1330	6	113				1600	Land plug
	1335							Release pressure to truck - dried up
	1338							wash truck
								Pack up
	1420							job complete Thanks Blaine Flint & Craig



P. O. Box 466
 Ness City, KS 67560
 Off: 785-798-2300



Invoice

DATE	INVOICE #
11/7/2014	27977

BILL TO
Murfin Drilling Co Inc PO Box 661 Colby, KS 67701-0661

- Acidizing
- Cement
- Tool Rental

TERMS	Well No.	Lease	County	Contractor	Well Type	Well Category	Job Purpose	Operator
Net 30	#4-4	WWWM	Logan	Company Tools	Oil	Development	Cement Port Collar	Blaine
PRICE REF.	DESCRIPTION				QTY	UM	UNIT PRICE	AMOUNT
575D	Mileage - 1 Way				80	Miles	6.00	480.00
576D-D	Pump Charge - Port Collar				1	Job	1,500.00	1,500.00
330	Swift Multi-Density Standard (MIDCON II)				175	Sacks	18.50	3,237.50T
276	Flocele				50	Lb(s)	2.50	125.00T
290	D-Air				2	Gallon(s)	42.00	84.00T
581D	Service Charge Cement				400	Sacks	2.00	800.00
583D	Drayage				1,632.16	Ton Miles	1.00	1,632.16
	Subtotal							7,858.66
	Sales Tax Logan County						7.65%	263.66
USED FOR <u>IC 103</u>								
APPROVED <u>J. J. [Signature]</u>								
We Appreciate Your Business!							Total	\$8,122.32

JOB LOG

SWIFT Services, Inc.

DATE 7 Nov 14 PAGE NO.

CUSTOMER **MOORE Drilling**

WELL NO. **4-4**

LEASE **wwwm**

JOB TYPE **cement port collar**

TICKET NO. **27977**

CHART NO.	TIME	RATE (BPM)	VOLUME (EBL) (GAL)	PUMPS		PRESSURE (PSI)		DESCRIPTION OF OPERATION AND MATERIALS
				T	C	TUBING	CASING	
								400 sk SMD cement w/ 1/4 flake 10 segel on side 2 3/4 x 5 1/2 Port collar - 2522'
	1100							on loc TRK 114
	1130					1200	1200	test to 1200 psi - held open port collar
	1145	3	2			400		inj rate 3 1/4 @ 400
	1155	3				400		mix SMD cement @ 11.2 ppg - fluid to surface -
		3	2			400		
		3 1/2	70			600		
	1229	3 1/2	93			650		— cement to surface — <div style="border-left: 1px solid black; border-right: 1px solid black; padding: 2px; display: inline-block;"> 175 sk mixed 15 to 8' </div>
		3 1/2	8			650		Displace w/ 8 1/2 bbl H ₂ O
								close port collar
	1239					1200	1200	test to 1200 psi - held
	1252	3						Reverse hole clean
		3	30					— 2 cement flages —
	1305							wash truck
								Rack up
	1340							job complete
								Thanks Phil, Blaine, & Rob

WWWM 'A' #4-4
 Daily Drilling Report
 Page Three

WWWM 'A' #4-4 990' FSL 335' FEL Sec. 4-T13S-R32W 3044' KB							WWWM #2-4 1735' FSL 660' FEL Sec. 4-T13S-R32W 3051' KB	
Formation	sample tops	Datum	Ref	Log Tops	Datum	Ref	Log Tops	Datum
Anhydrite	2528	+516	-1	2525	+519	+2	2534	+517
B/Anhydrite	2551	+493	-1	2550	+494	Flat	2557	+494
Topeka	3768	-724	-3	3765	-721	Flat	3772	-721
Heebner	3993	-949	-6	3990	-946	-3	3994	-943
Toronto	4017	-973	-4	4011	-967	+2	4020	-969
Lansing	4038	-994	-6	4036	-992	-4	4039	-988
Stark	4272	-1228	-7	4269	-1225	-4	4272	-1221
Pawnee	4474	-1430	-8	4472	-1428	-6	4473	-1422
Fort Scott	4528	-1484	-7	4528	-1484	-7	4528	-1477
Cherokee	4558	-1514	-10	4555	-1511	-7	4555	-1504
Johnson	4602	-1558	-12	4599	-1555	-9	4597	-1546
Mississippi	4668	-1624	-24	4667	-1623	-23	4651	-1600
RTD	4750	-1706					4780	-1729
LTD				4748			4782	-1731



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.Inc.**

250 N Water STE 300
Wichita KS 67202

ATTN: Tom Funk

WWWM A #4 4

4-13s-32w Logan,KS

Start Date: 2014.10.24 @ 07:26:15

End Date: 2014.10.24 @ 16:10:30

Job Ticket #: 59174 DST #: 1

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

Printed: 2014.10.30 @ 16:33:07



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
 250 N Water STE 300
 Wichita KS 67202
 ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
 Job Ticket: 59174 **DST#: 1**
 Test Start: 2014.10.24 @ 07:26:15

GENERAL INFORMATION:

Formation: **E-F**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 09:41:45
 Time Test Ended: 16:10:30
 Interval: **4103.00 ft (KB) To 4139.00 ft (KB) (TVD)**
 Total Depth: 4141.00 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: 3044.00 ft (KB)
 3034.00 ft (CF)
 KB to GR/CF: 10.00 ft

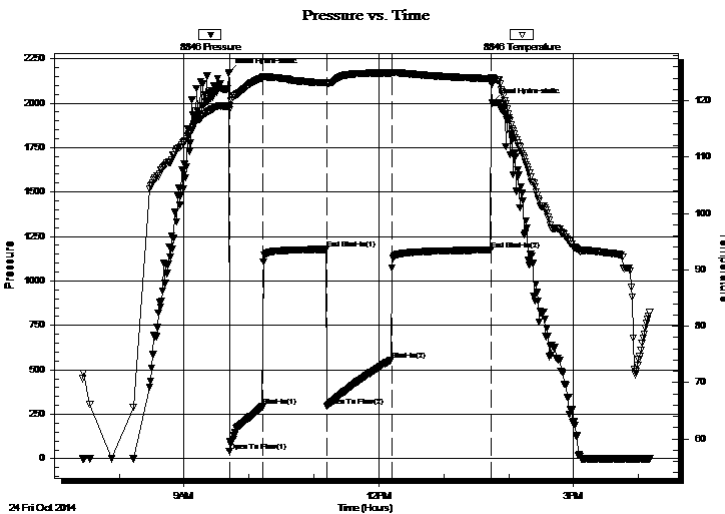
Serial #: 8846

Inside

Press@RunDepth: 557.43 psig @ 4134.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.10.24 End Date: 2014.10.24 Last Calib.: 2014.10.24
 Start Time: 07:26:15 End Time: 16:10:30 Time On Btm: 2014.10.24 @ 09:41:30
 Time Off Btm: 2014.10.24 @ 13:45:00

TEST COMMENT: IF:BOB in 7 min.
 IS:No return blow
 FF:BOB in 10 min.
 FS:No return blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2173.14	119.03	Initial Hydro-static
1	42.32	118.36	Open To Flow (1)
31	292.81	124.04	Shut-In(1)
90	1178.36	123.16	End Shut-In(1)
91	295.72	122.96	Open To Flow (2)
151	557.43	124.90	Shut-In(2)
242	1174.29	123.91	End Shut-In(2)
244	2001.04	124.16	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
271.00	sw 100% sw	1.33
450.00	mcsw 20%m 80%sw	6.23
180.00	mcsw 50%m 50%sw	2.52
240.00	mud 100%m	3.37

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59174 **DST#: 1**
Test Start: 2014.10.24 @ 07:26:15

Tool Information

Drill Pipe:	Length: 3824.00 ft	Diameter: 3.80 inches	Volume: 53.64 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: 280.00 ft	Diameter: 2.25 inches	Volume: 1.38 bbl	Weight to Pull Loose: 90000.00 lb
			<u>Total Volume: 55.02 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	22.00 ft			String Weight: Initial 72000.00 lb
Depth to Top Packer:	4103.00 ft			Final 80000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	36.00 ft			
Tool Length:	57.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

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

Change Over Sub	1.00			4083.00	
Shut In Tool	5.00			4088.00	
Hydraulic tool	5.00			4093.00	
Packer	5.00			4098.00	21.00 Bottom Of Top Packer
Packer	5.00			4103.00	
Stubb	1.00			4104.00	
Perforations	30.00			4134.00	
Recorder	0.00	8846	Inside	4134.00	
Recorder	0.00	8737	Outside	4134.00	
Bullnose	5.00			4139.00	36.00 Bottom Packers & Anchor
Total Tool Length:	57.00				



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59174 **DST#: 1**
Test Start: 2014.10.24 @ 07:26:15

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: 18000 ppm
Viscosity: 59.00 sec/qt	Cushion Volume: bbl	
Water Loss: 7.54 in ³	Gas Cushion Type:	
Resistivity: 0.00 ohm.m	Gas Cushion Pressure: psig	
Salinity: 6000.00 ppm		
Filter Cake: 2.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
271.00	sw 100% sw	1.333
450.00	mcsw 20%m 80%sw	6.230
180.00	mcsw 50%m 50%sw	2.525
240.00	mud 100%m	3.367

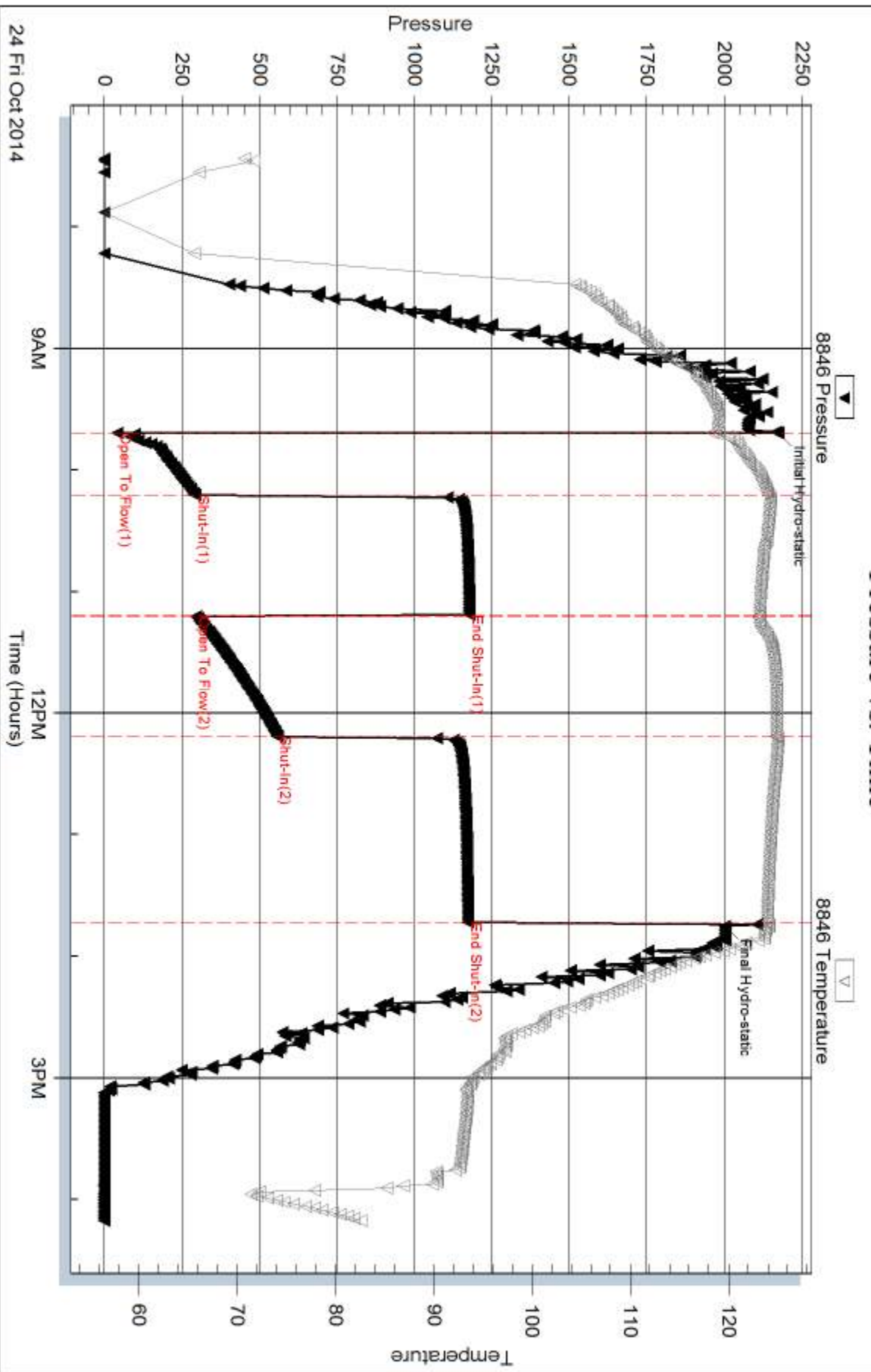
Total Length: 1141.00 ft Total Volume: 2215.269 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: RW= .30 @ 88.5*= 18,000 ppm

