



## DRILL STEM TEST REPORT

Prepared For: **King Oil Operations**

1746 150th Ave  
Ellis, KS 67637

ATTN: Jason Alm

### **Engel-Boyd Unit 1-12**

### **12-12s-32w Logan,KS**

Start Date: 2017.02.07 @ 14:10:00

End Date: 2017.02.07 @ 20:47:45

Job Ticket #: 61311                      DST #: 1

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

Printed: 2017.02.09 @ 10:29:13



**TRILOBITE  
TESTING, INC**

# DRILL STEM TEST REPORT

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

ATTN: Jason Alm

Job Ticket: 61311

**DST#: 1**

Test Start: 2017.02.07 @ 14:10:00

## GENERAL INFORMATION:

Formation: **LKC - H-J**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 17:04:15

Time Test Ended: 20:47:45

Test Type: Conventional Bottom Hole (Initial)

Tester: Bradley Walter

Unit No: 78

**Interval: 4180.00 ft (KB) To 4276.00 ft (KB) (TVD)**

Reference Elevations: 2988.00 ft (KB)

Total Depth: 4276.00 ft (KB) (TVD)

2980.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

**Serial #: 8845 Outside**

Press@RunDepth: 18.73 psig @ 4181.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.02.07 End Date: 2017.02.07

Last Calib.: 2017.02.07

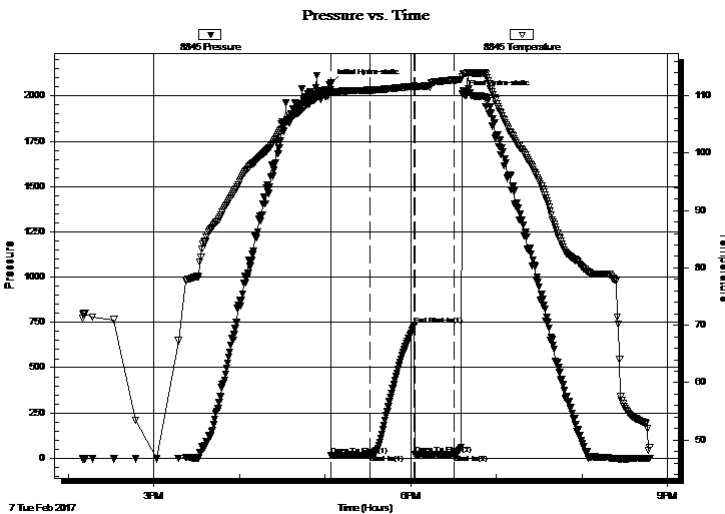
Start Time: 14:10:05 End Time: 20:47:44

Time On Btm: 2017.02.07 @ 17:04:00

Time Off Btm: 2017.02.07 @ 18:36:00

**TEST COMMENT:** IF: 1/2" blow , receded to surface.  
IS: No return.  
FF: No blow Flushed tool. blow died  
FS: Pulled test.

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2070.35	111.09	Initial Hydro-static
1	14.50	110.47	Open To Flow (1)
27	18.73	110.98	Shut-In(1)
59	735.81	111.68	End Shut-In(1)
60	20.01	111.59	Open To Flow (2)
87	23.46	112.73	Shut-In(2)
92	2009.84	113.38	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
20.00	Mud 100m (Oil spots in tool)	0.16

## Gas Rates

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





**TRILOBITE  
TESTING, INC**

# DRILL STEM TEST REPORT

**TOOL DIAGRAM**

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

Job Ticket: 61311

**DST#: 1**

ATTN: Jason Alm

Test Start: 2017.02.07 @ 14:10:00

## Tool Information

Drill Pipe:	Length: 3880.00 ft	Diameter: 3.80 inches	Volume: 54.43 bbl	Tool Weight:	2000.00 lb
Heavy Wt. Pipe:	Length: 312.00 ft	Diameter: 2.90 inches	Volume: 2.55 bbl	Weight set on Packer:	25000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose:	62000.00 lb
			<u>Total Volume: 56.98 bbl</u>	Tool Chased	0.00 ft
Drill Pipe Above KB:	32.00 ft			String Weight: Initial	52000.00 lb
Depth to Top Packer:	4180.00 ft			Final	52000.00 lb
Depth to Bottom Packer:	ft				
Interval between Packers:	96.00 ft				
Tool Length:	116.00 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	20.00 Bottom Of Top Packer
Packer	4.00			4180.00	
Stubb	1.00			4181.00	
Recorder	0.00	8365	Inside	4181.00	
Recorder	0.00	8845	Outside	4181.00	
Perforations	27.00			4208.00	
Change Over Sub	1.00			4209.00	
Drill Pipe	63.00			4272.00	
Change Over Sub	1.00			4273.00	
Bullnose	3.00			4276.00	96.00 Bottom Packers & Anchor

