

**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Prepared For: **Tug Hill Operations**

550 Bailey Ave STE 510  
Ft Worth TX 76107

ATTN: Winnie Scott/ Dave P

### **Cline #1-14**

#### **14-32s-15w Barber,KS**

Start Date: 2013.04.25 @ 07:51:21

End Date: 2013.04.25 @ 22:50:51

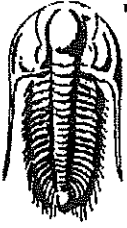
Job Ticket #: 52305                      DST #: 1

Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Tug Hill Operations  
14-32s-15w Barber,KS  
Cline #1-14  
DST # 1  
Viola  
2013.04.25



**TRILOBITE TESTING, INC.**

## DRILL STEM TEST REPORT

Tug Hill Operations  
550 Bailey Ave STE 510  
Ft Worth TX 76107

**14-32s-15w Barber, KS**

**Cline #1-14**

Job Ticket: 52305

DST#: 1

ATTN: Winnie Scott/ Dave P

Test Start: 2013.04.25 @ 07:51:21

### GENERAL INFORMATION:

Formation: **Viola**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 15:05:21

Time Test Ended: 22:50:51

Test Type: Conventional Bottom Hole (Initial)

Tester: Chris Staats

Unit No: 47

Interval: 4944.00 ft (KB) To 4994.00 ft (KB) (TVD)

Total Depth: 4994.00 ft (KB) (TVD)

Hole Diameter: 8.75 inches Hole Condition: Fair

Reference Elevations: 2021.00 ft (KB)

1998.00 ft (CF)

KB to GR/CF: 23.00 ft

**Serial #: 6773**

**Outside**

Press@RunDepth: 43.18 psig @ 4945.00 ft (KB)

Start Date: 2013.04.25

End Date:

2013.04.25

Start Time: 07:51:26

End Time:

22:50:51

Capacity: 8000.00 psig

Last Calib.: 2013.04.25

Time On Btm: 2013.04.25 @ 15:00:06

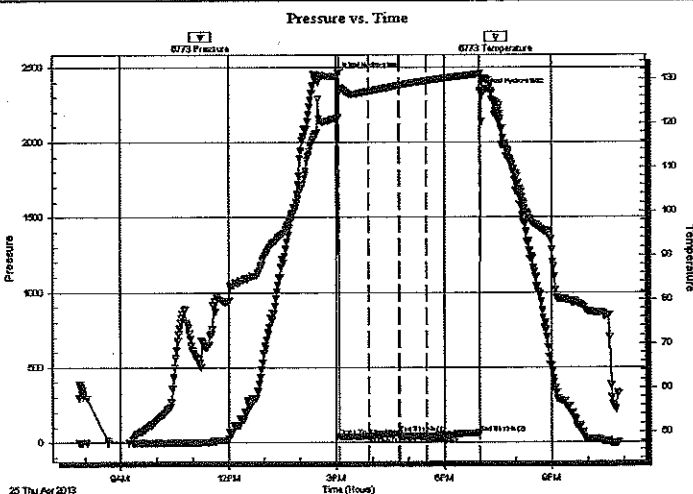
Time Off Btm: 2013.04.25 @ 19:01:06

TEST COMMENT: IF: Weak surface blow

IS: No blow back

FF: No blow

FS: No blow back



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2439.59	121.00	Initial Hydro-static
6	39.28	127.73	Open To Flow (1)
54	40.06	127.04	Shut-In(1)
106	58.74	128.39	End Shut-In(1)
107	42.00	128.45	Open To Flow (2)
150	43.18	129.45	Shut-In(2)
239	61.02	131.00	End Shut-In(2)
241	2330.74	131.23	Final Hydro-static

### Recovery

Length (ft)	Description	Volume (bbl)
10.00	MUD	0.05

### Gas Rates

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



**TRILOBITE  
TESTING, INC**

## DRILL STEM TEST REPORT

TOOL DIAGRAM

Tug Hill Operations

14-32s-15w Barber, KS

550 Bailey Ave STE 510  
Ft Worth TX 76107

Cline #1-14

Job Ticket: 52305

DST#: 1

ATTN: Winnie Scott/ Dave P

Test Start: 2013.04.25 @ 07:51:21

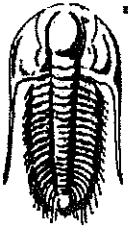
### Tool Information

Drill Pipe:	Length: 4377.00 ft	Diameter: 4.80 inches	Volume: 97.96 bbl	Tool Weight: 2200.00 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: 549.00 ft	Diameter: 2.25 inches	Volume: 2.70 bbl	Weight to Pull Loose: 155000.0 lb
			<u>Total Volume: 100.66 bbl</u>	Tool Chased 2.00 ft
Drill Pipe Above KB:	11.00 ft			String Weight: Initial 120000.0 lb
Depth to Top Packer:	4944.00 ft			Final 120000.0 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	50.00 ft			
Tool Length:	79.00 ft			
Number of Packers:	2	Diameter: 8.75 inches		