Pressure vs. Time

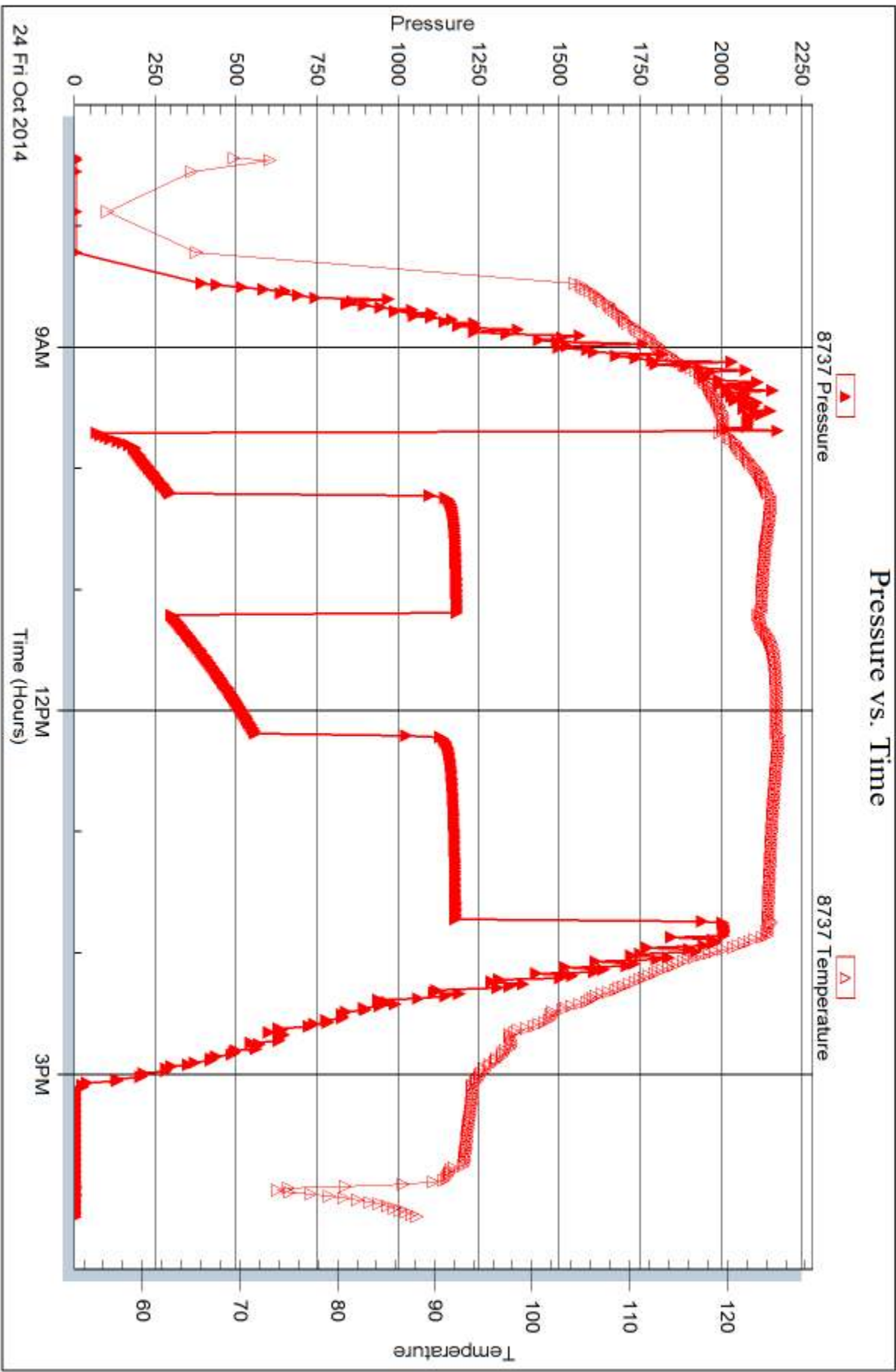


Serial #: 8737

Outside Murfin Drilling Co. Inc.

WWMMMA #4 4

DST Test Number: 1



Triobite Testing, Inc

Ref. No: 59174

Printed: 2014, 10:30 @ 16:33:09



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.Inc.**

250 N Water STE 300
Wichita KS 67202

ATTN: Tom Funk

WWWM A #4 4

4-13s-32w Logan,KS

Start Date: 2014.10.25 @ 09:30:15

End Date: 2014.10.25 @ 17:27:45

Job Ticket #: 59201 DST #: 2

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

Printed: 2014.10.30 @ 16:32:42



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
 250 N Water STE 300
 Wichita KS 67202
 ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
 Job Ticket: 59201 **DST#: 2**
 Test Start: 2014.10.25 @ 09:30:15

GENERAL INFORMATION:

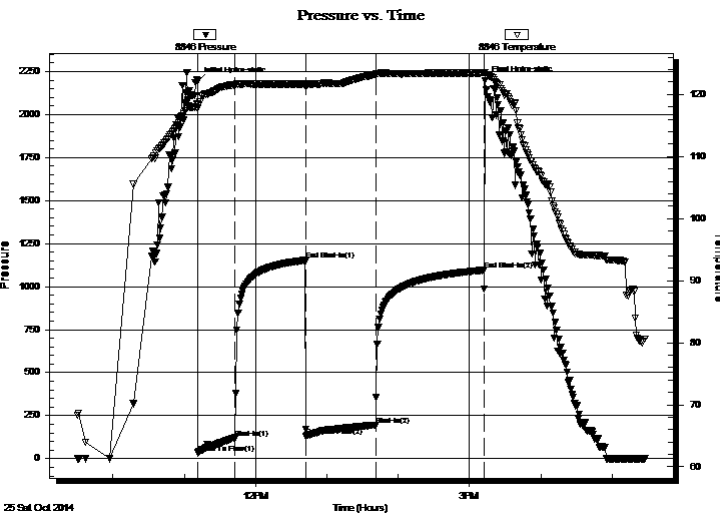
Formation: **H-I**
 Deviated: No Whipstock: ft (KB) Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 11:11:15 Tester: Mike Roberts
 Time Test Ended: 17:27:45 Unit No: 65
Interval: 4181.00 ft (KB) To 4242.00 ft (KB) (TVD) Reference Elevations: 3044.00 ft (KB)
 Total Depth: 4242.00 ft (KB) (TVD) 3034.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Fair KB to GR/CF: 10.00 ft

Serial #: 8846

Inside

Press@RunDepth: 196.12 psig @ 4237.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.10.25 End Date: 2014.10.25 Last Calib.: 2014.10.25
 Start Time: 09:30:15 End Time: 17:27:45 Time On Btm: 2014.10.25 @ 11:11:00
 Time Off Btm: 2014.10.25 @ 15:13:15

TEST COMMENT: IF: Built to 4" blow
 IS: No return blow
 FF: Built to 8" blow
 FS: No return blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2193.94	118.53	Initial Hydro-static
1	34.06	117.69	Open To Flow (1)
32	121.73	121.39	Shut-In(1)
91	1152.58	121.66	End Shut-In(1)
91	131.41	121.18	Open To Flow (2)
150	196.12	123.24	Shut-In(2)
241	1095.09	123.48	End Shut-In(2)
243	2195.38	123.56	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
90.00	w cm 20%w 80%m	708.17
340.00	mud 100%m	1497.13

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC.**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.

4-13s-32w Logan, KS

250 N Water STE 300
Wichita KS 67202

WWWM A #4 4

Job Ticket: 59201

DST#: 2

ATTN: Tom Funk

Test Start: 2014.10.25 @ 09:30:15

Tool Information

Drill Pipe:	Length: 3894.00 ft	Diameter: 3.80 inches	Volume: 54.62 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: 280.00 ft	Diameter: 90.00 inches	Volume: 2203.19 bbl	Weight to Pull Loose:	100000.0 lb
			<u>Total Volume: 2257.81 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	14.00 ft			String Weight: Initial	80000.00 lb
Depth to Top Packer:	4181.00 ft			Final	81000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	61.00 ft				
Tool Length:	82.00 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			4161.00	
Shut In Tool	5.00			4166.00	
Hydraulic tool	5.00			4171.00	
Packer	5.00			4176.00	21.00 Bottom Of Top Packer
Packer	5.00			4181.00	
Stubb	1.00			4182.00	
Perforations	1.00			4183.00	
Change Over Sub	1.00			4184.00	
Drill Pipe	32.00			4216.00	
Change Over Sub	1.00			4217.00	
Perforations	20.00			4237.00	
Recorder	0.00	8846	Inside	4237.00	
Recorder	0.00	8737	Outside	4237.00	
Bullnose	5.00			4242.00	61.00 Bottom Packers & Anchor

Total Tool Length: 82.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59201 **DST#: 2**
Test Start: 2014.10.25 @ 09:30:15

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: 19000 ppm
Viscosity: 70.00 sec/qt	Cushion Volume: bbl	
Water Loss: 6.76 in ³	Gas Cushion Type:	
Resistivity: 0.00 ohm.m	Gas Cushion Pressure: psig	
Salinity: 6200.00 ppm		
Filter Cake: 2.00 inches		

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
90.00	w cm 20%w 80%m	708.169
340.00	mud 100%m	1497.127

Total Length: 430.00 ft Total Volume: 2205.296 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments: RW= .31@ 88.6*= 19,000 ppm

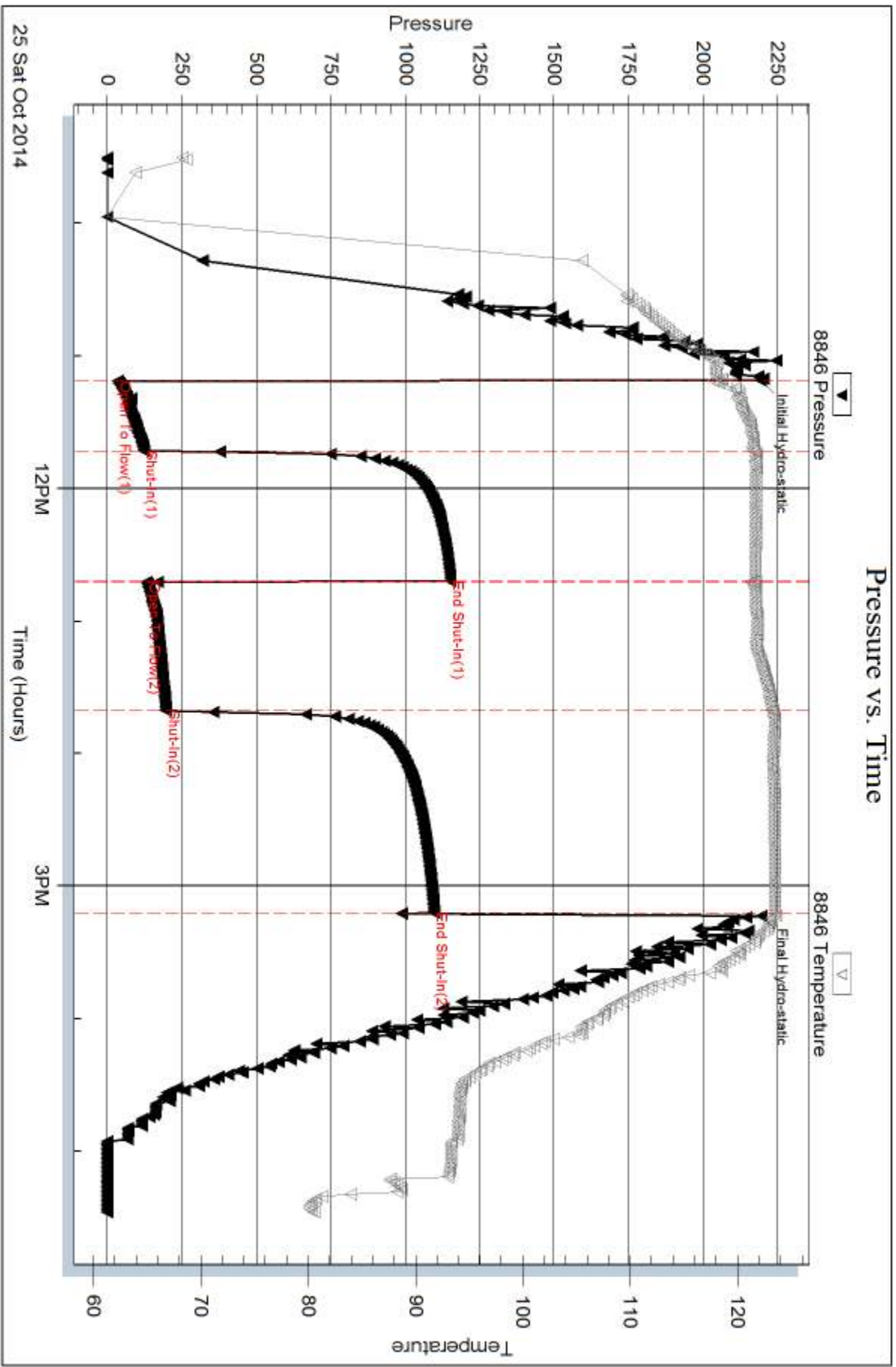
Serial #: 8846

Inside

Murfin Drilling Co. Inc.