**Total Tool Length: 116.00**



**TRILOBITE  
TESTING, INC**

# DRILL STEM TEST REPORT

**FLUID SUMMARY**

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

Job Ticket: 61311

**DST#: 1**

ATTN: Jason Alm

Test Start: 2017.02.07 @ 14:10:00

## Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

0 deg API

Mud Weight: 9.00 lb/gal

Cushion Length:

ft

Water Salinity:

0 ppm

Viscosity: 53.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 5.59 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2000.00 ppm

Filter Cake: 1.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
20.00	Mud 100m (Oil spots in tool)	0.163

Total Length: 20.00 ft      Total Volume: 0.163 bbl

Num Fluid Samples: 0

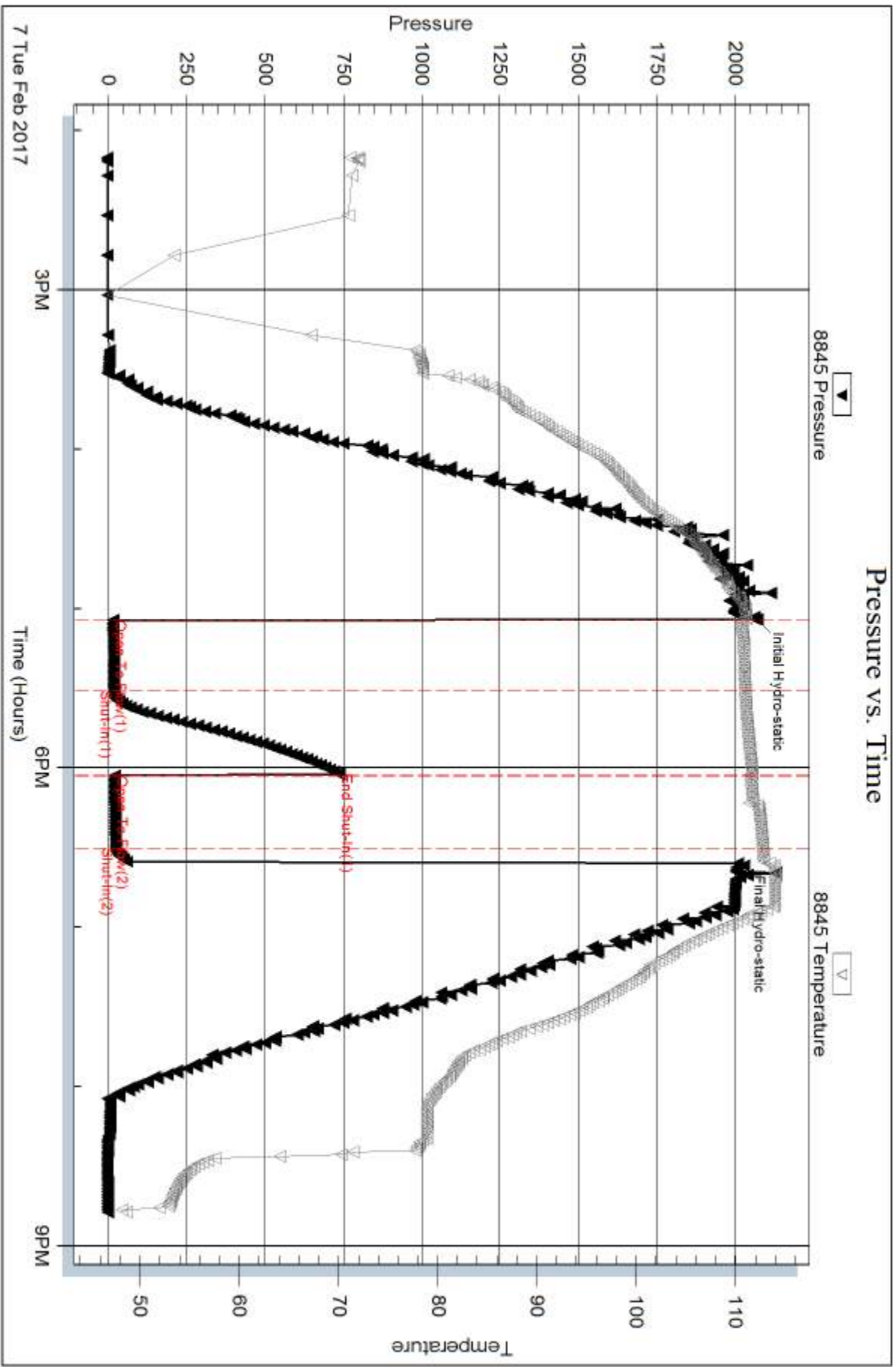
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:



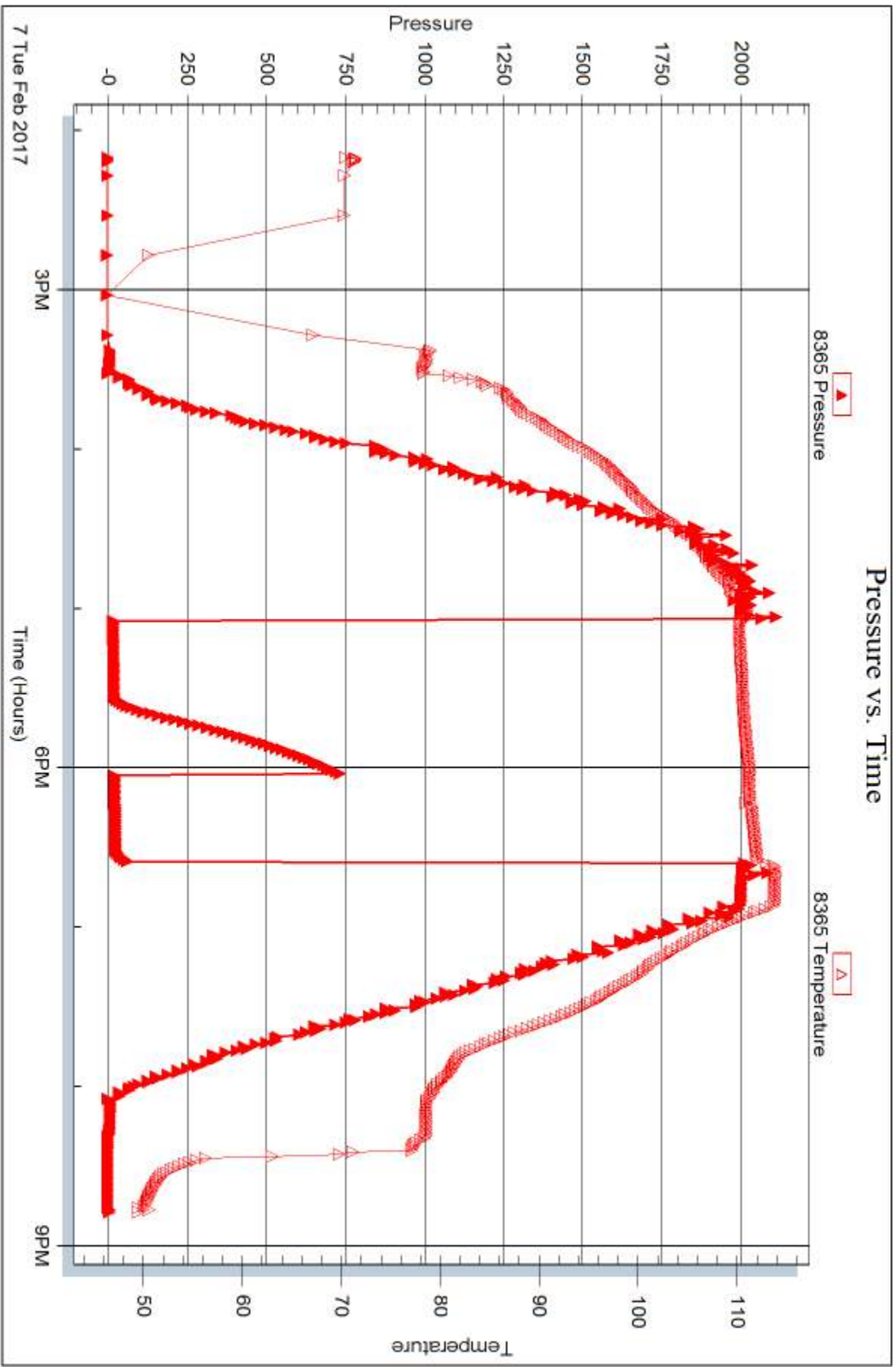
Serial #: 8365

Inside

King Oil Operations

Engel-Boyd Unit 1-12

DST Test Number: 1





## DRILL STEM TEST REPORT

Prepared For: **King Oil Operations**

1746 150th Ave  
Ellis, KS 67637

ATTN: Jason Alm

### **Engel-Boyd Unit 1-12**

### **12-12s-32w Logan,KS**

Start Date: 2017.02.08 @ 23:27:00

End Date: 2017.02.09 @ 09:45:00

Job Ticket #: 61312                      DST #: 2

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

Printed: 2017.02.09 @ 10:24:46





**TRILOBITE  
TESTING, INC**

# DRILL STEM TEST REPORT

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

ATTN: Jason Alm

Job Ticket: 61312

**DST#: 2**

Test Start: 2017.02.08 @ 23:27:00

## GENERAL INFORMATION:

Formation: **Johnson**

Deviated: No Whipstock: ft (KB)