Tool Comments:

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4916.00	
Shut In Tool	5.00			4921.00	
Hydraulic tool	5.00			4926.00	
Jars	5.00			4931.00	
Safety Joint	3.00			4934.00	
Packer	5.00			4939.00	29.00 Bottom Of Top Packer
Packer	5.00			4944.00	
Stubb	1.00			4945.00	
Recorder	0.00	6773	Outside	4945.00	
Recorder	0.00	8676	Inside	4945.00	
Change Over Sub	1.00			4946.00	
Drill Pipe	31.00			4977.00	
Change Over Sub	1.00			4978.00	
Perforations	13.00			4991.00	
Bullnose	3.00			4994.00	50.00 Bottom Packers & Anchor

**Total Tool Length: 79.00**



**TRILOBITE  
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# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Tug Hill Operations

**14-32s-15w Barber,KS**

550 Bailey Ave STE 510  
Ft Worth TX 76107

**Cline #1-14**

Job Ticket: 52305

**DST#: 1**

ATTN: Winnie Scott/ Dave P

Test Start: 2013.04.25 @ 07:51:21

## 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: 49.00 sec/qt	Cushion Volume: bbl		
Water Loss: 3.99 in <sup>s</sup>	Gas Cushion Type:		
Resistivity: 0.00 ohm.m	Gas Cushion Pressure: psig		
Salinity: 8500.00 ppm			
Filter Cake: 0.00 inches			

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
10.00	MUD	0.049

Total Length: 10.00 ft      Total Volume: 0.049 bbl

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

Laboratory Name:      Laboratory Location:

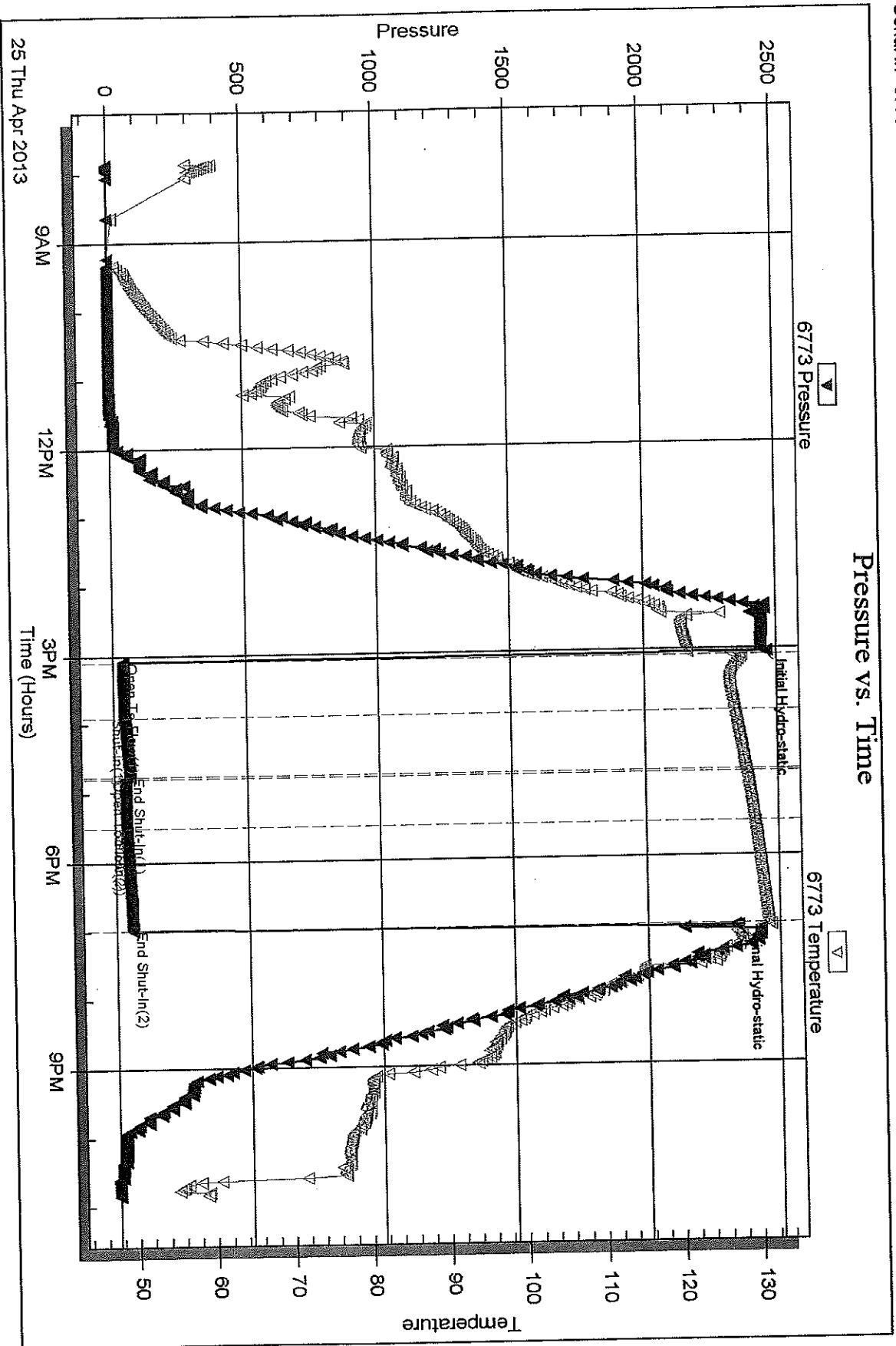
Recovery Comments:

Serial #: 6773

Outside Tug Hill Operations

Cline #1-14

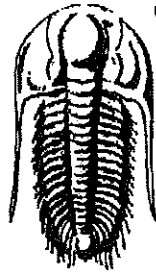
DST Test Number: 1



Triobite Testing, Inc

Ref. No: 52305

Printed: 2013.04.30 @ 08:33:51



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Prepared For: **Tug Hill Operations**

550 Bailey Ave STE 510  
Ft Worth TX 76107

ATTN: Winnie Scott/ Dave P

**Cline #1-14**

**14-32s-15w Barber,KS**

Start Date: 2013.04.27 @ 10:07:39

End Date: 2013.04.27 @ 22:51:24

Job Ticket #: 52306                      DST #: 2

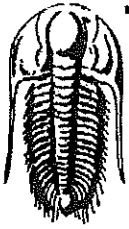
Trilobite Testing, Inc

PO Box 362 Hays, KS 67601

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

Printed: 2013.04.30 @ 08:32:47

Tug Hill Operations  
14-32s-15w Barber,KS  
Cline #1-14  
DST # 2  
Viola  
2013.04.27



**TRILOBITE  
TESTING, INC.**

## DRILL STEM TEST REPORT

Tug Hill Operations  
550 Bailey Ave STE 510  
Ft Worth TX 76107  
ATTN: Winnie Scott/ Dave P

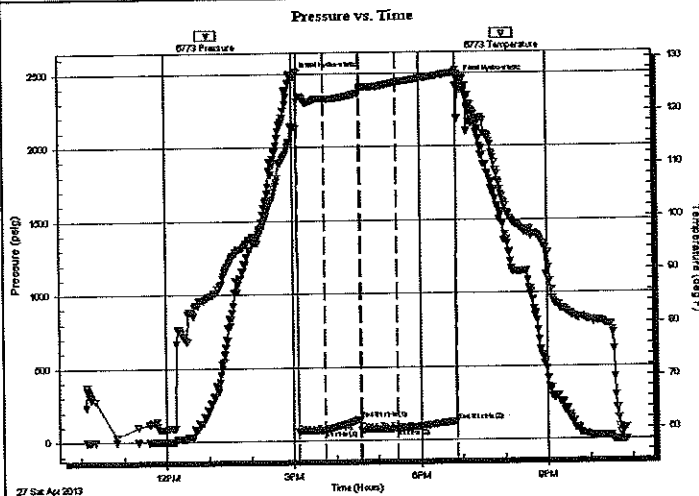
**14-32s-15w Barber,KS**  
**Cline #1-14**  
Job Ticket: 52306      **DST#: 2**  
Test Start: 2013.04.27 @ 10:07:39

### GENERAL INFORMATION:

Formation: **Viola**  
Deviated: No Whipstock: ft (KB)  
Time Tool Opened: 15:06:54  
Time Test Ended: 22:51:24  
Interval: **4979.00 ft (KB) To 5060.00 ft (KB) (TVD)**  
Total Depth: 4994.00 ft (KB) (TVD)  
Hole Diameter: 8.75 inches Hole Condition: Fair  
Test Type: Conventional Bottom Hole (Reset)  
Tester: Chris Staats  
Unit No: 47  
Reference Elevations: 2021.00 ft (KB)  
1998.00 ft (CF)  
KB to GR/CF: 23.00 ft