WWMMMA #4 4

DST Test Number: 2



Trilobite Testing, Inc

Ref. No: 59201

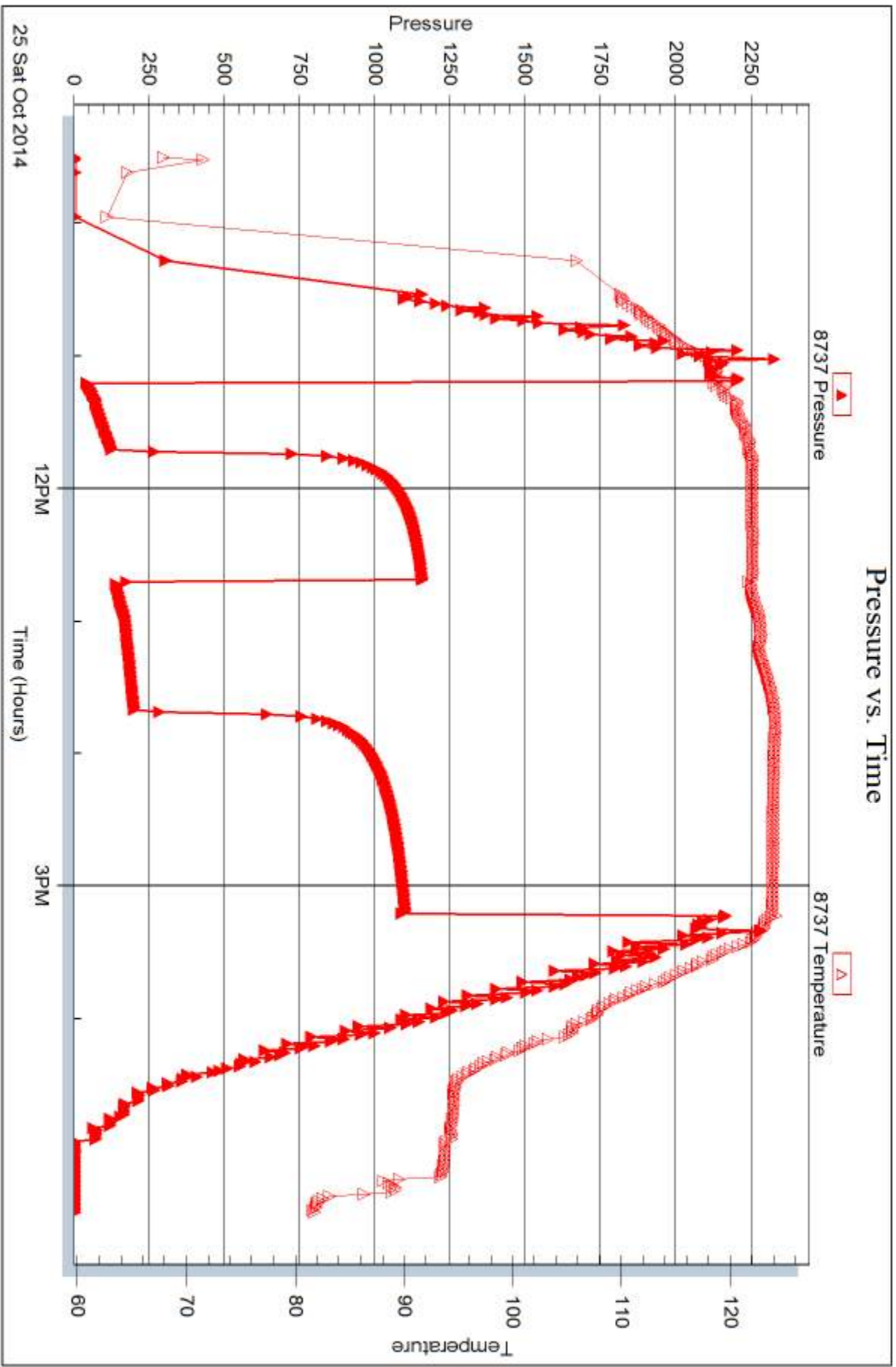
Printed: 2014, 10:30 @ 16:32:43

Serial #: 8737

Outside Murfin Drilling Co. Inc.

WMMMA #4 4

DST Test Number: 2



Triobite Testing, Inc

Ref. No: 59201

Printed: 2014, 10:30 @ 16:32:43



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.Inc.**

250 N Water STE 300
Wichita KS 67202

ATTN: Tom Funk

WWWM A #4 4

4-13s-32w Logan,KS

Start Date: 2014.10.26 @ 17:10:15

End Date: 2014.10.27 @ 01:26:15

Job Ticket #: 59202 DST #: 3

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

Printed: 2014.10.30 @ 16:25:23

Murfin Drilling Co.Inc.

4-13s-32w Logan,KS

WWWM A #4 4

DST # 3

Altamont A-B-C

2014.10.26



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS

WWWM A #4 4

Job Ticket: 59202

DST#: 3

Test Start: 2014.10.26 @ 17:10:15

GENERAL INFORMATION:

Formation: **Altamont A-B-C**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 19:38:00

Time Test Ended: 01:26:15

Test Type: Conventional Bottom Hole (Reset)

Tester: Mike Roberts

Unit No: 65

Interval: 4380.00 ft (KB) To 4460.00 ft (KB) (TVD)

Reference Elevations: 3044.00 ft (KB)

Total Depth: 4460.00 ft (KB) (TVD)

3034.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Fair

KB to GR/CF: 10.00 ft

Serial #: 8846

Inside

Press@RunDepth: 97.97 psig @ 4455.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2014.10.26

End Date:

2014.10.27

Last Calib.: 2014.10.27

Start Time: 17:10:15

End Time:

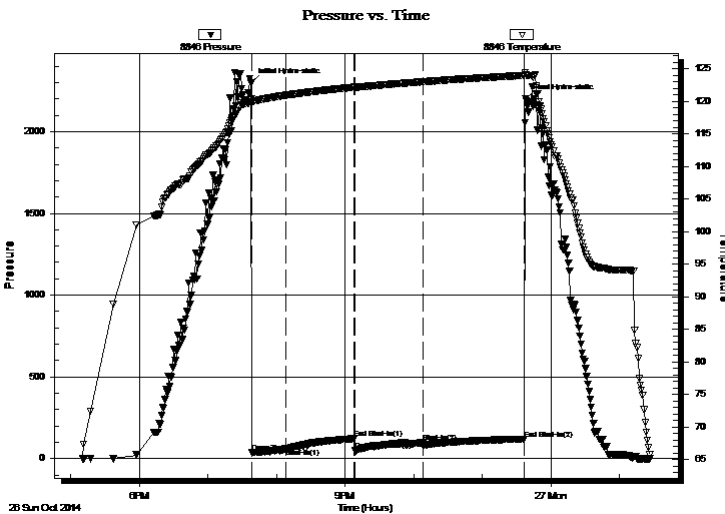
01:26:15

Time On Btm: 2014.10.26 @ 19:37:45

Time Off Btm: 2014.10.26 @ 23:38:00

TEST COMMENT: IF: Built to 1/8" blow
IS: No return blow
FF: No blow
FS: No return blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2296.71	120.34	Initial Hydro-static
1	37.48	119.74	Open To Flow (1)
31	62.80	120.96	Shut-In(1)
90	122.22	122.19	End Shut-In(1)
91	50.42	122.17	Open To Flow (2)
150	97.97	123.03	Shut-In(2)
239	121.12	124.00	End Shut-In(2)
241	2201.43	124.14	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

Murfin Drilling Co. Inc.
 250 N Water STE 300
 Wichita KS 67202
 ATTN: Tom Funk

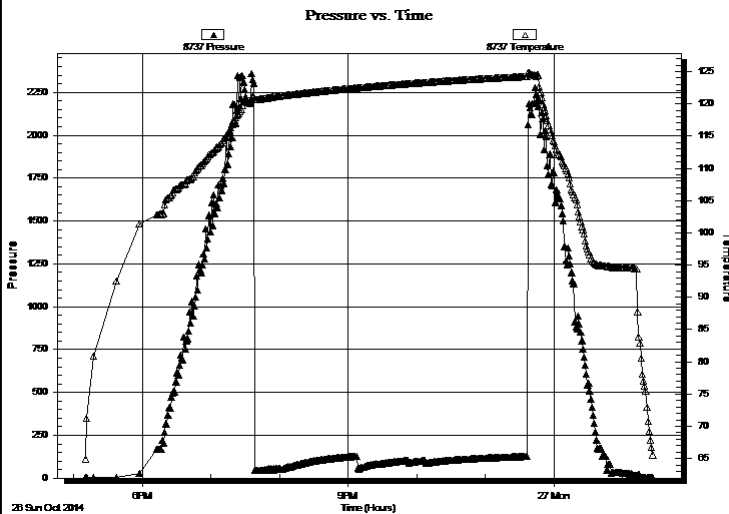
4-13s-32w Logan, KS
WWWM A #4 4
 Job Ticket: 59202 **DST#: 3**
 Test Start: 2014.10.26 @ 17:10:15

GENERAL INFORMATION:

Formation: **Altamont A-B-C**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 19:38:00
 Time Test Ended: 01:26:15
 Interval: **4380.00 ft (KB) To 4460.00 ft (KB) (TVD)**
 Total Depth: 4460.00 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: 3044.00 ft (KB)
 3034.00 ft (CF)
 KB to GR/CF: 10.00 ft

Serial #: 8737 Outside
 Press@RunDepth: psig @ 4455.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.10.26 End Date: 2014.10.27 Last Calib.: 2014.10.27
 Start Time: 17:10:15 End Time: 01:26:15 Time On Btm:
 Time Off Btm:

TEST COMMENT: IF: Built to 1/8" blow
 IS: No return blow
 FF: No blow
 FS: No return blow



PRESSURE SUMMARY

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

Recovery

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

Gas Rates

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

* Recovery from multiple tests



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.