Time Tool Opened: 02:20:00

Time Test Ended: 09:45:00

Test Type: Conventional Bottom Hole (Reset)

Tester: Bradley Walter

Unit No: 78

**Interval: 4545.00 ft (KB) To 4607.00 ft (KB) (TVD)**

Reference Elevations: 2988.00 ft (KB)

Total Depth: 4607.00 ft (KB) (TVD)

2980.00 ft (CF)

Hole Diameter: 7.88 inches Hole Condition: Good

KB to GR/CF: 8.00 ft

**Serial #: 8365**

**Inside**

Press@RunDepth: 191.05 psig @ 4546.00 ft (KB)

Capacity: 8000.00 psig

Start Date: 2017.02.08

End Date:

2017.02.09

Last Calib.:

2017.02.09

Start Time: 23:27:05

End Time:

09:45:00

Time On Btm:

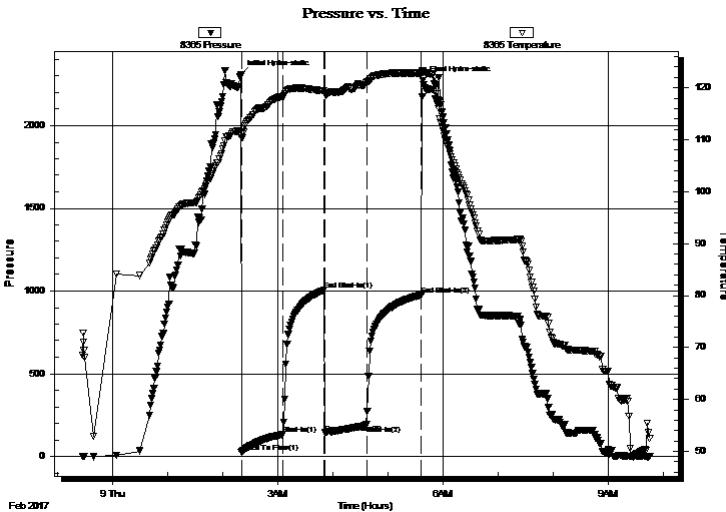
2017.02.09 @ 02:19:45

Time Off Btm:

2017.02.09 @ 05:38:00

**TEST COMMENT:** IF: BOB @ 18 min.  
IS: 1 1/4" return, receded to 3/4".  
FF: BOB @ 20 min.  
FS: 3 1/2" blow .

## PRESSURE SUMMARY



Time (Min.)	Pressure (psig)	Temp (deg F)	Annotation
0	2305.40	111.22	Initial Hydro-static
1	24.18	110.36	Open To Flow (1)
45	131.85	118.31	Shut-In(1)
91	1004.80	119.42	End Shut-In(1)
91	143.11	119.02	Open To Flow (2)
137	191.05	121.07	Shut-In(2)
197	975.96	122.87	End Shut-In(2)
199	2270.30	123.05	Final Hydro-static

## Recovery

Length (ft)	Description	Volume (bbl)
250.00	gmco 35g 30m 35o	1.84
190.00	go 10g 90o	2.25
0.00	630' GIP	0.00