**Serial #: 6773**      **Outside**  
Press@RunDepth: 80.15 psig @ 4980.00 ft (KB)      Capacity: 8000.00 psig  
Start Date: 2013.04.27      End Date: 2013.04.27      Last Calib.: 2013.04.27  
Start Time: 10:07:44      End Time: 22:51:24      Time On Btm: 2013.04.27 @ 15:02:24  
Time Off Btm: 2013.04.27 @ 18:54:54

**TEST COMMENT:** IF: Weak blow 3/4"  
IS: No blow back  
FF: No blow  
FSI: No blow back



### PRESSURE SUMMARY

Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2480.56	116.95	Initial Hydro-static
5	63.28	121.96	Open To Flow (1)
43	75.25	122.28	Shut-In(1)
92	145.67	123.33	End Shut-In(1)
94	74.32	124.27	Open To Flow (2)
145	80.15	125.29	Shut-In(2)
229	126.82	127.12	End Shut-In(2)
233	2452.95	124.56	Final Hydro-static

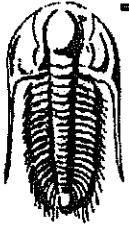
### Recovery

Length (ft)	Description	Volume (bbl)
20.00	MUD	0.10

\* Recovery from multiple tests

### Gas Rates

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



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# DRILL STEM TEST REPORT

Tug Hill Operations  
 550 Bailey Ave STE 510  
 Ft Worth TX 76107  
 ATTN: Winnie Scott/ Dave P

**14-32s-15w Barber, KS**  
**Cline #1-14**  
 Job Ticket: 52306      DST#: 2  
 Test Start: 2013.04.27 @ 10:07:39

## GENERAL INFORMATION:

Formation: **Viola**  
 Deviated: No Whipstock:      ft (KB)  
 Time Tool Opened: 15:06:54  
 Time Test Ended: 22:51:24

Test Type: Conventional Bottom Hole (Reset)  
 Tester: Chris Staats  
 Unit No: 47

Interval: **4979.00 ft (KB) To 5060.00 ft (KB) (TVD)**  
 Total Depth: 4994.00 ft (KB) (TVD)  
 Hole Diameter: 8.75 inches Hole Condition: Fair

Reference Elevations: 2021.00 ft (KB)  
 1998.00 ft (CF)  
 KB to GR/CF: 23.00 ft

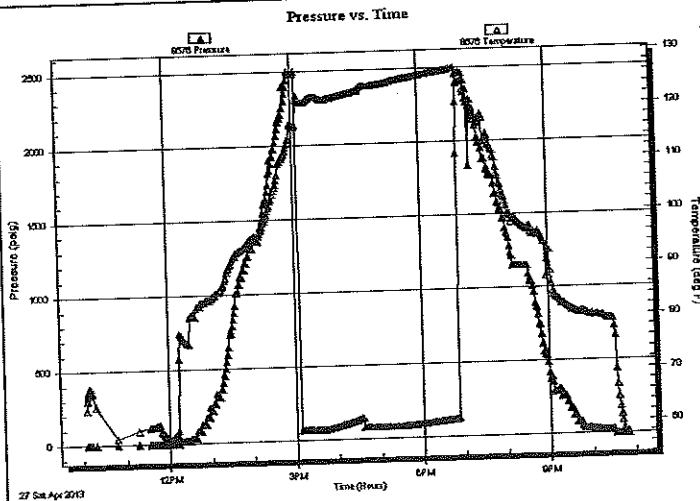
**Serial #: 8676**

Inside

Press@RunDepth:      psig @ 4980.00 ft (KB)  
 Start Date: 2013.04.27      End Date: 2013.04.27  
 Start Time: 10:04:59      End Time: 22:50:24

Capacity: 8000.00 psig  
 Last Calib.: 2013.04.27  
 Time On Btm:  
 Time Off Btm:

TEST COMMENT: IF: Weak blow 3/4"  
 IS: No blow back  
 FF: No blow  
 FSI: No blow back



## PRESSURE SUMMARY

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

## Recovery

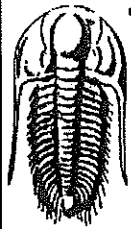
Length (ft)	Description	Volume (bbl)
20.00	MUD	0.10