4-13s-32w Logan, KS

250 N Water STE 300
Wichita KS 67202

WWWM A #4 4

Job Ticket: 59202

DST#: 3

ATTN: Tom Funk

Test Start: 2014.10.26 @ 17:10:15

Tool Information

Drill Pipe:	Length: 4124.00 ft	Diameter: 3.80 inches	Volume: 57.85 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: 271.00 ft	Diameter: 2.25 inches	Volume: 1.33 bbl	Weight to Pull Loose: 90000.00 lb
			<u>Total Volume: 59.18 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	36.00 ft			String Weight: Initial 78000.00 lb
Depth to Top Packer:	4380.00 ft			Final 78000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	80.00 ft			
Tool Length:	101.00 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			4360.00	
Shut In Tool	5.00			4365.00	
Hydraulic tool	5.00			4370.00	
Packer	5.00			4375.00	21.00 Bottom Of Top Packer
Packer	5.00			4380.00	
Stubb	1.00			4381.00	
Perforations	9.00			4390.00	
Change Over Sub	1.00			4391.00	
Drill Pipe	63.00			4454.00	
Change Over Sub	1.00			4455.00	
Recorder	0.00	8846	Inside	4455.00	
Recorder	0.00	8737	Outside	4455.00	
Bullnose	5.00			4460.00	80.00 Bottom Packers & Anchor

Total Tool Length: 101.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59202 **DST#: 3**
Test Start: 2014.10.26 @ 17:10:15

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: 60.00 sec/qt	Cushion Volume: bbl		
Water Loss: 7.96 in ³	Gas Cushion Type:		
Resistivity: 0.00 ohm.m	Gas Cushion Pressure: psig		
Salinity: 4700.00 ppm			
Filter Cake: 2.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	mud 100%m	0.025

Total Length: 5.00 ft Total Volume: 39.343 bbl
 Num Fluid Samples: 0 Num Gas Bombs: 0 Serial #:
 Laboratory Name: Laboratory Location:
 Recovery Comments:

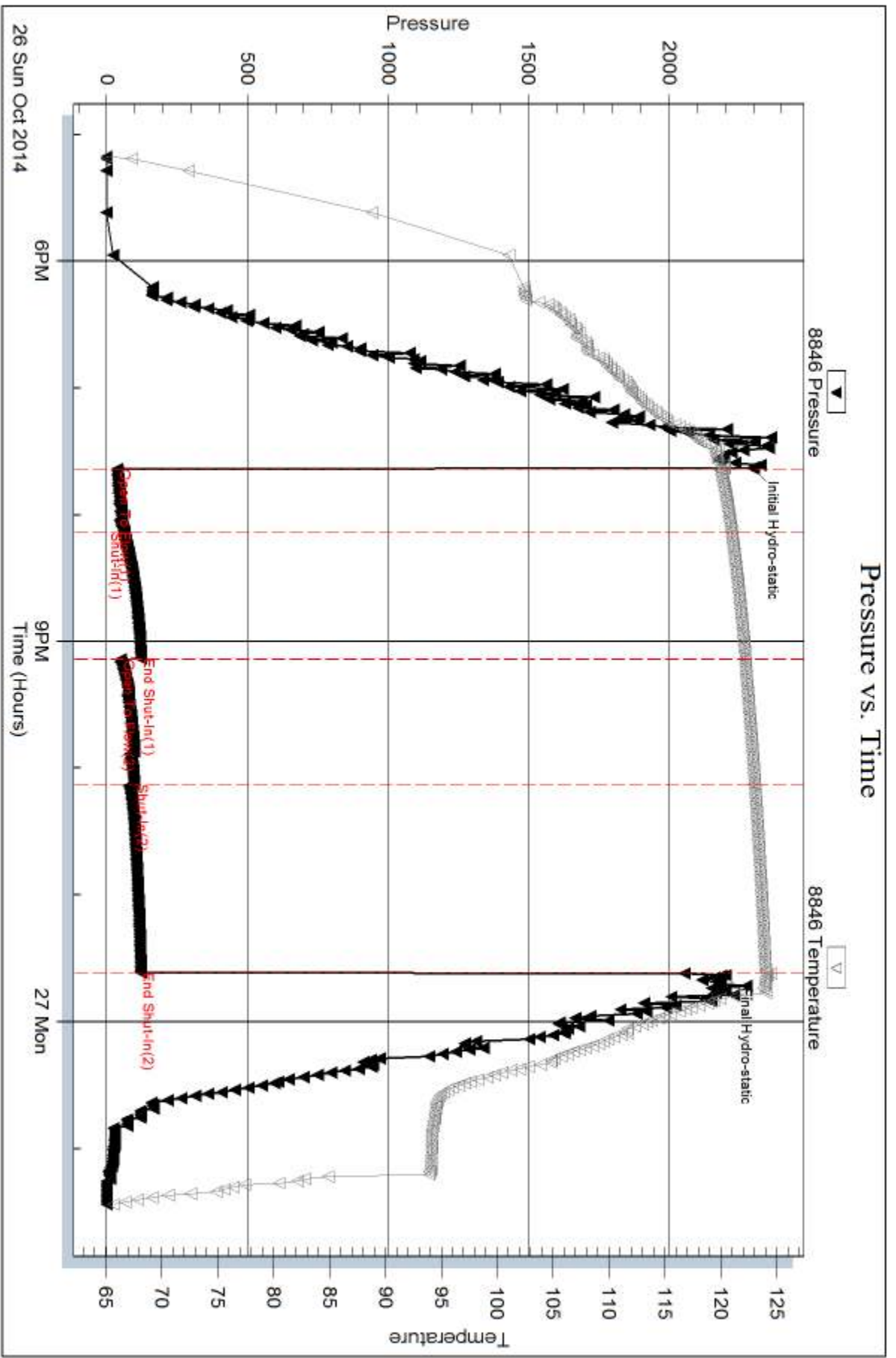
Serial #: 8846

Inside

Murfin Drilling Co. Inc.

WVWMA #4 4

DST Test Number: 3



Trilobite Testing, Inc

Ref. No: 59202

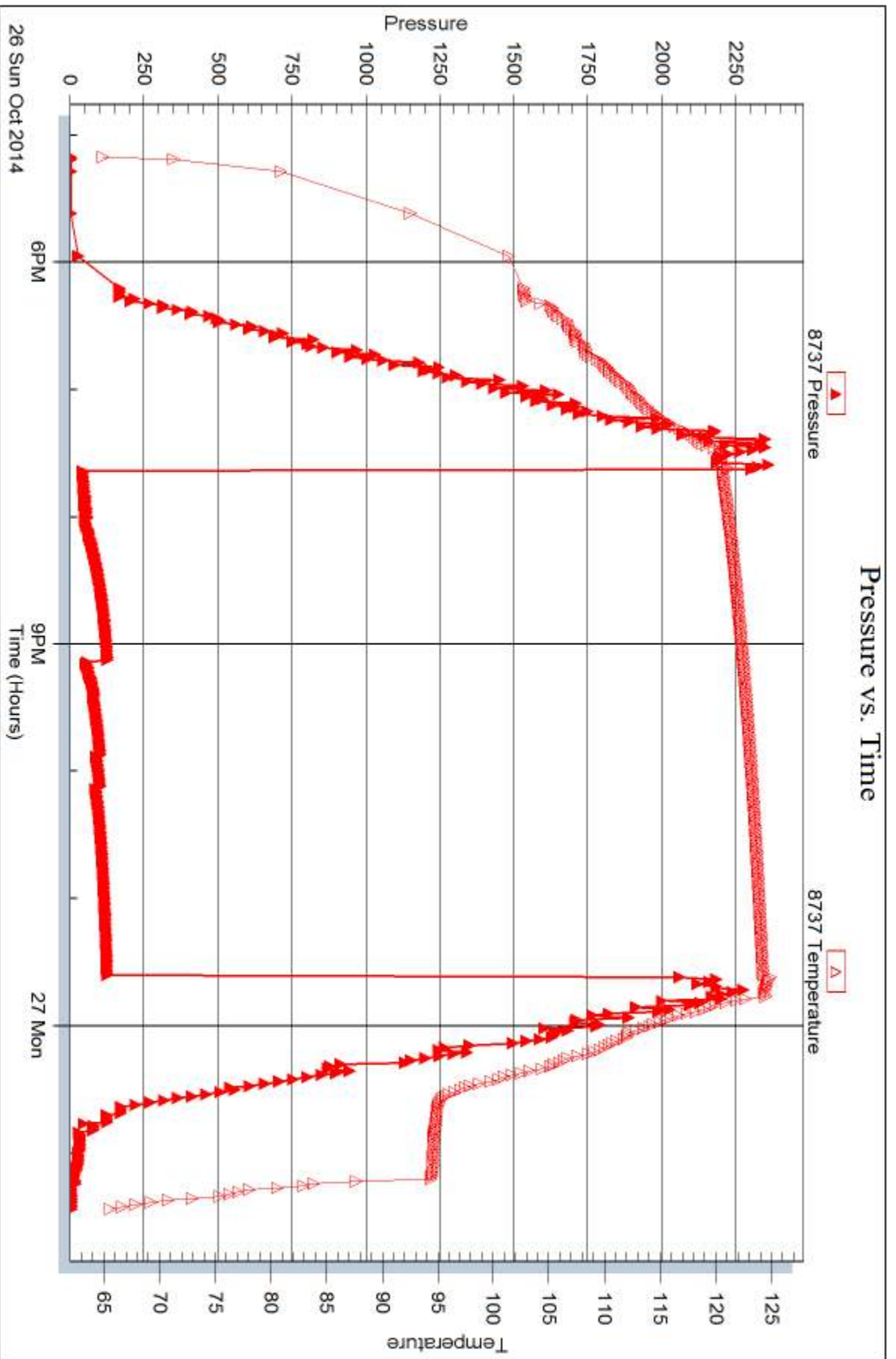
Printed: 2014, 10:30 @ 16:25:24

Serial #: 8737

Outside Murfin Drilling Co. Inc.

WMMMM #4 4

DST Test Number: 3





DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.Inc.**

250 N Water STE 300
Wichita KS 67202

ATTN: Tom Funk

WWWM A #4 4

4-13s-32w Logan,KS

Start Date: 2014.10.27 @ 13:09:15

End Date: 2014.10.27 @ 22:08:30

Job Ticket #: 59203 DST #: 4

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

Printed: 2014.10.30 @ 16:24:58

Murfin Drilling Co.Inc. 4-13s-32w Logan,KS WWWM A #4 4 DST # 4 Pawnee - Ft. Scott 2014.10.27



TRILOBITE TESTING, INC

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
 250 N Water STE 300
 Wichita KS 67202
 ATTN: Tom Funk

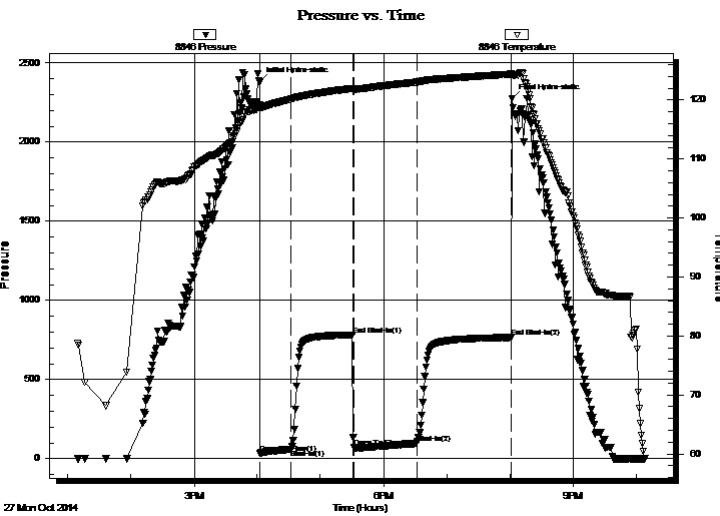
4-13s-32w Logan, KS
WWWM A #4 4
 Job Ticket: 59203 **DST#: 4**
 Test Start: 2014.10.27 @ 13:09:15

GENERAL INFORMATION:

Formation: **Pawnee - Ft. Scott**
 Deviated: No Whipstock: ft (KB)
 Time Tool Opened: 16:02:15
 Time Test Ended: 22:08:30
 Interval: **4464.00 ft (KB) To 4540.00 ft (KB) (TVD)**
 Total Depth: 4540.00 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: 3044.00 ft (KB)
 3034.00 ft (CF)
 KB to GR/CF: 10.00 ft

Serial #: 8846 Inside
 Press@RunDepth: 96.68 psig @ 4535.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.10.27 End Date: 2014.10.27 Last Calib.: 2014.10.27
 Start Time: 13:09:15 End Time: 22:08:30 Time On Btm: 2014.10.27 @ 16:02:00
 Time Off Btm: 2014.10.27 @ 20:02:15

TEST COMMENT: IF: Built to 3/4" blow
 IS: No return blow
 FF: No blow
 FS: No return blow



PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2380.44	119.11	Initial Hydro-static
1	35.50	118.49	Open To Flow (1)
31	60.38	120.14	Shut-In(1)
89	783.09	121.97	End Shut-In(1)
90	71.32	121.81	Open To Flow (2)
150	96.68	123.03	Shut-In(2)
239	766.63	124.38	End Shut-In(2)
241	2275.70	124.32	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
90.00	w cm 30%w 70%m	0.44

* Recovery from multiple tests

Gas Rates

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



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

TOOL DIAGRAM

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59203 **DST#: 4**
Test Start: 2014.10.27 @ 13:09:15

Tool Information

Drill Pipe:	Length: 4177.00 ft	Diameter: 3.80 inches	Volume: 58.59 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: 271.00 ft	Diameter: 2.25 inches	Volume: 1.33 bbl	Weight to Pull Loose: 90000.00 lb
			<u>Total Volume: 59.92 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	5.00 ft			String Weight: Initial 78000.00 lb
Depth to Top Packer:	4464.00 ft			Final 78000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	76.00 ft			
Tool Length:	97.00 ft			
Number of Packers:	2	Diameter: 6.75 inches		

Tool Comments:

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

Change Over Sub	1.00			4444.00	
Shut In Tool	5.00			4449.00	
Hydraulic tool	5.00			4454.00	
Packer	5.00			4459.00	21.00 Bottom Of Top Packer
Packer	5.00			4464.00	
Stubb	1.00			4465.00	
Perforations	4.00			4469.00	
Change Over Sub	1.00			4470.00	
Drill Pipe	64.00			4534.00	
Change Over Sub	1.00			4535.00	
Recorder	0.00	8846	Inside	4535.00	
Recorder	0.00	8737	Outside	4535.00	
Bullnose	5.00			4540.00	76.00 Bottom Packers & Anchor

Total Tool Length: 97.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co.Inc.