\* Recovery from multiple tests

## Gas Rates

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



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**TESTING, INC.**

**DRILL STEM TEST REPORT**

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

Job Ticket: 61312

**DST#: 2**

ATTN: Jason Alm

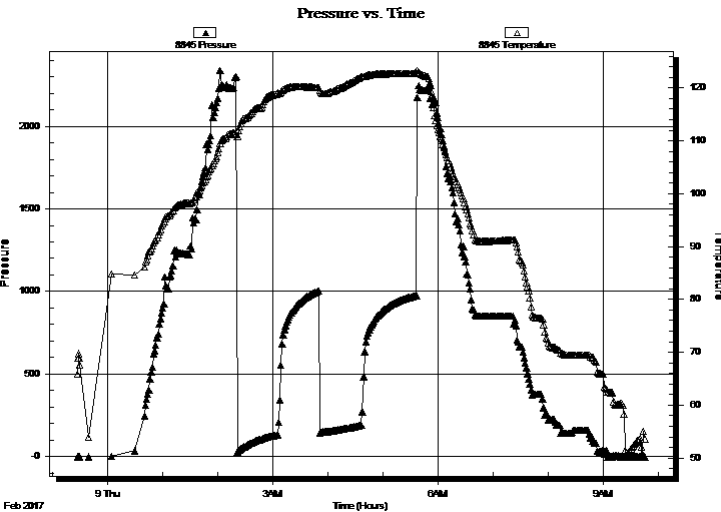
Test Start: 2017.02.08 @ 23:27:00

**GENERAL INFORMATION:**

Formation: **Johnson**  
 Deviated: No Whipstock: ft (KB)  
 Test Type: Conventional Bottom Hole (Reset)  
 Time Tool Opened: 02:20:00 Tester: Bradley Walter  
 Time Test Ended: 09:45:00 Unit No: 78  
**Interval: 4545.00 ft (KB) To 4607.00 ft (KB) (TVD)**  
 Reference Elevations: 2988.00 ft (KB)  
 Total Depth: 4607.00 ft (KB) (TVD) 2980.00 ft (CF)  
 Hole Diameter: 7.88 inches Hole Condition: Good KB to GR/CF: 8.00 ft

**Serial #: 8845 Outside**  
 Press@RunDepth: psig @ 4546.00 ft (KB) Capacity: 8000.00 psig  
 Start Date: 2017.02.08 End Date: 2017.02.09 Last Calib.: 1899.12.30  
 Start Time: 23:27:05 End Time: 09:45:00 Time On Btm:  
 Time Off Btm:

**TEST COMMENT:** IF: BOB @ 18 min.  
 IS: 1 1/4" return, receded to 3/4".  
 FF: BOB @ 20 min.  
 FS: 3 1/2" blow .



**PRESSURE SUMMARY**

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

**Recovery**

Length (ft)	Description	Volume (bbl)
250.00	gmco 35g 30m 35o	1.84
190.00	go 10g 90o	2.25
0.00	630' GIP	0.00

**Gas Rates**

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

\* Recovery from multiple tests



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TESTING, INC.**

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**TOOL DIAGRAM**

King Oil Operations

**12-12s-32w Logan,KS**

1746 150th Ave  
Ellis, KS 67637

**Engel-Boyd Unit 1-12**

Job Ticket: 61312

**DST#: 2**

ATTN: Jason Alm

Test Start: 2017.02.08 @ 23:27:00

## Tool Information

Drill Pipe:	Length: 4233.00 ft	Diameter: 3.80 inches	Volume: 59.38 bbl	Tool Weight: 2000.00 lb
Heavy Wt. Pipe:	Length: 312.00 ft	Diameter: 2.75 inches	Volume: 2.29 bbl	Weight set on Packer: 25000.00 lb
Drill Collar:	Length: 0.00 ft	Diameter: 0.00 inches	Volume: 0.00 bbl	Weight to Pull Loose: 67000.00 lb
			<u>Total Volume: 61.67 bbl</u>	Tool Chased 3.00 ft
Drill Pipe Above KB:	20.00 ft			String Weight: Initial 54000.00 lb
Depth to Top Packer:	4545.00 ft			Final 56000.00 lb
Depth to Bottom Packer:	ft			
Interval between Packers:	62.00 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			4526.00	
Shut In Tool	5.00			4531.00	
Hydraulic tool	5.00			4536.00	
Packer	5.00			4541.00	20.00 Bottom Of Top Packer
Packer	4.00			4545.00	
Stubb	1.00			4546.00	
Recorder	0.00	8365	Inside	4546.00	
Recorder	0.00	8845	Outside	4546.00	
Perforations	25.00			4571.00	
Change Over Sub	1.00			4572.00	
Drill Pipe	31.00			4603.00	
Change Over Sub	1.00			4604.00	
Bullnose	3.00			4607.00	62.00 Bottom Packers & Anchor

**Total Tool Length: 82.00**



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**Engel-Boyd Unit 1-12**

Job Ticket: 61312

**DST#: 2**

ATTN: Jason Alm

Test Start: 2017.02.08 @ 23:27:00

## Mud and Cushion Information

Mud Type: Gel Chem

Cushion Type:

Oil API:

25 deg API

Mud Weight: 10.00 lb/gal

Cushion Length:

ft

Water Salinity:

ppm

Viscosity: 50.00 sec/qt

Cushion Volume:

bbbl

Water Loss: 7.19 in<sup>3</sup>

Gas Cushion Type:

Resistivity: ohm.m

Gas Cushion Pressure:

psig

Salinity: 2500.00 ppm

Filter Cake: 1.00 inches

## Recovery Information

Recovery Table

Length ft	Description	Volume bbl
250.00	gmco 35g 30m 35o	1.837
190.00	go 10g 90o	2.251
0.00	630' GIP	0.000

Total Length: 440.00 ft

Total Volume: 4.088 bbl

Num Fluid Samples: 0

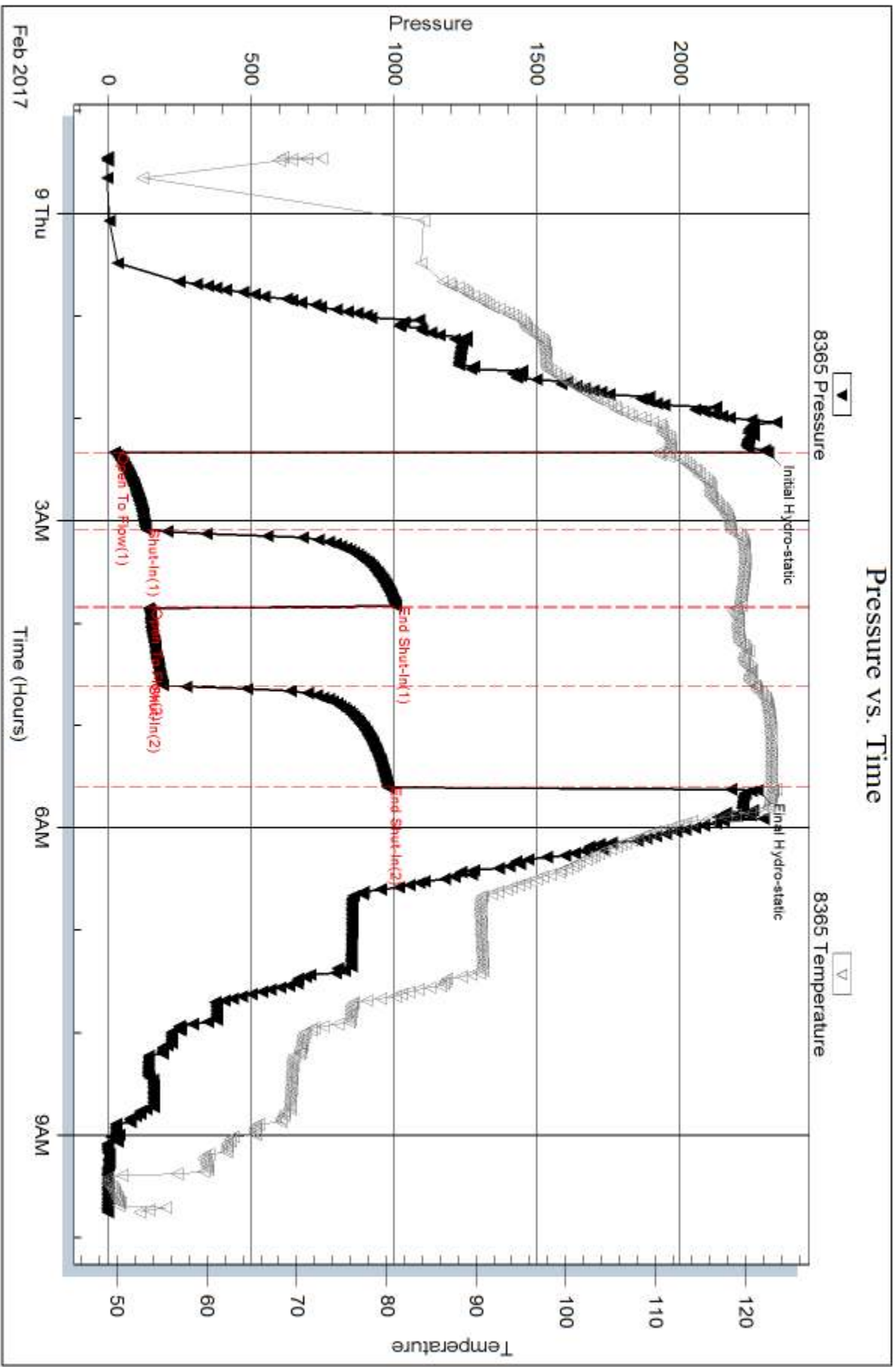
Num Gas Bombs: 0

Serial #:

Laboratory Name:

Laboratory Location:

Recovery Comments:

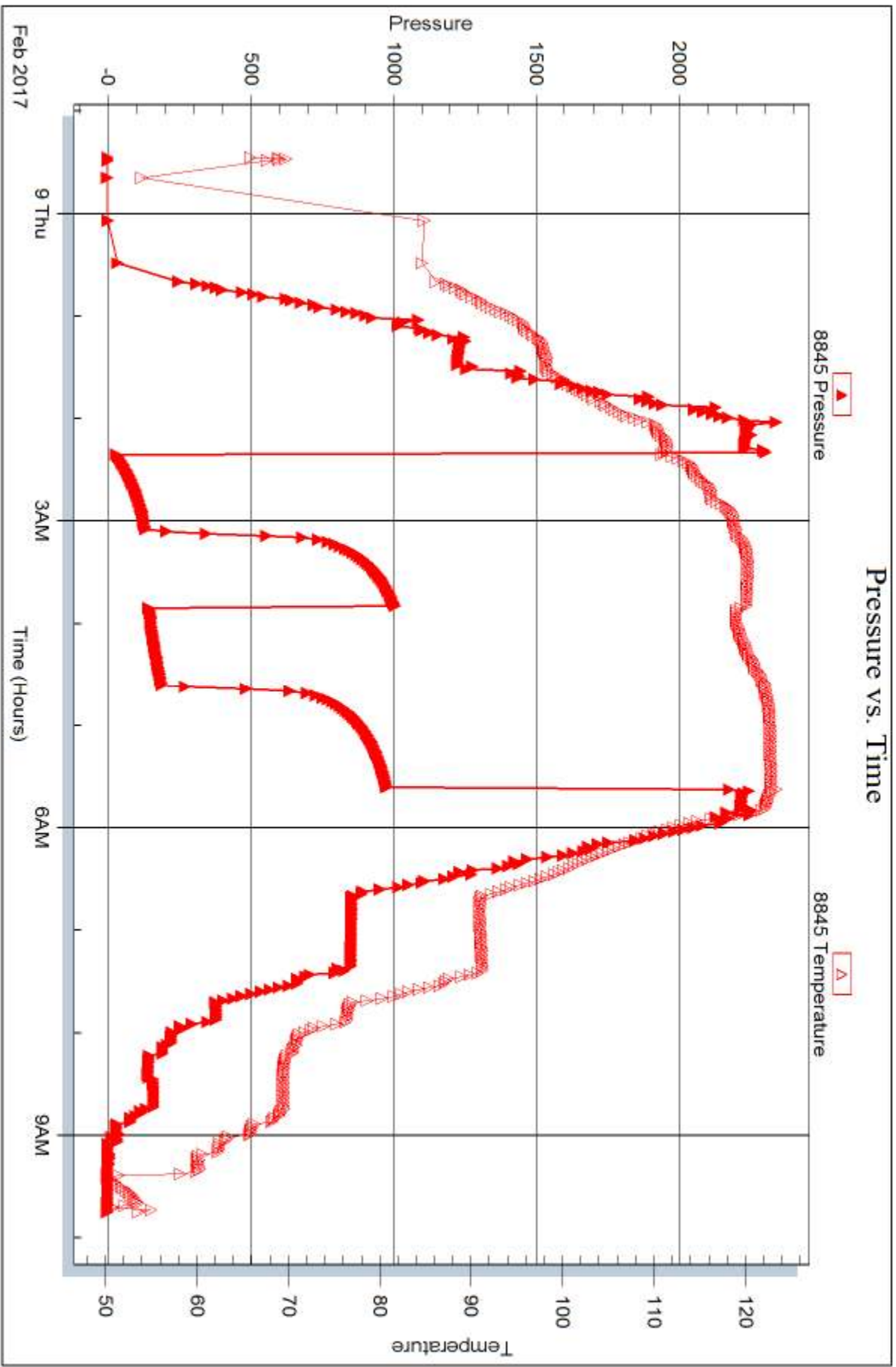


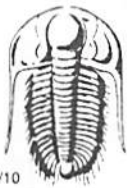
Serial #: 8845

Outside King Oil Operations

Engel-Boyd Unit 1-12

DST Test Number: 2





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. 61311

4/10

Well Name & No. Engel-Boyd Unit #1-12 Test No. 1 Date 2/07/17  
 Company King Oil Operators Elevation 2988 KB 2980 GL  
 Address 1746 150<sup>th</sup> Ave Ells, Ks 67637  
 Co. Rep / Geo. Jason Alin Rig Discovery 1  
 Location: Sec. 12 Twp. 12S Rge. 32W Co. Logan State Ks