\* Recovery from multiple tests

## Gas Rates

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





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TESTING, INC.**

## DRILL STEM TEST REPORT

TOOL DIAGRAM

Tug Hill Operations

14-32s-15w Barber,KS

550 Bailey Ave STE 510  
Ft Worth TX 76107

Cline #1-14

Job Ticket: 52306

DST#: 2

ATTN: Winnie Scott/ Dave P

Test Start: 2013.04.27 @ 10:07:39

### Tool Information

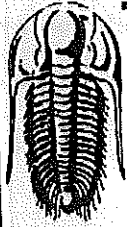
Drill Pipe:	Length: 4408.00 ft	Diameter: 4.80 inches	Volume: 98.66 bbl	Tool Weight: 2200.00 lb
Heavy Wt. Pipe:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 549.00 ft	Diameter: 2.25 inches	Volume: 2.70 bbl	Weight to Pull Loose: 160000.0 lb
			<u>Total Volume: 101.36 bbl</u>	Tool Chased 2.00 ft
Drill Pipe Above KB:	7.00 ft			String Weight: Initial 120000.0 lb
Depth to Top Packer:	4979.00 ft			Final 120000.0 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	81.00 ft			
Tool Length:	110.00 ft			
Number of Packers:	2	Diameter: 8.75 inches		

Tool Comments:

### Tool Description

Tool Description	Length (ft)	Serial No.	Position	Depth (ft)	Accum. Lengths
Change Over Sub	1.00			4951.00	
Shut In Tool	5.00			4956.00	
Hydraulic tool	5.00			4961.00	
Jars	5.00			4966.00	
Safety Joint	3.00			4969.00	
Packer	5.00			4974.00	29.00 Bottom Of Top Packer
Packer	5.00			4979.00	
Stubb	1.00			4980.00	
Recorder	0.00	6773	Outside	4980.00	
Recorder	0.00	8676	Inside	4980.00	
Change Over Sub	1.00			4981.00	
Drill Pipe	62.00			5043.00	
Change Over Sub	1.00			5044.00	
Perforations	13.00			5057.00	
Bullnose	3.00			5060.00	81.00 Bottom Packers & Anchor

**Total Tool Length: 110.00**



**TRIOBITE  
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# DRILL STEM TEST REPORT

**FLUID SUMMARY**

Tug Hill Operations  
 550 Bailey Ave STE 510  
 Ft Worth TX 76107  
 ATTN: Winnie Scott/ Dave P

**14-32s-15w Barber,KS**  
**Cline #1-14**  
 Job Ticket: 52306      DST#: 2  
 Test Start: 2013.04.27 @ 10:07:39

## Mud and Cushion Information

Mud Type: Gel Chem  
 Mud Weight: 9.00 lb/gal  
 Viscosity: 54.00 sec/qt  
 Water Loss: 4.00 in<sup>3</sup>  
 Resistivity: 0.00 ohm.m  
 Salinity: 9000.00 ppm  
 Filter Cake: 0.00 inches

Cushion Type:  
 Cushion Length: ft  
 Cushion Volume: bbl  
 Gas Cushion Type:  
 Gas Cushion Pressure: psig

Oil API:  
 Water Salinity: deg API ppm

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
20.00	MUD	0.098

Total Length: 20.00 ft      Total Volume: 0.098 bbl

Num Fluid Samples: 0  
 Laboratory Name:  
 Recovery Comments:

Num Gas Bombs: 0      Serial #:  
 Laboratory Location:

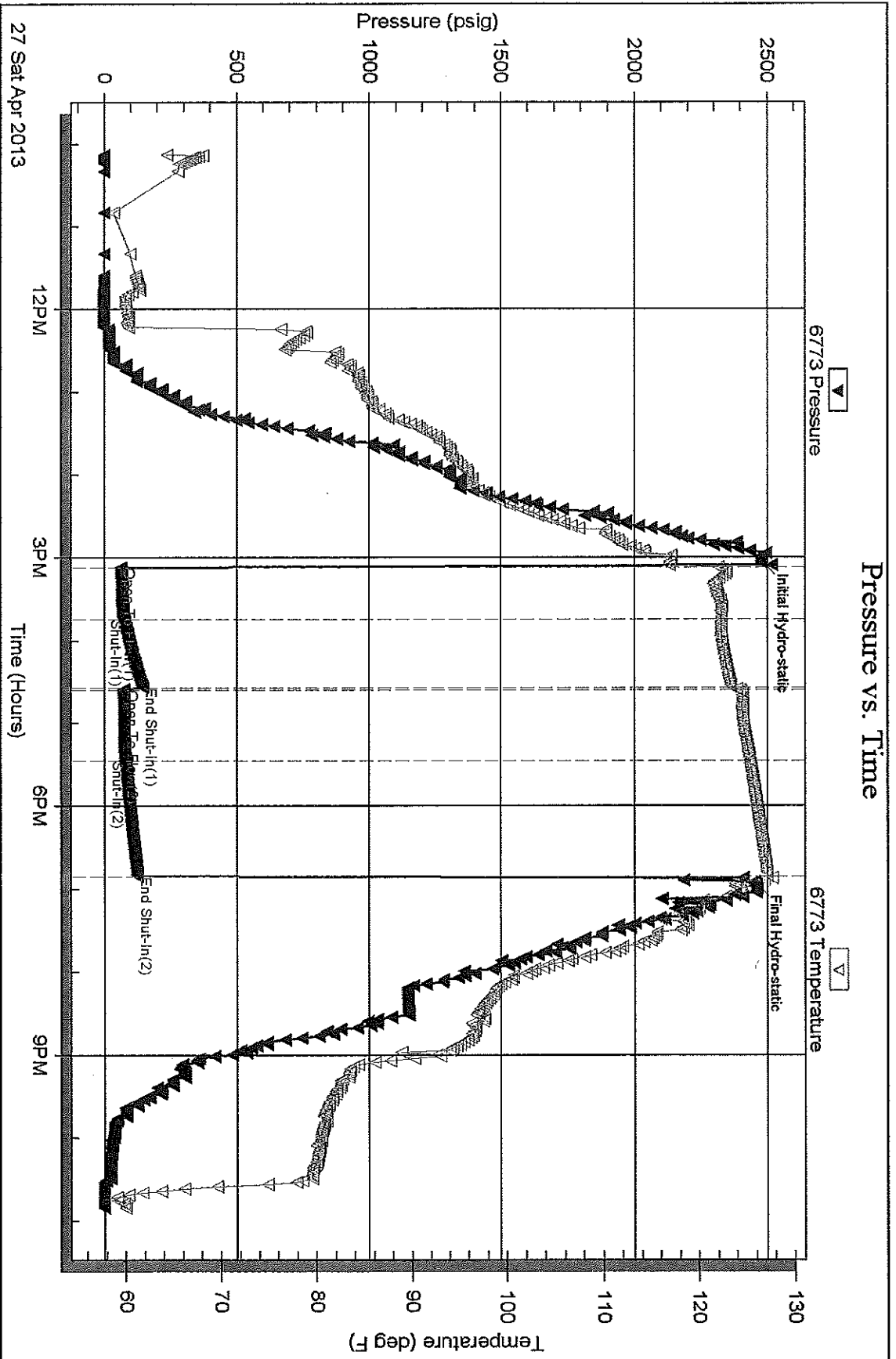
Serial #: 6773

Outside Tug Hill Operations

Cline #1-14

DST Test Number: 2

### Pressure vs. Time



Triobite Testing, Inc

Ref. No: 52306

Printed: 2013.04.30 @ 08:32:50

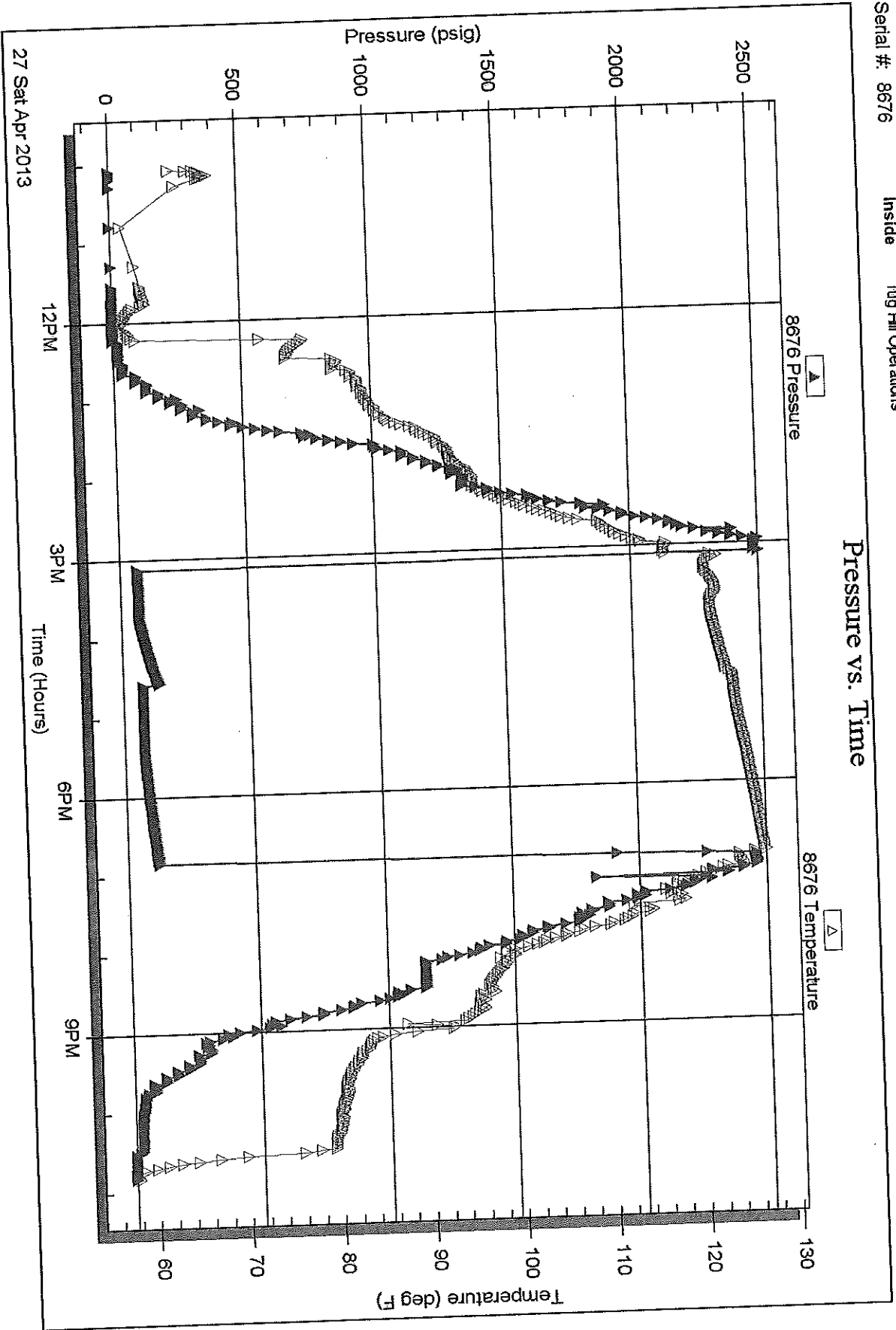
Serial #: 8676

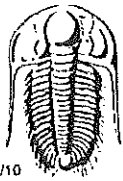
Inside Tug Hill Operations

Cline #1-14

DST Test Number: 2

### Pressure vs. Time





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 52305

Well Name & No. Cline # 1-14 Test No. 1 Date 4-25-13  
 Company Tug Hill operations Elevation \_\_\_\_\_ KB \_\_\_\_\_ GL \_\_\_\_\_  
 Address 550 Bailey Ave STE 510 Ft Worth TX 76107  
 Co. Rep / Geo. Winnic SCOTT Rig Patterson #172  
 Location: Sec. 14 Twp. 32 Rge. 15 Co. Barber State KCS

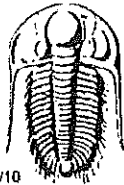
Interval Tested 4944 - 4994 Zone Tested Viola  
 Anchor Length 50' Drill Pipe Run 4377 Mud Wt. 9.2  
 Top Packer Depth 4939 Drill Collars Run 549 Vis 49  
 Bottom Packer Depth 4944 Wt. Pipe Run 0 WL 4.0  
 Total Depth 4994 Chlorides 8500 ppm System LCM 0  
 Blow Description IF: weak surface blow  
ISI: NO blow back  
FF: NO blow  
FSL: NO blow back