4-13s-32w Logan,KS

250 N Water STE 300
Wichita KS 67202

WWWM A #4 4

Job Ticket: 59203

DST#: 4

ATTN: Tom Funk

Test Start: 2014.10.27 @ 13:09:15

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:

21000 ppm

Viscosity: 60.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.98 in³

Gas Cushion Type:

Resistivity: 0.00 ohm.m

Gas Cushion Pressure:

psig

Salinity: 4700.00 ppm

Filter Cake: 2.00 inches

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
90.00	w cm 30%w 70%m	0.443

Total Length: 90.00 ft Total Volume: 708.169 bbl

Num Fluid Samples: 0

Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments: RW= .337 @ 78.2*=21,000 ppm

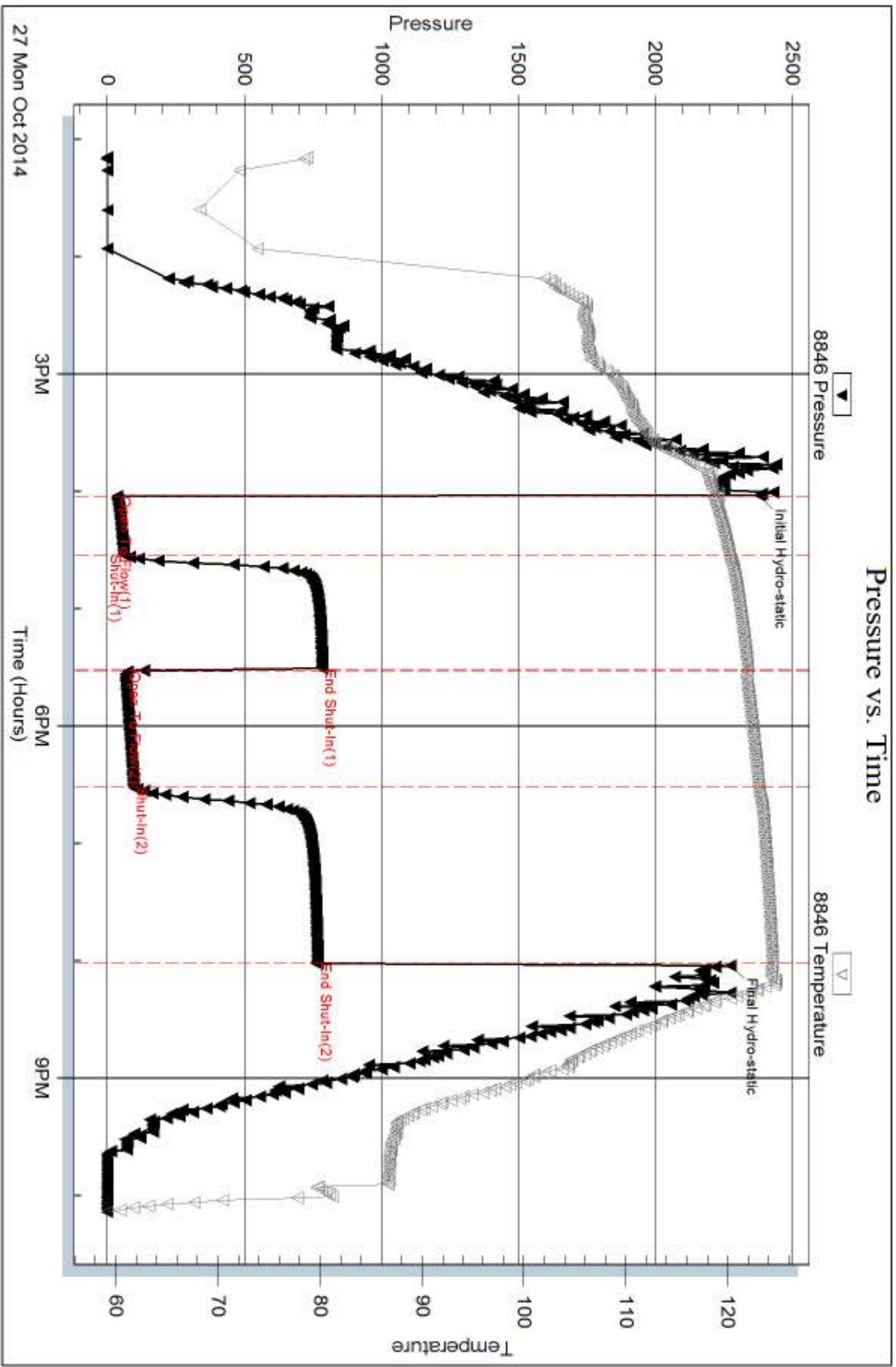
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Inside

Murfin Drilling Co. Inc.

WMMMM #4 4

DST Test Number: 4



Trilobite Testing, Inc

Ref. No: 59203

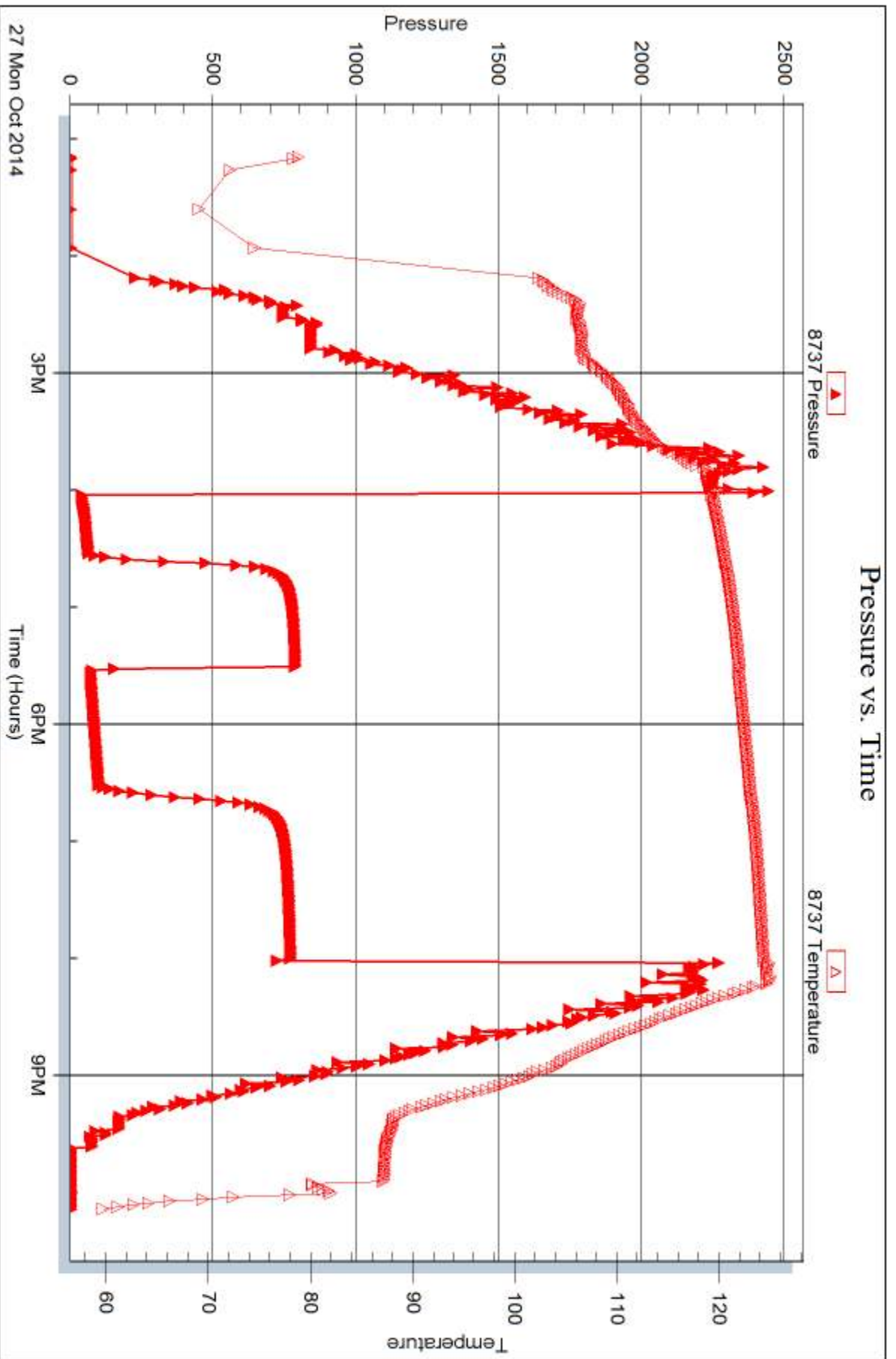
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Serial #: 8737

Outside Murfin Drilling Co. Inc.

WMMMM #4 4

DST Test Number: 4



Trilobite Testing, Inc

Ref. No: 59203

Printed: 2014, 10:30 @ 16:24:59



DRILL STEM TEST REPORT

Prepared For: **Murfin Drilling Co.Inc.**

250 N Water STE 300
Wichita KS 67202

ATTN: Tom Funk

WWWM A #4 4

4-13s-32w Logan,KS

Start Date: 2014.10.28 @ 09:10:15

End Date: 2014.10.28 @ 17:31:30

Job Ticket #: 59204 DST #: 5

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

Printed: 2014.10.30 @ 16:24:12



TRILOBITE TESTING, INC.

DRILL STEM TEST REPORT

Murfin Drilling Co. Inc.
 250 N Water STE 300
 Wichita KS 67202
 ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
 Job Ticket: 59204 **DST#: 5**
 Test Start: 2014.10.28 @ 09:10:15

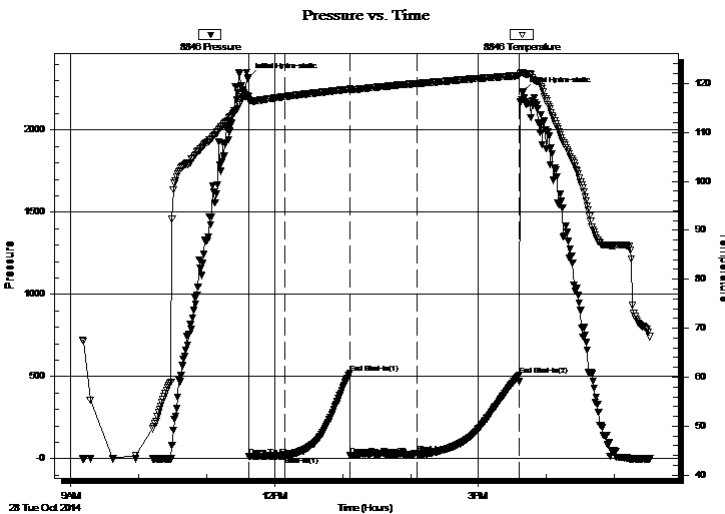
GENERAL INFORMATION:

Formation: **Johnson**
 Deviated: No Whipstock: ft (KB)
 Test Type: Conventional Bottom Hole (Reset)
 Time Tool Opened: 11:37:00 Tester: Mike Roberts/ Justin
 Time Test Ended: 17:31:30 Unit No: 65
 Interval: **4565.00 ft (KB) To 4620.00 ft (KB) (TVD)** Reference Elevations: 3044.00 ft (KB)
 Total Depth: 4620.00 ft (KB) (TVD) 3034.00 ft (CF)
 Hole Diameter: 7.88 inches Hole Condition: Fair KB to GR/CF: 10.00 ft

Serial #: 8846 Inside
 Press@RunDepth: 33.92 psig @ 4615.00 ft (KB) Capacity: 8000.00 psig
 Start Date: 2014.10.28 End Date: 2014.10.28 Last Calib.: 2014.10.28
 Start Time: 09:10:15 End Time: 17:31:30 Time On Btm: 2014.10.28 @ 11:36:45
 Time Off Btm: 2014.10.28 @ 15:39:00

TEST COMMENT: 30: Weak surface blow died in 15 mins.
 60: No Return
 60: No blow
 90: No return blow

PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2320.44	117.33	Initial Hydro-static
1	15.29	116.58	Open To Flow (1)
32	18.07	117.25	Shut-In(1)
90	520.40	118.78	End Shut-In(1)
90	19.11	118.64	Open To Flow (2)
149	33.92	119.94	Shut-In(2)
240	510.45	121.57	End Shut-In(2)
243	2234.89	122.22	Final Hydro-static

Recovery

Length (ft)	Description	Volume (bbl)
5.00	mud w ith oil spots	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

Murfin Drilling Co. Inc.