Interval Tested 4180 - 4276 Zone Tested LKC H, I, J  
 Anchor Length 96 Drill Pipe Run 3880 Mud Wt. 9.1  
 Top Packer Depth 4175 Drill Collars Run — Vis 53  
 Bottom Packer Depth 4180 Wt. Pipe Run 312 WL 5.6  
 Total Depth 4276 Chlorides 2,000 ppm System LCM 4#

Blow Description IF 1/2" blow recorded to surface  
ISI No return.  
PF No blow Flushed tool, blow checked  
FST Pulled Test

Rec	Feet of	%gas	%oil	%water	%mud
<u>20</u>	<u>mud</u>			<u>100</u>	
	<u>oil spots in tool</u>				

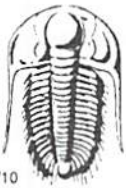
Rec Total 20 BHT 116 Gravity — API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2070  Test 1150 T-On Location 1045  
 (B) First Initial Flow 15  Jars — T-Started 1410  
 (C) First Final Flow 19  Safety Joint — T-Open 1702  
 (D) Initial Shut-In 736  Circ Sub N/C T-Pulled 1830  
 (E) Second Initial Flow 20  Hourly Standby — T-Out 2047  
 (F) Second Final Flow 23  Mileage 85 RT 63.75 Comments —  
 (G) Final Shut-In —  Sampler —  
 (H) Final Hydrostatic 2010  Straddle —  Ruined Shale Packer —  
 Shale Packer —  Ruined Packer —  
 Extra Packer —  Extra Copies —  
 Initial Open 30  Extra Recorder — Sub Total 0  
 Initial Shut-In 30  Day Standby — Total 1213.75  
 Final Flow Flush  Accessibility — MP/DST Disc't —  
 Final Shut-In Pull  Sub Total 1213.75

Approved By \_\_\_\_\_ Our Representative [Signature]

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





# TRILOBITE TESTING INC.

1515 Commerce Parkway • Hays, Kansas 67601

## Test Ticket

NO. **61312**

4/10

Well Name & No. Engel Boyd Unit #1-12 Test No. 2 Date 2/09/2017  
 Company King Oil Operations Elevation 2985 KB 2950 GL  
 Address 1746 150<sup>th</sup> Ave Ellis, ks 67637  
 Co. Rep / Geo. Jason Alm Rig Discovery 1  
 Location: Sec. 12 Twp. 12s Rge. 32w Co. Logan State KS

Interval Tested 4545 4607 Zone Tested Johnson  
 Anchor Length 62 Drill Pipe Run 4233 Mud Wt. 9.5  
 Top Packer Depth 4540 Drill Collars Run 312 Vis 50  
 Bottom Packer Depth 4545 Wt. Pipe Run 312 WL 7.2  
 Total Depth 4607 Chlorides 2500 ppm System LCM 8 #

Blow Description IF BOB @ 15 min.  
ISF No 1 1/4" return, receded to 3/4"  
FF BOB @ 18 min.  
FSI 3 1/2" return, receded to 2 3/4"

Rec	Feet of	%gas	%oil	%water	%mud
<u>190</u>	<u>60</u>	<u>10</u>	<u>90</u>		
<u>250</u>	<u>6100</u>	<u>35</u>	<u>35</u>		<u>50</u>
	<u>630</u>	<u>GIP</u>			

Rec Total 440 BHT 122 Gravity 25 API RW — @ — °F Chlorides — ppm

(A) Initial Hydrostatic 2305  Test 1150 T-On Location 1945  
 (B) First Initial Flow 24 ~~Test~~ NO T-Started 2327  
 (C) First Final Flow 132  Safety Joint T-Open 0221  
 (D) Initial Shut-In 1005  Circ Sub 1/c T-Pulled 0521  
 (E) Second Initial Flow 143  Hourly Standby 4hrs 320 T-Out 0945 2/09  
 (F) Second Final Flow 191  Mileage 85 RT 63.75 Comments unexpected short trip  
 (G) Final Shut-In 976  Sampler  Ruined Shale Packer  
 (H) Final Hydrostatic 2270  Straddle  Ruined Packer 320  
 Shale Packer  Extra Copies  
 Extra Packer  Extra Recorder Sub Total 320  
 Extra Recorder  Day Standby Total 1533.75 + 320  
 Day Standby  Accessibility MP/DST Disc't  
 Accessibility Sub Total 1533.75

Approved By \_\_\_\_\_ Our Representative

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.