Well Name Cline 1-14  
 Rec 10' Feet of MUD AFE No. 13-1095 %gas \_\_\_\_\_ %oil \_\_\_\_\_ %water \_\_\_\_\_ %mud \_\_\_\_\_  
 Rec \_\_\_\_\_ Feet of \_\_\_\_\_ ACCNT No. 830.24 %gas \_\_\_\_\_ %oil \_\_\_\_\_ %water \_\_\_\_\_ %mud \_\_\_\_\_  
 Rec \_\_\_\_\_ Feet of \_\_\_\_\_ Name D. Patterson %gas \_\_\_\_\_ %oil \_\_\_\_\_ %water \_\_\_\_\_ %mud \_\_\_\_\_  
 Rec \_\_\_\_\_ Feet of \_\_\_\_\_ Signature [Signature] %gas \_\_\_\_\_ %oil \_\_\_\_\_ %water \_\_\_\_\_ %mud \_\_\_\_\_  
 Rec \_\_\_\_\_ Feet of \_\_\_\_\_ %gas \_\_\_\_\_ %oil \_\_\_\_\_ %water \_\_\_\_\_ %mud \_\_\_\_\_  
 Rec Total 10 BHT 130 Gravity \_\_\_\_\_ API RW \_\_\_\_\_ @ \_\_\_\_\_ °F Chlorides \_\_\_\_\_ ppm  
 (A) Initial Hydrostatic 2439  Test 1,225<sup>00</sup> 1250 T-On Location 6:55  
 (B) First Initial Flow 39  Jars 250<sup>00</sup> T-Started 7:31  
 (C) First Final Flow 40  Safety Joint 75<sup>00</sup> T-Open 15:05  
 (D) Initial Shut-In 58  Circ Sub \_\_\_\_\_ T-Pulled 19:00  
 (E) Second Initial Flow 42  Hourly Standby 6hrs 5.75h 575 T-Out 22:45  
 (F) Second Final Flow 43  Mileage 110 miles 170<sup>50</sup> Comments \_\_\_\_\_  
 (G) Final Shut-In 61  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 2330  Straddle \_\_\_\_\_  
 Initial Open 30  Shale Packer \_\_\_\_\_  Ruined Shale Packer \_\_\_\_\_  
 Initial Shut-In 60  Extra Packer 2 8" packers  Ruined Packer \_\_\_\_\_  
 Final Flow 45  Extra Recorder \_\_\_\_\_ Sub Total 0  
 Final Shut-In 98  Day Standby \_\_\_\_\_ Total 2970.50  
 Accessibility 150<sup>00</sup> MP/DST Disc't \_\_\_\_\_  
 Sub Total 2970.50

Approved By [Signature]

Our Representative Chris Stott

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. 52306

Well Name & No. Cline #1-14 Test No. 2 Date 4-27-13  
 Company Tug Hill operations Elevation 2021 KB 1998 GL  
 Address 550 Bailey Ave SFE 510 FT Worth TX 76107  
 Co. Rep / Geo. Winnie Scott / David Patterson Rig Patterson #172  
 Location: Sec. 14 Twp. 32 Rge. 1S Co. Barber State KS

Interval Tested 4979 - 5060 Zone Tested Viola  
 Anchor Length 81' Drill Pipe Run 4408 Mud Wt. 9.3  
 Top Packer Depth 4974 Drill Collars Run 549 Vis 54  
 Bottom Packer Depth 4979 Wt. Pipe Run 0 WL 4.0  
 Total Depth 5060 Chlorides 9,000 ppm System LCM 0

Blow Description IF: weak blow 3/4"  
LSI: NO blow back  
FF: NO blow  
FSI: NO blow back

Rec	Feet of	%gas	%oil	%water	%mud
Rec <u>20'</u>	Feet of <u>MUD</u>	%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 20' BHT 182° Gravity - API RW - @ - F Chlorides - ppm  
 (A) Initial Hydrostatic 3480  Test 1325<sup>00</sup> 1350 T-On Location 9:00  
 (B) First Initial Flow 63  Jars 250<sup>00</sup> T-Started 10:07  
 (C) First Final Flow 75  Safety Joint 75<sup>00</sup> T-Open 15:06  
 (D) Initial Shut-In 145  Circ Sub T-Pulled 18:50  
 (E) Second Initial Flow 74  Hourly Standby 4 hrs 2.75h 275 T-Out 22:50  
 (F) Second Final Flow 80  Mileage 110 miles 170<sup>50</sup> Comments \_\_\_\_\_  
 (G) Final Shut-In 126  Sampler \_\_\_\_\_  
 (H) Final Hydrostatic 245<sup>2</sup>  Straddle \_\_\_\_\_  Ruined Shale Packer \_\_\_\_\_  
 Shale Packer \_\_\_\_\_  Ruined Packer \_\_\_\_\_  
 Extra Packer 8" packers 500<sup>00</sup>  Extra Copies \_\_\_\_\_

Initial Open 30  Extra Recorder \_\_\_\_\_ Sub Total 341.67  
 Initial Shut-In 60  Day Standby 1d 10.25h Total 3112.17  
 Final Flow 45  Accessibility 150<sup>00</sup> MP/DST Disc't \_\_\_\_\_  
 Final Shut-In 90 Sub Total 2770.50

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