4-13s-32w Logan, KS

250 N Water STE 300
Wichita KS 67202

WWWM A #4 4

Job Ticket: 59204

DST#: 5

ATTN: Tom Funk

Test Start: 2014.10.28 @ 09:10:15

Tool Information

Drill Pipe:	Length: 4279.00 ft	Diameter: 3.80 inches	Volume: 60.02 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: 271.00 ft	Diameter: 2.25 inches	Volume: 1.33 bbl	Weight to Pull Loose: 85000.00 lb
			<u>Total Volume: 61.35 bbl</u>	Tool Chased 0.00 ft
Drill Pipe Above KB:	6.00 ft			String Weight: Initial 78000.00 lb
Depth to Top Packer:	4565.00 ft			Final 78000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	55.00 ft			
Tool Length:	76.00 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			4545.00	
Shut In Tool	5.00			4550.00	
Hydraulic tool	5.00			4555.00	
Packer	5.00			4560.00	21.00 Bottom Of Top Packer
Packer	5.00			4565.00	
Stubb	1.00			4566.00	
Perforations	16.00			4582.00	
Change Over Sub	1.00			4583.00	
Drill Pipe	31.00			4614.00	
Change Over Sub	1.00			4615.00	
Recorder	0.00	8846	Inside	4615.00	
Recorder	0.00	8737	Outside	4615.00	
Bullnose	5.00			4620.00	55.00 Bottom Packers & Anchor

Total Tool Length: 76.00



**TRILOBITE
TESTING, INC**

DRILL STEM TEST REPORT

FLUID SUMMARY

Murfin Drilling Co. Inc.
250 N Water STE 300
Wichita KS 67202
ATTN: Tom Funk

4-13s-32w Logan, KS
WWWM A #4 4
Job Ticket: 59204 **DST#: 5**
Test Start: 2014.10.28 @ 09:10:15

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: 60.00 sec/qt	Cushion Volume: bbl		
Water Loss: 7.98 in ³	Gas Cushion Type:		
Resistivity: 0.00 ohm.m	Gas Cushion Pressure: psig		
Salinity: 4700.00 ppm			
Filter Cake: 2.00 inches			

Recovery Information

Recovery Table

Length ft	Description	Volume bbl
5.00	mud w ith oil spots	0.025

Total Length: 5.00 ft Total Volume: 39.343 bbl

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

Laboratory Name: Laboratory Location:

Recovery Comments:

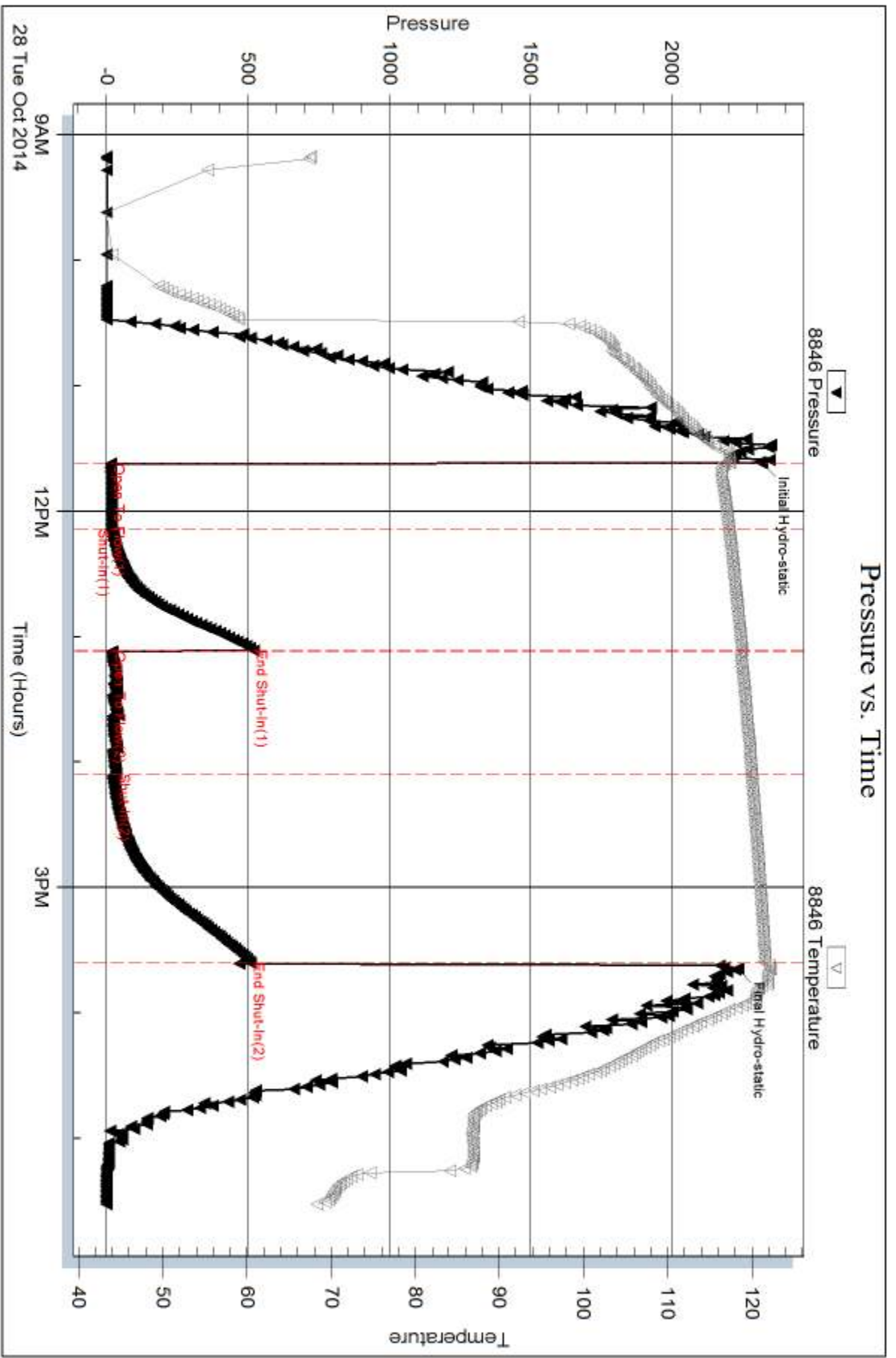
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Inside

Murfin Drilling Co. Inc.

WMMMM #4 4

DST Test Number: 5



Trilobite Testing, Inc

Ref. No: 59204

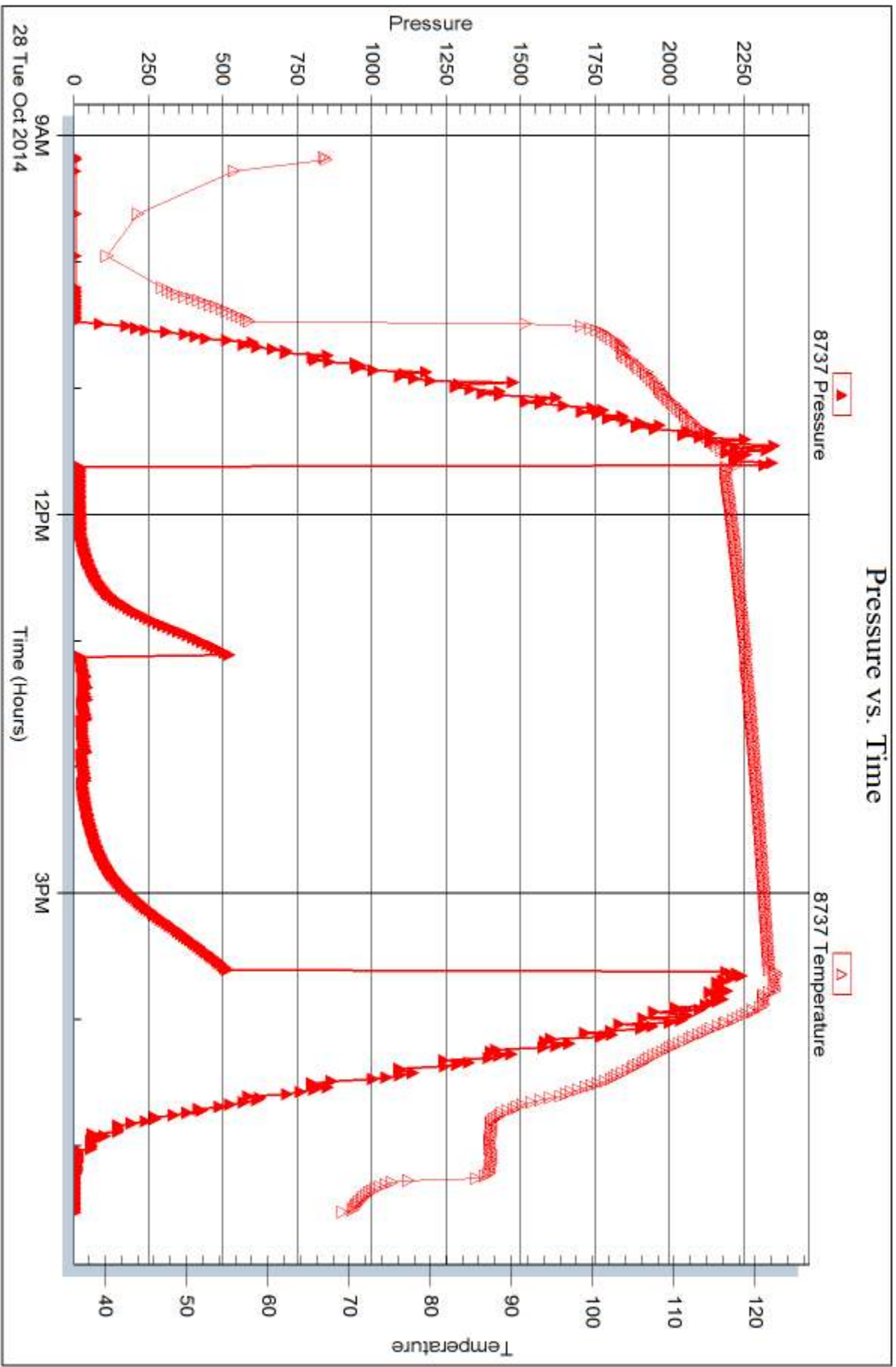
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Serial #: 8737

Outside Murfin Drilling Co. Inc.

WWMMMA #4 4

DST Test Number: 5



Trilobite Testing, Inc

Ref. No: 59204

Printed: 2014, 10:30 @ 16:24:13



TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 59175

4/10

Well Name & No. WWW M "A" 4-4 Test No. 1 Date 10-24-14
 Company Martin Drilling Co Inc Elevation 3044 KB 3034 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Tom Funk Rig Martin 4
 Location: Sec. 4 Twp. 13S Rge. 32W Co. Logan State KS

Interval Tested 4103-4199 Zone Tested E-F
 Anchor Length 36 Drill Pipe Run ~~4000~~ 3824 Mud Wt. 9.0
 Top Packer Depth 4100 Drill Collars Run ~~3000~~ 271 Vis 59
 Bottom Packer Depth 4105 Wt. Pipe Run Ø WL 7.6
 Total Depth 4141 Chlorides 6000 ppm System LCM 6

Blow Description IF: BOB IN 7 Min
IS: No Return Blow
FF: BOB IN 10 Min
FS: No Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>240</u>	<u>MUD</u>			<u>100</u>	
<u>180</u>	<u>MCSW</u>		<u>50</u>	<u>50</u>	
<u>450</u>	<u>MCSW</u>		<u>80</u>	<u>20</u>	
<u>271</u>	<u>SW</u>		<u>100</u>		

Rec Total 1141 BHT 124 Gravity 1.30 API RW 130 @ 88.5° F Chlorides 18000 ppm
 (A) Initial Hydrostatic 2173 Test 1250⁰⁰ T-On Location 05:20
 (B) First Initial Flow 42 Jars T-Started 07:26
 (C) First Final Flow 292 Safety Joint NL T-Open 09:42
 (D) Initial Shut-In 1178 Circ Sub T-Pulled 13:42
 (E) Second Initial Flow 295 Hourly Standby T-Out 16:10
 (F) Second Final Flow 557 Mileage 76 RT = 117.80/- Comments _____
 (G) Final Shut-In 1174 Sampler _____
 (H) Final Hydrostatic 2001 Straddle _____

Shale Packer _____
 Shale Packer _____
 Extra Packer _____
 Extra Recorder _____
 Day Standby _____
 Accessibility _____
 Sub Total 1367.80
 MP/DST Disc't _____

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 90
 Approved By [Signature] 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. 59201

4/10

Well Name & No.	WWWM "A" 4-4	Test No.	2	Date	10-25-14
Company	Mustin Drilling Co Inc.	Elevation	3044	KB	3034 GL
Address	250 N. Water STE 300 Wichita KS 67202				
Co. Rep / Geo.	Tom Funk	Rig	Mustin 4		
Location: Sec.	4	Twp.	13s	Rge.	32w
		Co.	Logan	State	KS

Interval Tested	4181-4242	Zone Tested	H-I
Anchor Length	61	Drill Pipe Run	3894
Top Packer Depth	4176	Drill Collars Run	271
Bottom Packer Depth	4181	Wt. Pipe Run	Ø
Total Depth	4242	Chlorides	6200 ppm System
Blow Description	IF: Built to 4" IS: No Return Blow FF: Built to 8" FS: No Return Blow		

Rec	Feet of	%gas	%oil	%water	%mud
340	MUD			100	
90	WCM		20	80	

Rec Total	430	BHT	124	Gravity	API RW 31 @ 88.4° F	Chlorides	19,000 ppm
(A) Initial Hydrostatic	2193	<input checked="" type="checkbox"/> Test	1250.00	T-On Location	09:15		
(B) First Initial Flow	34	<input type="checkbox"/> Jars		T-Started	09:30		
(C) First Final Flow	121	<input type="checkbox"/> Safety Joint		T-Open	11:11		
(D) Initial Shut-In	1152	<input checked="" type="checkbox"/> Circ Sub	NO	T-Pulled	15:11		
(E) Second Initial Flow	131	<input type="checkbox"/> Hourly Standby		T-Out	17:27		
(F) Second Final Flow	196	<input checked="" type="checkbox"/> Mileage	76 RT = 117.80%	Comments			
(G) Final Shut-In	1096	<input type="checkbox"/> Sampler					
(H) Final Hydrostatic	2195	<input type="checkbox"/> Straddle					
Initial Open	30	<input type="checkbox"/> Shale Packer					
Initial Shut-In	60	<input type="checkbox"/> Extra Packer					
Final Flow	60	<input type="checkbox"/> Extra Recorder					
Final Shut-In	99	<input type="checkbox"/> Day Standby					
		<input type="checkbox"/> Accessibility					
Sub Total			1367.80	MP/DST Disc't			

Approved By *[Signature]*

Our Representative *[Signature]*

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 59202

4/10

Well Name & No. WWW M "A" 4-4 Test No. 3 Date 10-26-14
 Company Murfin Drilling Co Inc. Elevation 3044 KB 3034 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Tom Funk Rig Murfin 4
 Location: Sec. 4 Twp. 13S Rge. 32W Co. Logan State KS

Interval Tested 4380-4460 Zone Tested Altamont A-B-C
 Anchor Length 80 Drill Pipe Run 4124 Mud Wt. 9.1
 Top Packer Depth 4375 Drill Collars Run 271 Vis 60
 Bottom Packer Depth 4380 Wt. Pipe Run Ø WL 8.0
 Total Depth 4460 Chlorides 4700 ppm System LCM 7
 Blow Description IF: Built to 1/8" 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 125 Gravity — API RW — @ — ° F Chlorides — ppm
 (A) Initial Hydrostatic 2294 Test 1250.00 T-On Location 16:30
 (B) First Initial Flow 37 Jars — T-Started 17:10
 (C) First Final Flow 62 Safety Joint — T-Open 19:35
 (D) Initial Shut-In 122 Circ Sub NC T-Pulled 23:35
 (E) Second Initial Flow 50 Hourly Standby — T-Out 01:26
 (F) Second Final Flow 97 Mileage 76RT = 117.80/- Comments —
 (G) Final Shut-In 121 Sampler —
 (H) Final Hydrostatic 2201 Straddle — Ruined Shale Packer —
 Shale Packer — Ruined Packer —
 Extra Packer — Extra Copies —
 Initial Open 30 Extra Recorder — Sub Total 0
 Initial Shut-In 60 Day Standby — Total 1367.80
 Final Flow 60 Accessibility — MP/DST Disc't —
 Final Shut-In 90 Sub Total 1367.80/-

Approved By Tom Funk Our Representative Mike Roberts

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TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

Test Ticket

NO. 59203

Well Name & No. WWNm "A" 4-4 Test No. 4 Date 10-27-14
 Company Martin Drilling Co Inc. Elevation 3044 KB 3034 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Tom Funk Rig Martin 4
 Location: Sec. 4 Twp. 13S Rge. 32W Co. Logan State KS

Interval Tested 4464-4540 Zone Tested Pawnee-Lower Pawnee-Forscott
 Anchor Length 76 Drill Pipe Run 4177 Mud Wt. 9.1
 Top Packer Depth 4460 Drill Collars Run 271 Vis 60
 Bottom Packer Depth 4464 Wt. Pipe Run 0 WL 8.0
 Total Depth 4540 Chlorides 4700 ppm System LCM 7

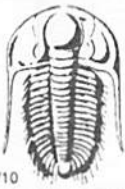
Blow Description IF: Built to 3/4" blow
IS: No Return Blow
FF: NO Blow
FS: No Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>90</u>	<u>WCm</u>			<u>30</u>	<u>70</u>
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud
Rec	Feet of	%gas	%oil	%water	%mud

Rec Total 90 BHT 125 Gravity - API RW 1337 @ 78.2° F Chlorides 21000 ppm
 (A) Initial Hydrostatic 2380 Test 1250.00 T-On Location 12:50
 (B) First Initial Flow 35 Jars T-Started 13:09
 (C) First Final Flow 60 Safety Joint T-Open 16:02
 (D) Initial Shut-In 783 Circ Sub NC T-Pulled 20:02
 (E) Second Initial Flow 71 Hourly Standby T-Out 22:08
 (F) Second Final Flow 96 Mileage 76 RT = \$117.80/- Comments _____
 (G) Final Shut-In 766 Sampler _____
 (H) Final Hydrostatic 2275 Straddle _____

Initial Open 30 Shale Packer _____
 Initial Shut-In 60 Shale Packer _____
 Final Flow 60 Extra Packer _____
 Final Shut-In 90 Extra Recorder _____
 Sub Total 0
 Total 1367.80
 Sub Total \$1367.80/- MP/DST Disc't _____

Approved By [Signature] Our Representative Mike Robert
 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. 59204

Well Name & No. WWW "A" 4-4 Test No. 5 Date 10-28-14
 Company Murfin Drilling Co Inc. Elevation 3044 KB 3034 GL
 Address 250 N. Water STE 300 Wichita KS 67202
 Co. Rep / Geo. Tom Funk Rig Murfin #4
 Location: Sec. 4 Twp. 13S Rge. 32W Co. Logan State KS

Interval Tested 4565 4620 Zone Tested Johnson
 Anchor Length 55 Drill Pipe Run 4279 Mud Wt. 9.1
 Top Packer Depth 4561 Drill Collars Run 271 Vis 60
 Bottom Packer Depth 4565 Wt. Pipe Run Ø WL 8.0
 Total Depth 4620 Chlorides 4700 ppm System LCM 7

Blow Description 30 weak surface Blow Died in 15 min.
60 No Return
60 No Blow
90 No Return Blow

Rec	Feet of	%gas	%oil	%water	%mud
<u>5</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 5 BHT 125 Gravity — API RW — @ — °F Chlorides — ppm
 (A) Initial Hydrostatic 2320 Test 1250 T-On Location 9:00
 (B) First Initial Flow 15 Jars T-Started 9:10
 (C) First Final Flow 18 Safety Joint T-Open 11:35
 (D) Initial Shut-In 520 Circ Sub N/C T-Pulled 15:35
 (E) Second Initial Flow 19 Hourly Standby T-Out 17:31
 (F) Second Final Flow 33 Mileage 76 RT 117.80
 (G) Final Shut-In 510 Sampler
 (H) Final Hydrostatic 2234 Straddle Ruined Shale Packer
 Shale Packer Ruined Packer
 Extra Packer Extra Copies

Initial Open 30
 Initial Shut-In 60
 Final Flow 60
 Final Shut-In 9.0
 Sub Total 0
 Total 1367.80
 MP/DST Disc't 50%/50%
 Sub Total 1367.80/-

Approved By [Signature] Our Representative Mike Roberts / Justin Harris
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Thomas J. Funk
Petrolem Geologist

Geologist's Report
Drilling Time and Sample Log

OPERATOR **Murfin Drilling Co., Inc**

LEASE **WWWM 'A'** WELL NO **#4-4**

FIELD **High Hat** API **15-109-21345**

LOCATION **990' FSL & 335' FEL**

SEC. **4** TWP. **13S** RGE. **32W**

COUNTY **Logan** STATE **Kansas**

CONTRACTOR **Murfin Dring Co** Reg #4

COMM **10/18/2014** COMP **10/30/2014**

RTD **4750'** LOG TD **4748'**

SAMPLES SAVED FROM **3670'** TO **4750'**

DRILLING TIME KEPT FROM **3670'** TO **4750'**

SAMPLES EXAMINED FROM **3670'** TO **4750'**

GEOLOGICAL SUPERVISION FROM **3700'** TO **4750'**

MUD UP **3300'** TYPE MUD **Chemical**

FORMATION LOG SAMPLE

Anhydrite **2526 (+518)** **2528 (+516)**

B/Anhydrite **2549 (+495)** **2551 (+493)**

Topokaka **3765 (-721)** **3768 (-724)**

Heebner Sh **3990 (-946)** **3993 (-949)**

Lansing **4036 (-992)** **4038 (-994)**

Muncie Creek **4181 (-1137)** **4185 (-1141)**

Start Sh **4263 (-1225)** **4273 (-1229)**

Marmaton **4372 (-1328)** **4376 (-1332)**

Pawnee **4474 (-1428)** **4474 (-1430)**

Cherokee Sh **4555 (-1511)** **4558 (-1514)**

Johnson Zone **4598 (-1554)** **4602 (-1558)**

Mississippian **4666 (-1622)** **4668 (-1624)**

Date	Daily Progress	NO. Stret	Make	Type	Depth	Out	Feet	Hours
10/18/14	Spud	1	12 1/4" HTC	HTC-1	223		223	3
10/19/14		2	7 7/8" HTC	DP506	3253		3030	42
10/20/14		3	7 7/8" HTC	GX20c	4750		1497	98
10/21/14								
10/22/14								
10/23/14								
10/24/14								
10/25/14								
10/26/14								
10/27/14								
10/28/14								
10/29/14								
10/30/14								

ELEVATION **3044'** **KB**

LEASE **WWWM 'A'** WELL NO **#4-4**

FIELD **High Hat** API **15-109-21345**

LOCATION **990' FSL & 335' FEL**

SEC. **4** TWP. **13S** RGE. **32W**

COUNTY **Logan** STATE **Kansas**

CONTRACTOR **Murfin Dring Co** Reg #4

COMM **10/18/2014** COMP **10/30/2014**

RTD **4750'** LOG TD **4748'**

SAMPLES SAVED FROM **3670'** TO **4750'**

DRILLING TIME KEPT FROM **3670'** TO **4750'**

SAMPLES EXAMINED FROM **3670'** TO **4750'**

GEOLOGICAL SUPERVISION FROM **3700'** TO **4750'**

MUD UP **3300'** TYPE MUD **Chemical**

FORMATION LOG SAMPLE

Anhydrite **2526 (+518)** **2528 (+516)**

B/Anhydrite **2549 (+495)** **2551 (+493)**

Topokaka **3765 (-721)** **3768 (-724)**

Heebner Sh **3990 (-946)** **3993 (-949)**

Lansing **4036 (-992)** **4038 (-994)**

Muncie Creek **4181 (-1137)** **4185 (-1141)**

Start Sh **4263 (-1225)** **4273 (-1229)**

Marmaton **4372 (-1328)** **4376 (-1332)**

Pawnee **4474 (-1428)** **4474 (-1430)**

Cherokee Sh **4555 (-1511)** **4558 (-1514)**

Johnson Zone **4598 (-1554)** **4602 (-1558)**

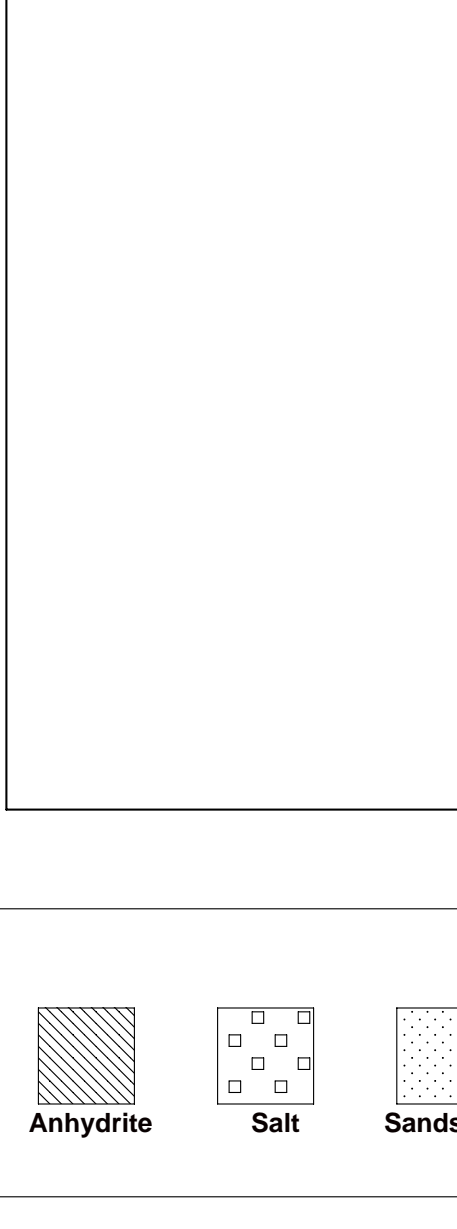
Mississippian **4666 (-1622)** **4668 (-1624)**

PRODUCTION **5 1/2" at 4747'KB w/175x**

ELECTRICAL SURVEYS **Pioneer Energy Serv**

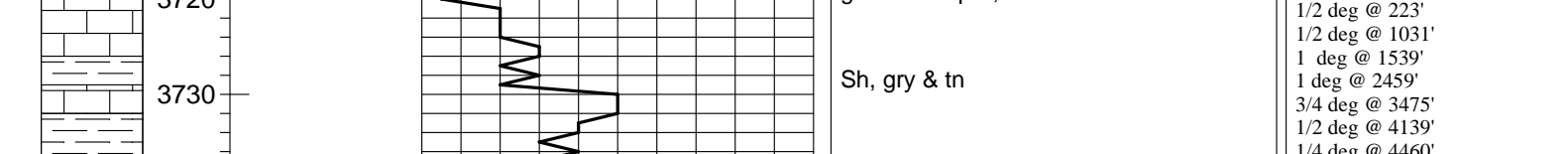
DIL **MEL**

DUQP **BHCS**



Remarks and Recommendations:
Production casing was set to further evaluate the #4 WWWM 'A' for possible production or water injection.
Thomas Funk
Petrolem Geologist

LEGEND



Lithology

DRILLING TIME IN MINUTES PER FOOT

Sample Descriptions

Remarks

Depth **3700**

Sh, tn & gry, md-sft

LS, wht-orm, f-xln, ool, sct foss, brittle, g& oomold por, NS

Sh, gry & tn

Sh, lt gry & tn, md-sft

Sh, gry & marrn, sft, silty

LS, tn, dns, v f-xln, trc foss, blocky

Sh, gry

LS, tn & crm, f-xln, foss, sm chalky, pr vis por, NS

LS, tn & gry, v f-xln, dns, trc foss

LS, crm-lt tn, f-xln, foss, v chalky, pr vis por, NS

LS, tn & wht, f-xln, chalky, trc ool, sft, pr vis por

LS, lt gry, dns, v f-xln, trc foss, mott

Sh, gry & tn, md-hrd

LS, tn, dns, f-xln, ool in prt, blocky, pr vis por

LS, crm-wht, f-xln, ool in prt, foss, v chalky, fr moldic por, NS

LS, crm-tn, f-xln, foss, sm chalky, v sct por, NS

LS, tn, v f-xln, foss, sm chty, brittle

LS, gry, dns, v f-xln, mott

Sh, drk gry

Sltstn, gry, v f-grn, silty in prt, mica

AA + Sh, drk gry, silty

LS, crm, f-xln, foss in prt, gran/dolo, pr vis int-xln por, NS

Sh, gry & tn

LS, lt gry, dns, micro-xln, mott in prt, trc foss

Sh, drk gry, md-hrd + LS, gry, dns, mott, argill

LS, crm-gry, f-xln, foss, trc moldic por, NSFO, no odor, trc blk stn

LS, tn, dns, v f-xln, trc foss, blocky

LS, crm, f-xln, dns, foss in prt, v chalky, sft

LS, lt gry, f-xln, dns, foss in prt, sm chty, hrd

Sh, blk, carb

Sh, gry, tn, & brn, md-sft

LS, crm-wht, f-xln, co-ool, foss, chalky, sct int-por part, NS

LS, crm-gry, f-xln, co-ool, mott, pr vis int-ool por, NS

Sh, gry, md-sft

LS, crm, f-xln, foss, trc ool, chalky, sft, pr vis por, NS

LS, crm-gry, f-xln, foss in prt, blocky, chty

Sh, gry, calc in prt

LS, tn, f-xln, foss, sm chalky, pr vis moldic por, NSFO, no odor, sct edge stn

LS, tn, dns, v f-xln, trc foss, hrd

LS, tn, dns, v f-xln, trc foss, blocky, hrd

LS, lt gry, micro-xln, v dns, mott

LS, crm, f-xln, dns, foss in prt, pr vis por, NSFO, no odor, pr vis stn

Sh, gry

LS, tn, dns, micro-xln, hrd, trc foss

LS, crm-tn, f-xln, foss, sct fossmold por, SSFO, fr odor, sct sat stn

LS, crm, dns, v f-xln, sm chalky, foss, pr vis por, NS

LS, tn, dns, micro-xln, chty in prt, trc foss, hrd

LS, tn, dns, micro-xln, trc foss, hrd

LS, tn-gry, dns, micro-xln, trc foss, chty in prt

Sh, blk, carb

Sh, grn & gry, md-sft

LS, crm, f-xln, foss, trc ool, sm chalky, pr to fr moldic & p pt por, SSFO, fr odor, fr sat stn

LS, tn, v f-xln, dns, trc foss, hrd

Sh, gry & blk

LS, crm-tn, f-xln, foss in prt, pr vis stn

Sh, rd, gry, and tn

LS, crm-tn & gry, dns, v f-xln, foss in prt, pr vis por, NS

LS, tn, dns, f-xln, tr ool, blocky, no vis por, NS

Sh, blk, carb

LS, crm-tn & gry, f-xln, foss, ool in prt, chalky, sct moldic por, NSFO, v silt odor, no vis stn

LS, crm, dns, v f-xln, trc foss, blocky

Sh, blk, carb

LS, tn-brn, dns, f-xln, foss in prt, sm gran, pr vis moldic por, NSFO, no odor, v sct stn

Dolo, tn, dns, v f-xln, trc foss, pr vis por, NS

Sh, gry & tn

LS, tn, dns, v f-xln, ool in prt, brittle

Sh, tn & rd, sft

Sh, tn, brn, & green, sft, sm mica

LS, tn-crm, dns, v f-xln, ool in prt, no vis por, NS

LS, lt gry, dns, micro-xln, trc ool, blocky

Sh, drk gry, tn, & rd

Sh, gry & brn, sft

LS, tn, dns, v f-xln, blocky, trc foss

LS, tn, dns, f-xln, foss, mott, pr vis por, pr vis stn

Sh, drk gry, sft

LS, crm-tn, f-xln, ool, foss in prt, sct int-por part, SSFO, silt odor, fw pcs w/sat stn

LS, tn, dns, v f-xln, tr foss & ool, blocky, pr vis por, NS

LS, lt gry, dns, micro-xln, trc foss, chty

Sh, blk

LS, tn, dns, f-xln, gran/dolo, foss in prt, sct p pt por, SSFO, silt odor, pr vis stn + Cht, lt gry, dns

LS, tn, dns, micro-xln, trc foss, chty

Sh, blk, carb

LS, tn & gry, f-xln, dns, ool in prt, v chalky, sct pr vis p pt por, NSFO, silt odor, sct drk stn

Sh, gry

LS, tn, dns, dns, micro-xln, chty, trc foss, hrd

Sh, gry & blk

LS, crm-tn & gry, f-xln, foss, sct fossmold por, SSFO, silt odor, sct sat stn

LS, tn, dns, v f-xln, trc foss, hrd, no vis por, NS

LS, crm-gry, f-xln, v chalky, sft, trc foss

Sh, drk gry & blk

Sh, gry, tn, & blk, md hrd

Sh, AA + SS, gry-wht, v f-grn, sb rd, v tile, argill

LS, tn, yell, & gry, sdy in prt, sft

LS, crm-gry, f-xln, ool in prt, sm v sdy, sft

LS, crm-gry, chiky, v f-xln, sm mott, trc foss & sd grns

LS, lt gry, dns, v f-xln, trc foss & ool, occas sd grn

LS, tn & gry, dns, micro-xln, chty in prt, tr sd grns

LS, crm-gry, dns, v f-xln, trc ool, blocky

LS, gry, dns, micro-xln, trc micro-ool, blocky

LS, crm-gry, v dns, micro-xln, trc foss, hrd

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-wht, f-xln, ool in prt, sm v sdy, sft

LS, crm-gry, f-xln, ool in prt, sm v sdy, sft

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-gry, chiky, v f-xln, sm mott, trc foss & sd grns

LS, lt gry, dns, v f-xln, trc foss & ool, occas sd grn

LS, tn & gry, dns, micro-xln, chty in prt, tr sd grns

LS, crm-gry, dns, v f-xln, trc ool, blocky

LS, gry, dns, micro-xln, trc micro-ool, blocky

LS, crm-gry, v dns, micro-xln, trc foss, hrd

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-wht, f-xln, ool in prt, sm v sdy, sft

LS, crm-gry, f-xln, ool in prt, sm v sdy, sft

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-gry, chiky, v f-xln, sm mott, trc foss & sd grns

LS, lt gry, dns, v f-xln, trc foss & ool, occas sd grn

LS, tn & gry, dns, micro-xln, chty in prt, tr sd grns

LS, crm-gry, dns, v f-xln, trc ool, blocky

LS, gry, dns, micro-xln, trc micro-ool, blocky

LS, crm-gry, v dns, micro-xln, trc foss, hrd

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-wht, f-xln, ool in prt, sm v sdy, sft

LS, crm-gry, f-xln, ool in prt, sm v sdy, sft

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-gry, chiky, v f-xln, sm mott, trc foss & sd grns

LS, lt gry, dns, v f-xln, trc foss & ool, occas sd grn

LS, tn & gry, dns, micro-xln, chty in prt, tr sd grns

LS, crm-gry, dns, v f-xln, trc ool, blocky

LS, gry, dns, micro-xln, trc micro-ool, blocky

LS, crm-gry, v dns, micro-xln, trc foss, hrd

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-wht, f-xln, ool in prt, sm v sdy, sft

LS, crm-gry, f-xln, ool in prt, sm v sdy, sft

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-gry, chiky, v f-xln, sm mott, trc foss & sd grns

LS, lt gry, dns, v f-xln, trc foss & ool, occas sd grn

LS, tn & gry, dns, micro-xln, chty in prt, tr sd grns

LS, crm-gry, dns, v f-xln, trc ool, blocky

LS, gry, dns, micro-xln, trc micro-ool, blocky

LS, crm-gry, v dns, micro-xln, trc foss, hrd

LS, crm-wht, f-xln, v dns, trc ool, chty in prt

LS, crm-wht, f-xln, ool in prt, sm v sdy, sft